

EDS PHASE 2 STEAM SERIES SOP

ATTACHMENT 9

Pueblo Chemical Depot

Pueblo, Colorado

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ATTACHMENT 9
EDS PHASE 2 STEAM SERIES SOP

SOP Number/Version	Title	Reference Location
EDS Phase 2 Steam Series Units SOP Rev 1 December 1, 2014	Standing Operating Procedure for Explosive Destruction System Phase 2 Steam Series Units	Attachment 2, Attachment 3, Appendix 6-1

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**U.S. ARMY
CHEMICAL MATERIALS ACTIVITY**

**RECOVERED CHEMICAL MATERIEL
DIRECTORATE**

**STANDING OPERATING PROCEDURE
FOR
EXPLOSIVE DESTRUCTION SYSTEM
PHASE 2 STEAM SERIES UNITS**

**FINAL
Revision 1**

1 December 2014

Requests for this document must be referred to EDS P2 Steam Series System Manager, ATTN: AMSCM-RC, Building E-4586, Hoadley Road, Aberdeen Proving Ground-South, Maryland 21010-5424.

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FOR
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PHASE 2 STEAM SERIES UNITS**

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STANDING OPERATING PROCEDURE

	Amendment		Lasers
X	Chemical Agent	X	Industrial
	Biological/Toxin		Pyrotechnics
	Radiation	X	Other (specify: <u>Explosives</u>)

RECOVERED CHEMICAL MATERIEL DIRECTORATE

**Title: STANDING OPERATING PROCEDURE FOR EXPLOSIVE DESTRUCTION
SYSTEM PHASE 2 STEAM SERIES UNITS**

Submitted by:

System Manager

Concurred by:

Risk Management Directorate: _____

ECBC Safety and Health Office: _____

Director, CB Operations: _____

Approved By:

Director, Recovered Chemical Materiel

Date

SOP TITLE: *EXPLOSIVE DESTRUCTION SYSTEM PHASE 2 STEAM SERIES UNITS*

EDS CREW SUPERVISOR'S STATEMENT

1. The EDS Crew Supervisor will sign this statement:
 - a. When first assigned as Crew Supervisor of this operation
 - b. When an approved change or revision is made
 - c. At least annually during continuing operations
 - d. After an absence from the job in excess of 15 consecutive workdays
 - e. When starting an intermittent operation that has not been conducted within the last 90 days.

2. I have personally reviewed each of the procedural steps of the SOP and have determined that the procedure can be performed safely, efficiently, and in an environmentally acceptable manner. I have verified that the operators have been trained in their designated areas and have instructed them to follow the SOP without deviation. In the event of an accident, I will notify the Installation Emergency Operations Center, my supervisor, and the U.S. Army Chemical Materials Activity (CMA) Risk Management Directorate.

SIGNATURE

DATE

_____	_____
_____	_____
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_____	_____
_____	_____

SOP TITLE: *EXPLOSIVE DESTRUCTION SYSTEM PHASE 2 STEAM SERIES UNITS*

EDS OPERATOR'S STATEMENT

1. The EDS Operator will sign this statement:
 - a. When first assigned to this operation
 - b. When an approved change or revision is made
 - c. At least annually during continuing operations
 - d. After an absence from the job in excess of 15 consecutive workdays
 - e. When starting an intermittent operation that has not been conducted within the last 90 days.
2. I have read, or have had read to me, and understand the general and specific safety and environmental requirements, personnel, work description, and inspection requirements necessary to accomplish each operation. I have been trained and agree to abide by these instructions throughout this assignment to the operation.
3. I will contact the EDS Crew Supervisor if the operational procedures specified in this SOP cannot be achieved or if the procedures seem to be inadequate in any way.
4. This operation or applicable steps are to be applied as required by the EDS Manager or his/her designee. All environmental, safety, and health requirements shall be adhered to in this procedure.

SIGNATURE

DATE

CHANGE
NO. 0

EDS System Manager, P2 Steam
Series Units
Aberdeen Proving Ground, Maryland
Date:

**STANDING OPERATING PROCEDURE
FOR
EXPLOSIVE DESTRUCTION SYSTEM PHASE 2 STEAM SERIES UNITS
CHANGE TRANSMITTAL PAGE**

This SOP is updated as follows:

1. File this sheet in front of the SOP for reference.
2. This change is a result of new operating procedures, site-specific criteria, illustrations, equipment, or supplies.
3. New or updated text and illustrations are indicated by a vertical bar in the outer margin of the page.
4. Remove old pages and insert new pages as indicated below.

Remove Pages

Insert Pages

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**STANDING OPERATING PROCEDURE FOR
EXPLOSIVE DESTRUCTION SYSTEM PHASE 2 STEAM SERIES UNITS**

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED DATA.

LIST OF EFFECTIVE PAGES

Dates of issue for original and changed pages are:

Final, 1 August 2014
Final Rev 1, 1 December 2014

TOTAL NUMBER OF PAGES IS 468 CONSISTING OF THE FOLLOWING:

Page No.	*Change No.	Page No.	*Change No.
EDS Cover Page	0	5-14-1 thru 5-14-6	0
Approval Page	0	5-15-1 thru 5-15-22	0
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EDS Operator's Statement (Continued)	0	5-19-1 thru 5-19-12	0
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Cover Page Section 1	0	A-1 thru A-6	0
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5-6-1 thru 5-6-12	0	Cover Page Annex I	0
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* Zero in this column indicates an original page.

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**STANDING OPERATING PROCEDURE
FOR
EXPLOSIVE DESTRUCTION SYSTEM PHASE 2 STEAM SERIES UNITS
REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), located in Annex A, directly to:

EDS P2 Steam Series System Manager
ATTN: AMSCM-RC
Building E-4585
Hoadley Road
Aberdeen Proving Ground-South, Maryland 21010-5424

A reply will be furnished to you.

Requests for this document must be referred to EDS P2 Steam Series System Manager, ATTN: AMSCM-RC, Building E-4585, Hoadley Road, Aberdeen Proving Ground-South, Maryland 21010-5424.

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**SECTION 1
EXPLOSIVE DESTRUCTION SYSTEM (EDS)
PHASE 2 STEAM SERIES UNITS
STATEMENT OF WORK**

SECTION 1
EXPLOSIVE DESTRUCTION SYSTEM (EDS)
PHASE 2 STEAM SERIES UNITS
STATEMENT OF WORK

1. Statement of Work: Provide for receipt, handling, and preparation for treatment of chemical filled munitions. Dispose of chemical filled munitions by explosively opening the munition, detonating any explosive components, and treating the chemical fill or re-containerizing the fills.

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SECTION 2
EDS PHASE 2 STEAM SERIES UNITS
ADDITIONAL NONSTANDARD RESPONSIBILITIES

SECTION 2
EDS PHASE 2 STEAM SERIES UNITS
ADDITIONAL NONSTANDARD RESPONSIBILITIES

1. Additional Nonstandard Responsibilities:

a. Supervisor's Responsibility:

(1) Verify all U.S. personnel are registered in the occupational health program; received required training under 29 Code of Federal Regulations 1910.120, Hazardous Waste Operations and Emergency Response; and are certified as EDS Chemical Operators or EDS Explosive Operators.

(2) Verify U.S. personnel are informed of their rights under 29 Code of Federal Regulations 1910.1200, Hazard Communication Standard, and are instructed in the proper use of Material Safety Data Sheets (MSDSs)/Safety Data Sheets (SDSs) for the chemicals involved.

(3) Verify a copy of this Standing Operating Procedure (SOP) and all directives, manuals, permits, and other documentation dealing with the operation are available and signed at the worksite.

(4) Verify adequate medical support is arranged prior to the start of any operation.

b. Operators' Responsibility: Operators must report to their supervisor any violations of the operating procedures and/or conditions or circumstances that are unusual and could adversely impact safety and health.

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**SECTION 3
EDS PHASE 2 STEAM SERIES UNITS
MATERIALS**

**SECTION 3
EDS PHASE 2 STEAM SERIES UNITS
MATERIALS**

1. Materials to Be Used:

- a. Personnel decontamination solution:
 - (1) Soap
 - (2) Water.
- b. Equipment and material decontaminant solution(s). See Procedure 3.
- c. Agents involved. Munitions with suspect chemical agent fills:
 - (1) Blister type agents.

2. Tools and Equipment to Be Used:

- a. EDS
- b. Items listed in equipment, tools, and supplies section of each procedure
- c. First-aid kit
- d. Means to transport personnel to the supporting medical facility (government vehicle only)
- e. Personal protective equipment (PPE) in accordance with (IAW) Annex G, PPE Levels
- f. Communications equipment (see Health and Safety Plan [HASP], if applicable).

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**SECTION 4
EDS PHASE 2 STEAM SERIES UNITS
HAZARDS**

SECTION 4
EDS PHASE 2 STEAM SERIES UNITS HAZARDS

1. Hazards Involved:

a. Refer to the System Hazard Analysis and individual MSDSs/SDSs for hazards of chemical agents.

b. Specific Hazards.

(1) Munitions. The EDS is equipped to handle the following types of munitions:

(a) Size. From a 75-millimeter (mm) projectile to an 8-inch projectile.

(b) Weight. Up to 72 pounds of chemical fill.

(c) Configuration. With or without explosive components including those deemed inappropriate to handle by conventional storage and disposal methods (may have in-line firing components with or without positive safeties, unapproved render-safe procedures, be safe only for hand-carrying to a disposal location, or have fills that may polymerize rapidly).

(d) Energetics. With bursters having approximately 8-pound trinitrotoluene (TNT) equivalent explosives, or less, whereby the total net explosive weight including the shaped charges does not exceed the approved 9-pounds net explosive weight of the EDS vessel.

Note

Chemical fills listed in the following paragraph are to be processed IAW Table 3-1 of this SOP.

(e) Fills. Chemical agent: mustards (H, HS, HD, HQ, HT, H+DA, H+PD).

2. Safety Requirements: See HASP, if applicable.

a. Ventilation. The EDS is not equipped with a chemical, biological, and radiological filter system.

b. Monitoring Requirements. Monitoring will be conducted IAW the Monitoring Concept Plan and Site Monitoring Plan.

c. Clothing. PPE will be worn IAW Annex G.

d. First-Aid and Firefighting Equipment:

- (1) Fire extinguishers will be located beside the EDS.
- (2) Approved eyewash capable of providing 15 minutes of flushing will be available onsite.
- (3) First-aid kits will be available onsite.

e. Special Precautions:

- (1) Net explosive weight limits will not be exceeded for the EDS.
- (2) A decontamination apparatus will be provided IAW the support agreement.
- (3) Equipment and tools will be identified, marked, and stored in a suitable place away from items that are not used in a toxic environment.

3. Remarks:

- a. The checklists for establishing the EDS site provide some factors to consider when selecting the operational site.
- b. Refer to the EDS HASP, if applicable, for detailed Personnel Decontamination Station (PDS) and air monitoring setup procedures.
- c. The checklist for EDS equipment setup specifies major activities to be accomplished. To find detailed procedures for equipment and systems setup, refer to the EDS Operations and Maintenance (O&M) Manual and this EDS SOP, as necessary.
- d. The sequence of the setup procedures for equipment may vary depending on the number of operator personnel and the instructions that they receive from the EDS Crew Supervisor.
- e. The operations explained in this SOP direct the trained explosive operators in preparing a munition(s) for processing in the EDS. Preparation of the munition(s) includes transferring custody of the munition(s) to the EDS team, moving the munition(s), removing the munition overpack (if one is present), and assembling the munition(s) holder.
- f. The operator will receive custody of the munition(s) and complete the appropriate paperwork involved in taking custody of the munition(s). If the munition(s) is overpacked, it is placed into a hazardous waste catch tray before being removed from the overpack. Once the munition(s) is removed from the overpack, its condition is evaluated for safety. It is then photographed and moved to the munition loading table

for munition(s) holder assembly. If the munition(s) is not overpacked, it is photographed and moved directly to the munition loading table for munition(s) holder assembly.

g. The munition(s) is placed into the munition(s) holder; the shaped charges are emplaced and connected; the munition(s) holder is completed; the munition(s) holder (now containing the munition) is loaded into the EDS containment vessel; and all explosive connections are routed through the containment vessel door.

h. Any hazardous waste created while preparing the munition(s) for processing in the EDS is sampled and packaged in a hazardous waste container.

i. The procedures in this SOP are based on normal testing expectations. If a situation not covered by this SOP is encountered, the operator(s) must notify the EDS Crew Supervisor for further guidance. The EDS supervisor may direct the operators to follow procedures in the SOP or may propose a deviation from the normal operating procedures in the SOP to the system manager in order to proceed with the test and eliminate the threat posed by the hazardous munition(s).

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**SECTION 5
EDS PHASE 2 STEAM SERIES UNITS
PROCEDURES**

**SECTION 5
EDS PHASE 2 STEAM SERIES UNITS
PROCEDURES**

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PROCEDURE 1 CHECKLISTS FOR ESTABLISHING THE EDS SITE

These checklists shall be used when establishing the EDS site. The site consists of three zones: Exclusion Zone, Contamination Reduction Zone, and Support Zone.

Figure 1-1 shows a generic layout for the EDS site. When a site safety plan or destruction plan exists for a specific site, those documents will serve as the primary guide for establishing the EDS site.

1.0 **USE** the following attached checklists as guides when establishing the EDS site:

- Table 1-1. Checklist for Selecting the EDS Site
- Table 1-2. Checklist for Establishing the Site for EDS Operations
- Table 1-3. Checklist for Establishing the EDS and Supporting Equipment.

Procedure 1

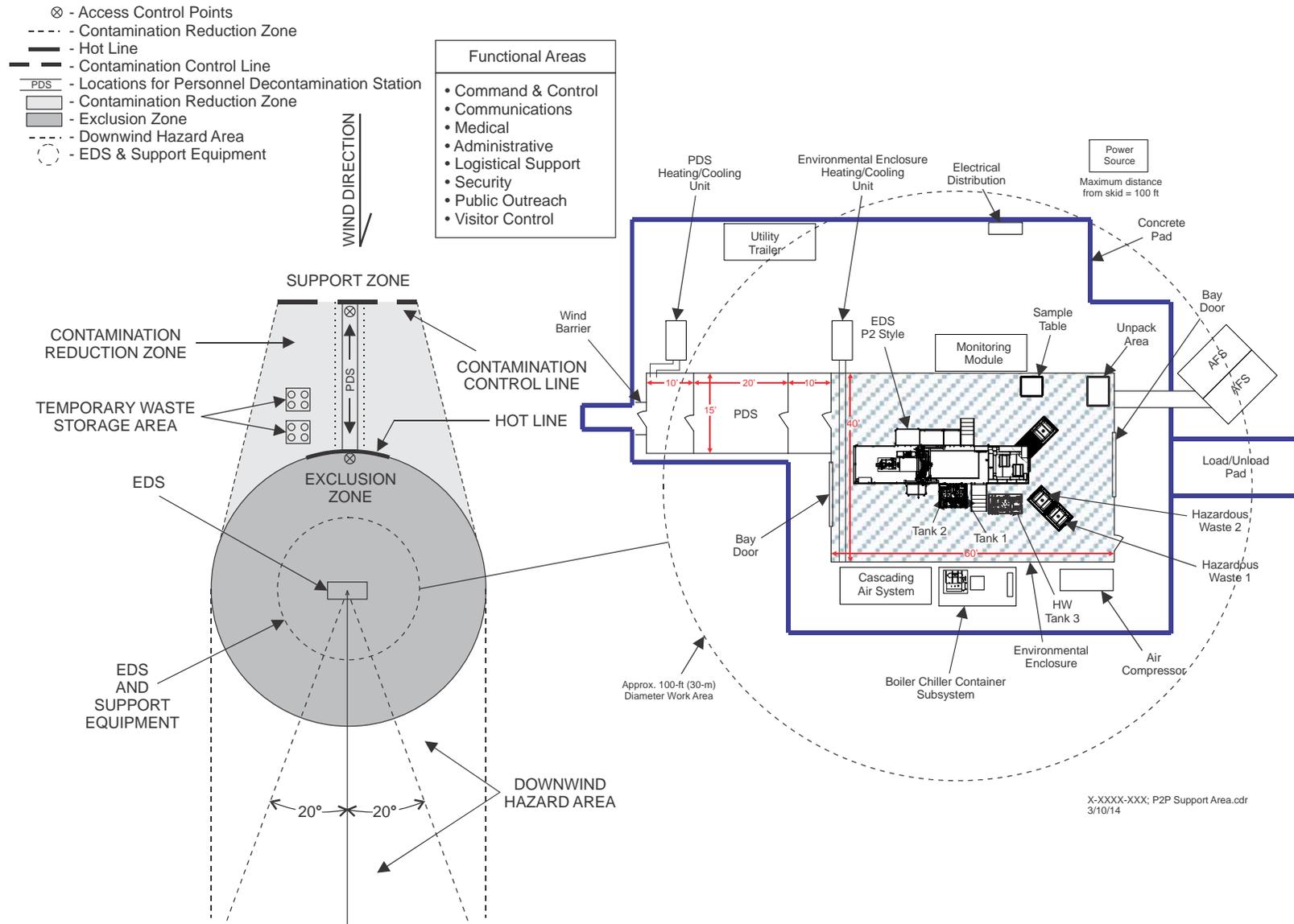


Figure 1-1. Generic Layout for the EDS Site

- 1.1 The EDS site is not a fixed size or place. The purpose of this checklist (Table 1-1) is to describe some factors to consider when selecting an adequate site.

Table 1-1. Checklist for Selecting the EDS Site

No.		Yes	No
1.	OBTAIN site map of operations area.		
2.	CONDUCT onsite survey of operations site.		
3.	NOTE topographical features, prevailing wind direction based on established meteorological conditions, drainage, and location of buildings, containers, impoundments, pits, ponds, and tanks.		
4.	SELECT location that: (a) Is level and allows for elimination of physical hazards (b) Allows for setup of waste staging areas, equipment storage areas, Personnel Decontamination Station, temporary structures for long-term operations (if required), Exclusion Zone, Contamination Reduction Zone, and Support Zone (c) Provides adequate illumination for work activities (d) Is near an adequate electrical power source, potable water supply, and utilities to support administrative areas (e) Allows controlled access to Contamination Reduction Zone and Exclusion Zone.		
5.	OBTAIN approval for site use.		

- 1.2 The purpose of this checklist (Table 1-2) is to describe some factors to consider when establishing the site for EDS operations.

Note

See Figure 1-2 for a generic layout of the EDS Site Exclusion Zone.

Table 1-2. Checklist for Establishing the Site for EDS Operations

No.	EXCLUSION ZONE	Yes	No
1.	DETERMINE size of the Exclusion Zone.		
2.	MARK Exclusion Zone (fence, tape, signs, etc.).		
3.	OBTAIN approval for the size and location of Exclusion Zone.		
4.	ESTABLISH worksite that will support the weight of the EDS Trailer; waste collection, removal, and staging; munitions unpack and preparation; Firing System setup; and Helium Supply and Leak Detection Subsystem setup.		
5.	ESTABLISH Access Control Point.		
6.	ESTABLISH a hot line boundary between Exclusion Zone and Contamination Reduction Zone.		
CONTAMINATION REDUCTION ZONE			
7.	ESTABLISH Contamination Reduction Zone upwind of Exclusion Zone.		
8.	ESTABLISH the Contamination Reduction Zone within the area between the Exclusion Zone and the boundary of Support Zone.		
9.	ESTABLISH Personnel Decontamination Station.		
10.	ESTABLISH Access Control Point.		
11.	ESTABLISH suitable waste staging area and Personnel Decontamination Station operations.		
12.	VERIFY Contamination Reduction Zone is organized to facilitate emergency response, equipment resupply, sample packaging, small forklift and hauling equipment, and containerization of the water and other liquids that were used during decontamination.		
SUPPORT ZONE			
13.	ESTABLISH Support Zone upwind of Contamination Reduction Zone.		

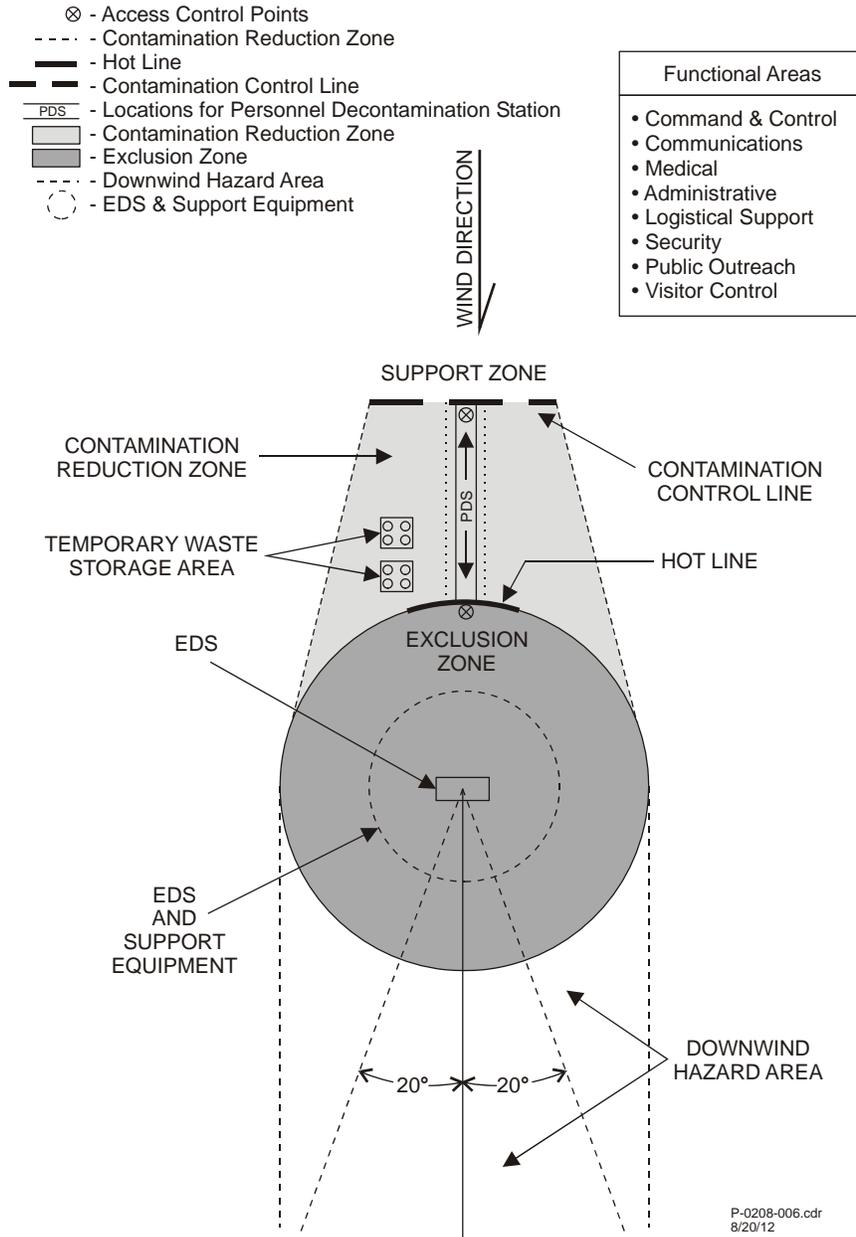


Figure 1-2. Generic Exclusion Zone Layout

- 1.3 The purpose of the following checklist (Table 1-3) is to specify the prerequisites for establishing the EDS and supporting equipment for EDS operations.

Notes

EDS may be located in a structure, facility, or open area. If possible, provide shelter over the EDS Trailer to protect the operators and equipment from the environment and to prevent run-on or accumulation of rainwater in the sumps.

If located in an open area, EDS supporting equipment should be located within a 15-meter radius from the center of the EDS Trailer. If located within a facility or structure, then the site shall be large enough to offer uncluttered workspace. Refer to Figures 1-3, 1-4, and 1-5 for layout of the EDS and supporting equipment.

Table 1-3. Checklist for Establishing the EDS and Supporting Equipment

No.	SET UP EDS AND SUPPORTING EQUIPMENT	Yes	No
1.	PRE-POSITION a portable/collapsible impermeable surface barrier large enough on which to pull the EDS Trailer. Fabricated secondary containment berms may be used around individual items if a large portable/collapsible berm is not available.		
2.	ARRANGE connections for water and 480-volt, 3-phase, 200-ampere, Delta-connection electrical power for operation.		
3.	SET UP location for reagent storage.		
4.	COORDINATE with Monitoring support.		
5.	SET UP spill response supplies, kits, and storage drums.		
6.	SET UP air compressor within 100 feet of EDS Trailer.		
PRE-POSITION FIRING SYSTEM			
7.	POSITION Firing System upwind and within 50 feet of EDS Trailer so that 50-foot detonator cables can easily reach exterior jacks on feedthrough assembly located on containment vessel door flange.		
SET UP MUNITIONS UNPACK AND PREPARATION AREA			
8.	PRE-POSITION approved open-head drums, emergency spill response supplies, spill containment kits, hazardous waste catch tray, and tools.		
9.	ESTABLISH workspace for the munitions, munitions containers, Fragment Suppression System, waste dunnage collection, explosive handling equipment, safety equipment, and supplies.		
10.	SET UP to provide for unobstructed view and safe movement of personnel.		
SET UP SOLID AND LIQUID WASTE STAGING AREAS			
11.	ESTABLISH liquid waste staging area so it connects via effluent hoses to the EDS Trailer.		
12.	ESTABLISH solid waste staging area in close proximity to the EDS Trailer.		
13.	ESTABLISH second liquid and solid waste staging areas in either the Containment Reduction Zone or the Support Zone for movement of waste from the Exclusion Zone to the staging area for waste awaiting disposal.		
14.	VERIFY waste staging areas allow for access for a small forklift or dolly.		
15.	MAINTAIN adequate space within the waste staging area for transfer, observation, and inspection of the waste containers.		
16.	VERIFY waste staging areas are diked and ground is covered with an impermeable surface barrier, if required.		
17.	VERIFY hazardous waste labels are placed on all waste containers and are properly marked and discernible.		
18.	POSITION all waste drums on containment pallets.		
19.	VERIFY open-head and liquid waste drums are segregated and identified.		
20.	COMPLETE and keep chain-of-custody records for waste generation, staging, and disposal on file at site.		
ESTABLISH PORTABLE POWER SUPPLY			
21.	When portable power supply is required, SET UP IAW vendor instructions.		
22.	LOCATE the fire extinguisher in proximity to portable power supply.		

Signature: EDS Crew Supervisor

Date

Signature: RCMD Representative

Date

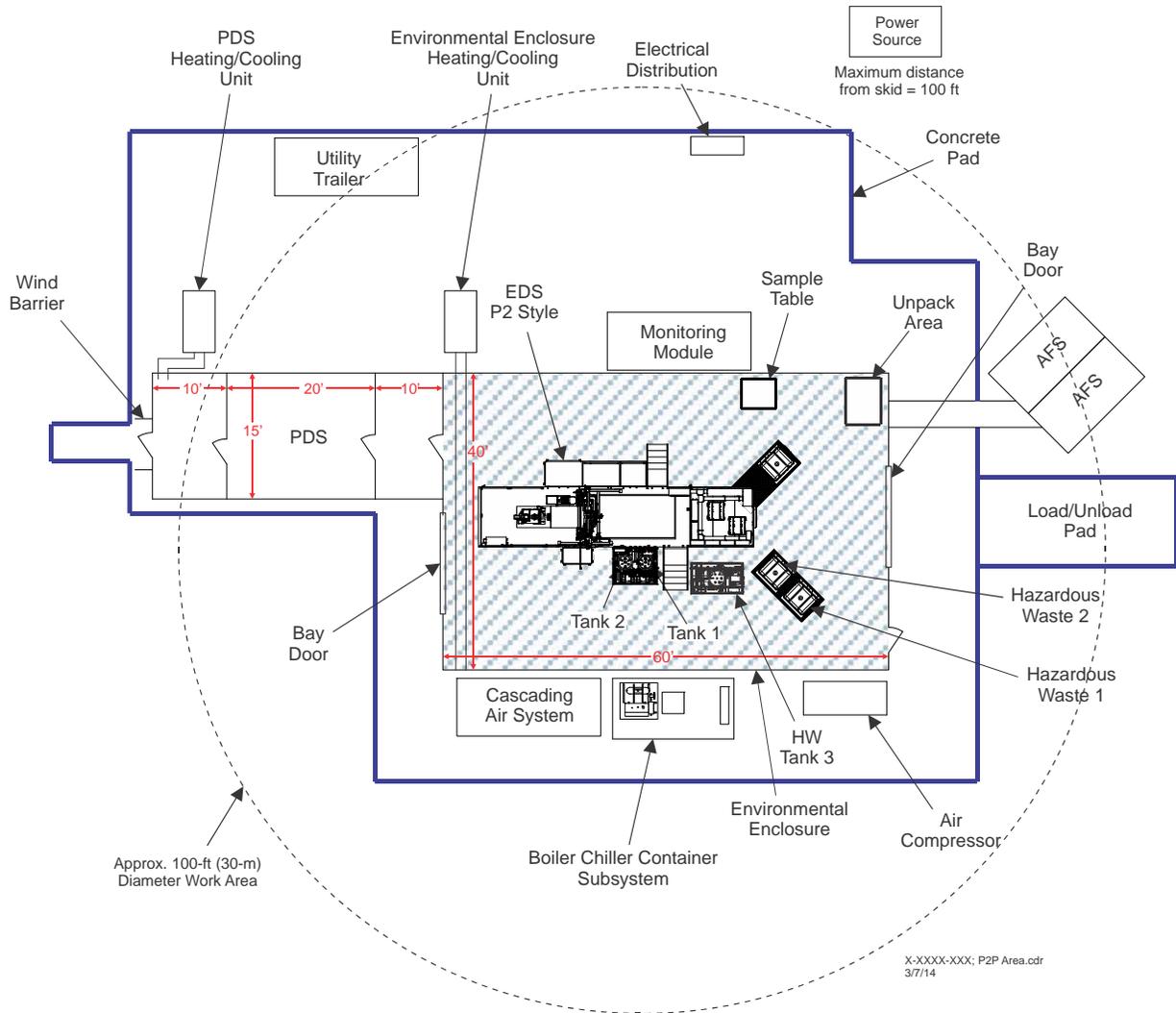


Figure 1-3. EDS and Supporting Equipment

Procedure 1

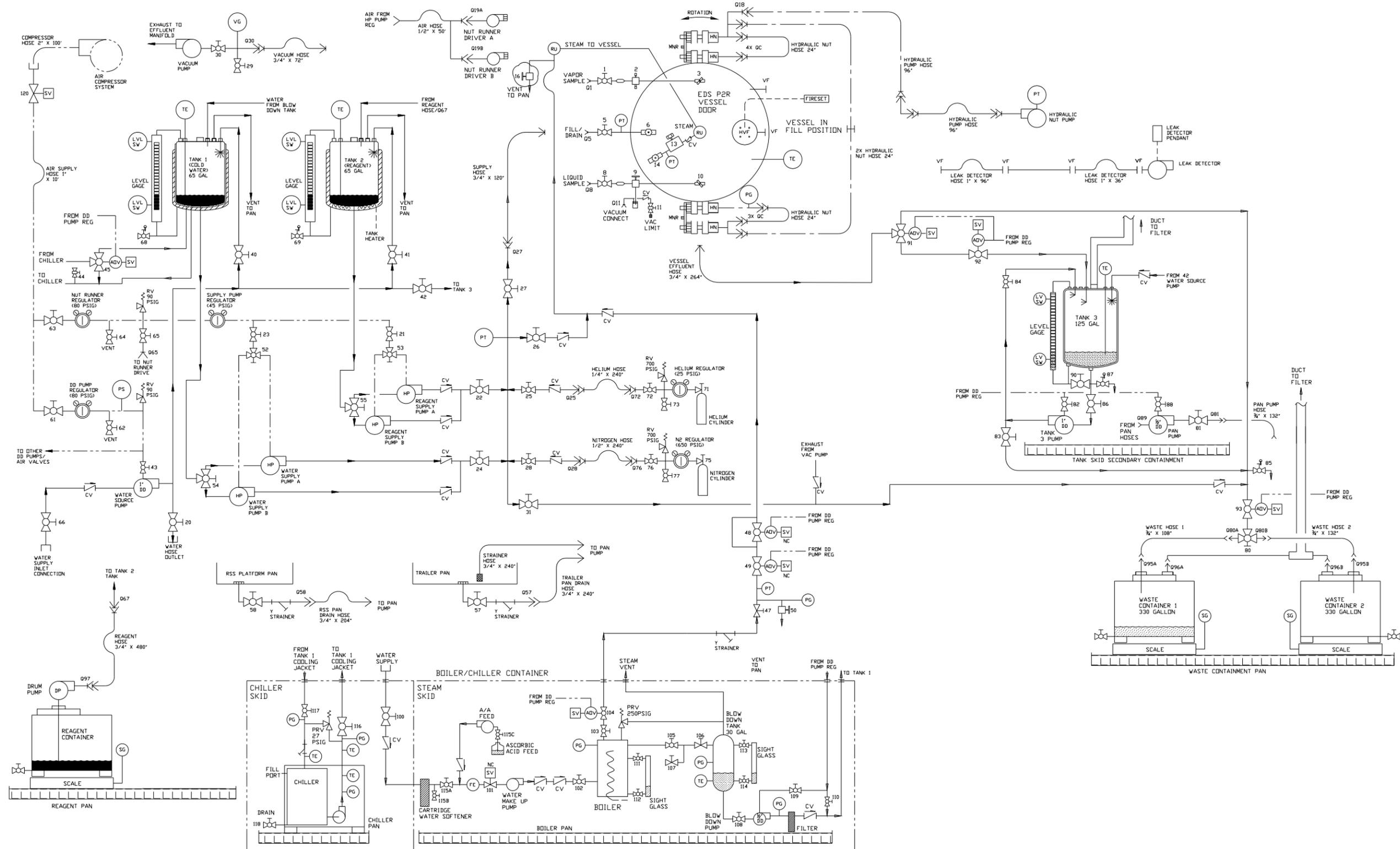


Figure 1-4. EDS Phase 2 Retrofit Series with Liquid Sample Adapter Assembly Flow Diagram

Procedure 1

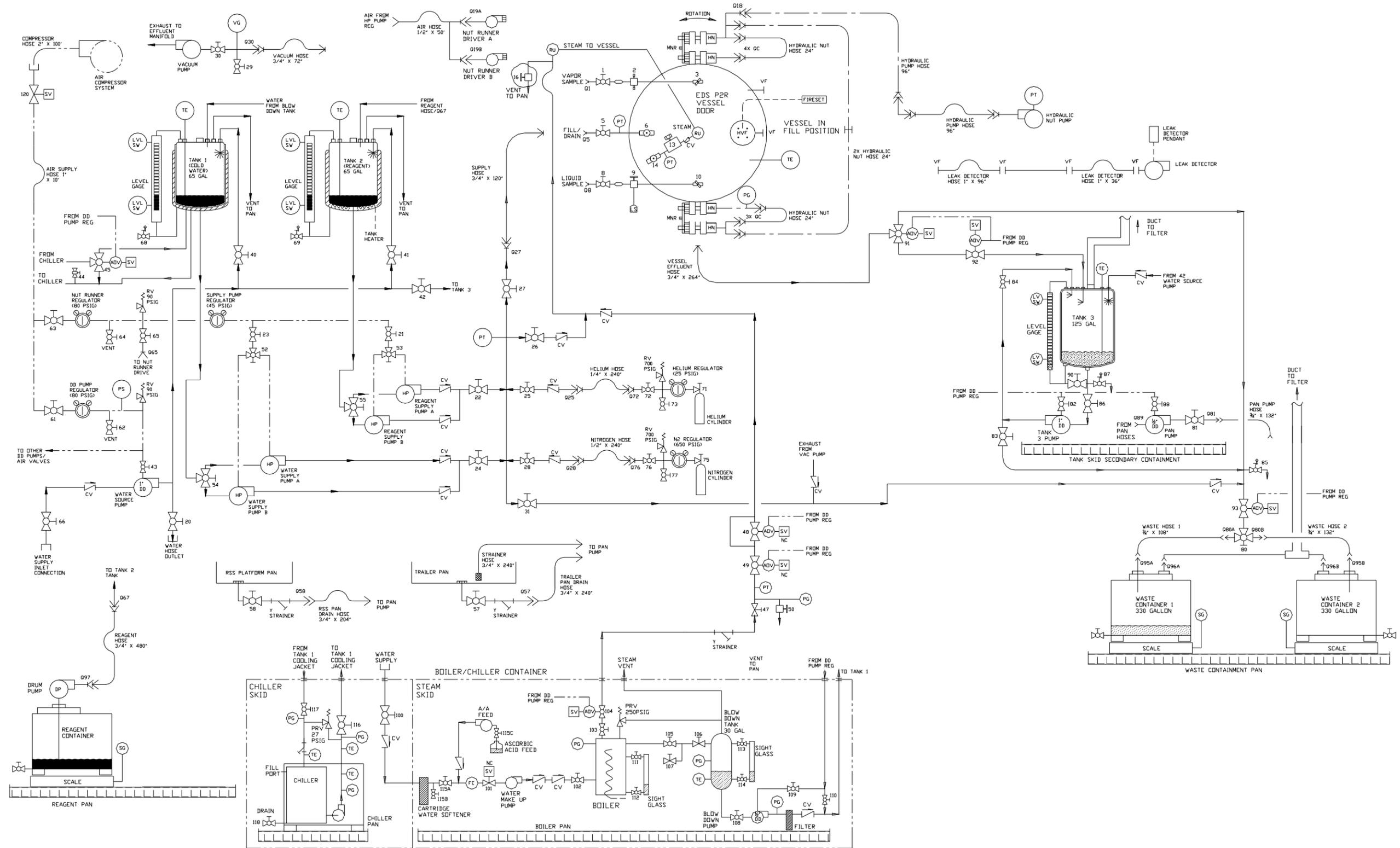


Figure 1-5. EDS Phase 2 Retrofit Series with Liquid Sample Valve Assembly Flow Diagram

SPECIAL REQUIREMENTS:

1. Operators are familiar with chemical accident/incident procedures and the EDS O&M Manual.
2. The checklists will be used by EDS Explosive Operators and/or Chemical Operators knowledgeable in chemical accident/incident response and assistance operations. The operators shall be trained in the conduct of EDS O&M procedures to include setup of the EDS.

EQUIPMENT, TOOLS, AND SUPPLIES:

ITEM:

QUANTITY:

Clipboard and pen	as required
Map of the operations area	1 each
Engineer tape	as required
Marking stake	as required
Poster board or sign materials	as required
Measuring tape	as required
EDS O&M Manual	as required

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PROCEDURE 2 CHECKLISTS FOR EDS SETUP PROCEDURES

The purpose of this procedure is to provide a guide to determine if the actions were completed for the initial setup of the EDS Trailer, daily startup, and daily post-munition operations closeout.

- 1.0 **VERIFY** EDS setup preventive maintenance checks and services for the EDS Trailer have been conducted in accordance with (IAW) the EDS Operations and Maintenance (O&M) Manual upon first arrival to the EDS site.
- 2.0 **USE** Table 2-1, Checklist for EDS Pre-operations, to verify pre-operational checks were completed prior to the start of each disposal operation.
- 3.0 **USE** Table 2-2, Pre-operations Checklist for Equipment, Tools, and Supplies, to verify appropriate items are on hand prior to the start of each disposal operation.
- 4.0 **USE** Table 2-3, Checklist for End-of-Day Operations, to verify specific equipment is shut down overnight during operations requiring more than 1 day to complete.
- 5.0 **USE** Table 2-4, Checklist for Post-operations, to verify post-operational checks are completed at the end of each disposal operation.

Table 2-1. Checklist for EDS Pre-operations

No.	ACTIVITY	Yes	No
1.	VERIFY monitoring is being conducted. <u>Monitoring Equipment</u> <u>Time Online</u> DAAMS _____ MINICAMS® _____		
2.	DETERMINE personal protective equipment (PPE) selection based on overnight monitoring results or Annex I if overnight monitoring is not conducted. Required PPE Level: _____ Cascade operational: ___ YES ___ NO ___ N/A		
3.	CONDUCT EDS team and safety meetings.		
4.	VERIFY Personnel Decontamination Station is operational.		
5.	VERIFY all valve handles are tight on valve stems. VERIFY all manually operated valves are closed. Note: Before continuation of a previous day's processing, OPEN any valves that were closed the previous day for system shutdown.		
6.	CHECK fuel levels on air compressor (____) and power generator (____) and TURN ON. VERIFY incoming air pressure is within 90 and 125 pounds per square inch gauge (psig) at the air compressor.		
7.	CHECK air lubricator oil levels and oil condition.		
8.	CHECK BCC and EDS Trailer electrical and water connections. Refer to EDS O&M Manual, Table 4-1, EDS Setup PMCS No. 1.10 and 2.		
9.	TURN ON electrical power main disconnect switch and water supply to BCC and EDS Trailer. PERFORM Lamp Test. OPEN valves 61, 63, and 65 on air supply line. VERIFY air pressure is set at 80 psig at the nut runner and double diaphragm pump air regulators pressure gauges on Air Control Panel and at 45 psig for the HP pump air regulator pressure gauge.		
10.	VERIFY helium bottle contains a minimum of 1,000 psig for (____) operations. VERIFY helium cylinder regulator is set at 10 psig.		
11.	VERIFY nitrogen bottle contains a minimum of 1,000 psig for (____) operations. VERIFY nitrogen cylinder regulator is set at 650 psig.		
12.	CHECK oil in helium leak detector. TURN ON and CALIBRATE helium leak detector. Refer to EDS O&M Manual, Table 4-1, EDS Setup PMCS No. 8.3.		
13.	PRE-POSITION decontaminant pail and rinse pail next to sample table.		
14.	SET UP waste containers on containment pallets and weight scales. Refer to EDS O&M Manual, Table 4-1, EDS Setup PMCS No. 3.2. OPEN valve 80 to WASTE 1 (Q80A). Note: VERIFY waste hoses are connected from quick-connects Q80A and Q80B to waste containers 1 (Q95A) and 2 (Q95B) quick-connects. VERIFY waste container vent hoses from waste containers 1 and 2 are connected to Duct vent Y. VERIFY valves 92 and 93 green OPEN lights are illuminated. PRESS ON/OFF button to turn on WASTE 1 and WASTE 2 weight scale digital displays. <u>Waste Container</u> <u>Label Number</u> <u>Initial Weight (lbs)</u> W1 _____ _____ W2 _____ _____ T3 NA _____ SW _____ _____		
15.	FILL reagent and water tanks. VERIFY Tank 2 heater on. Refer to Procedure 3. Tank 1 Fill: _____ Liters: _____ Temp. Setpoint: _____ Tank 2 Fill: _____ Liters: _____ Temp. Setpoint: _____ Containment Vessel Temp. Setpoint: _____ (CHECK all setpoints °C) Note: Set initial vessel temperature 5 degrees above target temperature.		
16.	PREPARE Steam Supply Subsystem IAW EDS P2R Series SOP, Procedure 3, Step 2.0. PREPARE ascorbic acid solution and FILL ascorbic acid feed tank.		
17.	PREPARE Chiller Unit IAW EDS P2R Series SOP, Procedure 3, Step 1.0.		

Table 2-1. Checklist for EDS Pre-operations (Continued)

No.	ACTIVITY	Yes	No
18.	VERIFY Tank 3 is empty. Refer to Procedure 18, Step 2.0.		
19.	VERIFY vessel hinge jack support is properly positioned.		
20.	INSPECT vessel interior for the presence of foreign objects and/or damage. REMOVE Grayloc® seal, if installed.		
21.	INSTALL/INSPECT AFSS. Refer to EDS O&M Manual, Table 4-2, Pre-Op PMCS No. 4.		
22.	CLEAN and PREPARE containment vessel sealing surfaces. Refer to EDS O&M Manual, Table 4-2, Pre-Op PMCS No. 3.		
23.	INSTALL vapor sample bag valve/vapor/liquid sample bottle assemblies and/or liquid sample adapter on valve panel IAW Annex K. VERIFY valves 2 and 9 are CLOSED. Note: USE thread lubricant on external threads of valve piping before installation of sample collection assemblies. CHECK torque (30 foot-pounds) on all valve fittings between valves 1, 3, 8, and 10. Vapor sample bag numbers: _____: _____: Liquid sample adapter bottles: _____: _____:		
24.	PREPARE EDS Firing System (refer to Procedure 4).		
25.	TEST EDS Firing System (refer to Procedure 4): <ul style="list-style-type: none"> • Preliminary function checks of EDS Firing System • High potential test of EDS Firing System • Dry Run Load Test (if applicable). 		
26.	INSTALL new O-ring IAW EDS O&M Manual, Chapter 5, Procedure CNV-16. INSTALL metal seal IAW EDS O&M Manual, Chapter 5, Procedure CNV-17. INSPECT/INSTALL internal containment vessel door hardware IAW EDS O&M Manual, Table 4-1 Pre-Op PMCS No. 8.2.		
27.	SECURE loading table(s) to grating (refer to Procedure 5).		
28.	PRE-POSITION munitions holder(s), assembled interior detonator jack assembly, and explosives based on munition(s) expected for treatment (refer to Procedure 5). VERIFY Interior Detonator Jack Assembly is the correct size for the selected munitions holder(s).		
29.	PREPARE labels for vapor sample bags, liquid sample adapter bottles, and jars IAW site-specific requirements.		
30.	PREPARE labels for waste containers IAW site specific requirements.		
31.	VERIFY all valves are closed except for valves 52, 53, 54, 55, 61, 63, 65, 66, 71, 72, 75, and 76. VERIFY valves 52, 53, 54, and 55 are OPEN to PUMP A (white arrow on valve handle points to PUMP A) and valve 80 is OPEN to "WASTE 1".		
32.	VERIFY lithium ion batteries are charged. TURN ON radio frequency transmitter.		
33.	VERIFY all panel pressure controllers are set at zero.		
34.	COORDINATE with Monitoring prior to start of operations.		
35.	COORDINATE with site manager prior to start of operations.		
36.	COORDINATE with emergency response personnel.		
37.	BEGIN operations at Procedure 6.		

Signature: EDS Crew Supervisor

Date

Signature: RCMD Representative

Date

Table 2-2. Pre-operations Checklist for Equipment, Tools, and Supplies

DESCRIPTION	QTY	DESCRIPTION	QTY
50-foot detonator cables (x4)		Hoe, vessel	
5-gallon water can		Hose, air compressor 2" x 100'	
Air compressor		Hose, air supply 1/2" x 120"	
Battery, lithium ion		Hose, garden	
Bleach solution		Hose, helium 1/4" x 120"	
Brushes		Hose, helium leak detector 1" x 72"	
Carpenter's level		Hose, helium leak detector/connection 1" x 36"	
Catch tray (unpack area)		Hose, hydraulic pump 96"	
Chain-of-custody documents (for munition and sampling)		Hose, hydraulic nut 24" (x4)	
Chock blocks		Hose, pan waste drum 1/2" x 84"	
Conical-shaped charge detonator clips		Hose, platform pan waste 1/2" x 48"	
Conical-shaped charges with O-rings		Hose, reagent source 1/2" x 84"	
Container, liquid waste		Hose, strainer 1/2" x 120"	
Crow's foot wrench		Hose, supply 1/2" x 72"	
Debris pan		Hose, tensioner pump hose 96"	
Digital camera		Hose, trailer pan spray 1/2" x 72"	
Drain plug wrench		Hose, trailer pan waste 1/2" x 144"	
Drum, solid waste		Hose, vacuum 1/2" x 72"	
Drum pump (backup)		Hose, vessel effluent 3/4" x 72"	
Duct tape		Hose, vessel waste drum 3/4" x 72" (x2)	
Dust caps		Hoses, waste drum vent 1" x 72" (x2)	
EDS Firing Systems (A and B)		Indelible ink pens	
EDS operator log		Interior and exterior shorting jacks	
Emergency eye wash		Key, interlocks	
Fire extinguishers		Key, vessel rotation/clamp control panel	
First-aid kit		Leather gloves	
Feedthrough assembly		Linear-shaped charge	
Fragment Suppression System		Linear-shaped charge detonator clips	
Generator		Linear-shaped charge retaining clips	
Grayloc [®] metal seal, high voltage feedthrough flange		Liquid Sample Adapter bottles, 2 ounces	
Grayloc metal seal, vessel door		Loading table, front	
Hammer, dead blow		Loading table, rear (x2)	
Hand truck		Loctite [®] N-7000 [™]	
Helium compressed gas tank with pressure regulator assembly and cylinder bracket		Mechanical fingers	

Table 2-2. Pre-operations Checklist for Equipment, Tools, and Supplies (Continued)

DESCRIPTION	QTY	DESCRIPTION	QTY
Multimeter (fluke)		Scales, drum	
Nitrogen compressed gas tank with pressure regulator assembly and cylinder bracket		Secondary containment pallet	
Open-head drums and liquid waste drums/containers		Spanner wrench, lock ring	
O-ring, high voltage feedthrough flange		Spanner wrench, 5" hex nut	
O-ring, vessel door		Spill containment tray	
Pendant, clamp hanger drive control		Spill kit	
Pendant, hydraulic nut pump		Sponges	
Pendant, leak detector		Stepladder	
Pendant, vessel rotation control		Strain relief clips (large binder clips)	
Plastic bags and sheeting		Strap wrench	
Plaster-of-Paris bandages		Tongs	
Personal protective equipment in accordance with Annex I and Health and Safety Plan		Trailer lighting fixtures	
Primary tool kit		Waste bag	
Rags		Waste hose vent T	
Reagent		Waste labels	
Rubber mallet		Wooden container (explosive components)	
Sample bag valve assembly		Wrench, T-handle 1-5/16-inch	
Sampling containers and secondary packaging		Wrench, T-handle 5/8-inch	
Sampling tools			

Signature: EDS Crew Supervisor

Date

Signature: RCMD Representative

Date

Table 2-3. Checklist for End-of-Day Operations

No.	ACTIVITY	Yes	No
1.	VERIFY the following power switches/valves are in the OFF position: <ul style="list-style-type: none"> • Supply pumps • Source pumps • Rotary Agitation Subsystem • Pan pump • Reagent supply tank heater • Helium Supply and Leak Detection Subsystem • Explosive Opening Subsystem • Radio frequency transmitter. 		
2.	TURN OFF water supply to EDS Trailer and BCC.		
3.	VERIFY all containment vessel door valves are CLOSED. RECORD valves CLOSED.		
4.	TURN OFF EDS Trailer main disconnect switch.		
5.	VERIFY all waste is placed in proper containers and sealed.		
6.	VERIFY waste containers are properly annotated and placed in the appropriate staging area.		
7.	VERIFY tools, equipment, and supplies are put in their proper places.		
8.	RECOIL 50-foot detonator cables and STORE along with the interior and exterior detonator shorting jacks and exterior detonator jack in the EDS Firing System accessory drawer, when directed.		
9.	VERIFY front and back covers have been replaced on EDS Firing System, when directed.		
10.	REMOVE lithium ion batteries for re-charging.		
11.	VERIFY security is coordinated for EDS Trailer and equipment.		
12.	COORDINATE with Monitoring prior to ceasing operations for the day.		
13.	COORDINATE with site manager prior to leaving the operations site for the day.		

Signature: EDS Crew Supervisor

Date

Signature: RCMD Representative

Date

Table 2-4. Checklist for Post-operations

No.	ACTIVITY	Yes	No
1.	VERIFY the following power switches/valves are in the OFF position: <ul style="list-style-type: none"> • Supply pumps • Source pumps • Rotary Agitation Subsystem • Pan pump • Reagent supply tank heater • Helium Supply and Leak Detection Subsystem • Explosive Opening Subsystem • Radio frequency transmitter. 		
2.	TURN OFF water supply to EDS Trailer and BCC.		
3.	VERIFY Blow Down Tank is empty.		
4.	VERIFY all EDS containment vessel door valves are CLOSED.		
5.	TURN OFF EDS Trailer and BCC main disconnect switch.		
6.	VERIFY all waste is placed in proper containers and sealed.		
7.	VERIFY waste containers are properly annotated and placed in the appropriate staging area.		
8.	VERIFY vessel door is open and training/shipping metal seal and door hinge support jack are in place.		
9.	RECOIL 50-foot detonator cables and STORE along with the interior and exterior detonator shorting jacks and exterior detonator jack in the EDS Firing System accessory drawer.		
10.	VERIFY tools, equipment, and supplies are put in their proper places.		
11.	VERIFY front and back covers have been replaced on EDS Firing System, when directed.		
12.	VERIFY security is coordinated for EDS Trailer and equipment.		
13.	COORDINATE with Monitoring prior to vacating operations area.		
14.	COORDINATE with site manager prior to vacating operations area.		

Signature: EDS Crew Supervisor

Date

Signature: RCMD Representative

Date

SPECIAL REQUIREMENTS:

1. Operators are familiar with chemical accident/incident procedures and the EDS O&M Manual.
2. This procedure guide will be used by EDS Explosive Operators and/or Chemical Operators knowledgeable in chemical accident/incident response and assistance operations.
3. The certified operators shall be trained in the conduct of EDS O&M procedures to include setup of the EDS.

EQUIPMENT, TOOLS, AND SUPPLIES:

ITEM:

Clipboard and pen
EDS O&M Manual

QUANTITY:

as required
as required

**PROCEDURE 3
PREPARE FOR LIQUID AND STEAM TRANSFER OPERATIONS**

The purpose of this procedure is to prepare the Steam Supply Subsystem; fill the two supply tanks located on the folding platform of the EDS Trailer with the appropriate reagent and water for later transfer to the containment vessel; and prepare the Chiller Unit for operations. Reagent or solvent is selected based on the chemical fill of the munition to be destroyed and using Table 3-1 as a reference. The reagent or solvent is loaded into Supply Tank 2.

PRECONDITIONS:

1. PPE must be worn IAW Annex G, if applicable, and/or as specified in the applicable MSDS/SDS for reagent or solvent being transferred.
2. All valves on containment vessel door, reagent supply platform, and Reagent Supply Panel (except valves 80, 61, 63, and 120) are CLOSED.

WARNINGS

USE PROPER MATERIAL HANDLING TECHNIQUES AND/OR MATERIAL HANDLING EQUIPMENT WHEN MOVING HEAVY ITEMS.

REAGENT, SOLVENT, ACIDS, AND REFRIGERANT CHEMICALS ARE HAZARDOUS. WEAR APPROPRIATE PPE WHEN HANDLING REAGENTS, SOLVENTS, AND REFRIGERANTS.

OPERATING STEAM SUPPLY SUBSYSTEM WITH A DAMAGED WATER SIGHT GLASS MAY RESULT IN A RELEASE OF HOT WATER AND STEAM.

DUE TO EXTREME TEMPERATURES, PERSONNEL SHOULD AVOID DIRECT SKIN CONTACT WITH HEATED SURFACES AND WEAR LEATHER GLOVES TO PREVENT PERSONAL INJURY DUE TO BURNS FROM HANDLING HOT LIQUID/EQUIPMENT.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

1.0 **PREPARE** Chiller Unit.

1.1 **VERIFY** valve 44 is CLOSED.

Note

Chiller Unit requires a main voltage supply of 460 volts (V) 3 phase 60 hertz (4 wire) with a ± 5 percent permissible voltage tolerance. Unit operates at 9 amps.

- 1.2 **VERIFY** Chiller Unit red ON switch is in the OFF position and Chiller Unit pump electrical cord is plugged into 460 V receptacle (UCR 1) in BCC.
- 1.3 **CHECK** coolant level and **REPLENISH** IAW vendor manual.
- 1.4 **PREPARE** Chiller Unit for operation.
 - 1.4.1 **OPEN** valve 116.
 - 1.4.2 **OPEN** valve 117 only 1/2 turn.
 - 1.4.3 **TURN** Chiller Unit red ON switch to the ON position.
 - 1.4.4 **PRESS** ON/OFF key on front panel display to start Chiller Unit.
 - 1.4.5 **VERIFY** Boiler Chiller Container (BCC) louvers are OPEN.
 - 1.4.6 **ADJUST** valve 117 until 10 ± 2 pounds per square inch gauge (psig) is shown on the in-flow pressure gauge.
 - 1.4.7 **CHECK** Chiller Unit temperature setpoint.
 - 1.4.7.1 **PUSH** and immediately **RELEASE** SET key on Chiller Unit front panel display to show temperature setpoint.

Notes

Use up or down arrow keys on Chiller Unit front display panel to change temperature setpoint.

The initial temperature setpoint displayed on front display panel is the temperature of the probe.

- 1.4.7.2 **PUSH** and immediately **RELEASE** SET key or **WAIT** 5 seconds for display to return to original display (probe temperature).

- 1.4.8 **ADJUST** temperature setpoint, as necessary.
 - 1.4.8.1 **PUSH** and **HOLD SET** key on front panel display for 2 seconds.
 - 1.4.8.2 **CHANGE** setpoint by using up or down arrow keys on front panel display.
 - 1.4.8.3 **PUSH SET** key on front panel display to save new setpoint.

Note

Drain blow down tank to Supply Tank 1 before initially filling Supply Tank 1.

- 2.0 **PREPARE** Steam Supply Subsystem.
 - 2.1 **CHECK** Steam Supply Subsystem.
 - 2.1.1 **VERIFY** red OFF button on VESSEL STEAM CONTROL Panel is illuminated.
 - 2.1.2 **VERIFY** Steam Skid Assembly 480 V power cord is plugged into 480 V receptacle (UBR 1) in BCC and 480 V receptacle switch is in the ON position.
 - 2.1.3 **VERIFY** Blow Down Tank is empty. **PROCEED** as follows:
 - 2.1.3.1 **VERIFY** valves 113 and 114 are OPEN.
 - 2.1.3.2 **CHECK** Blow Down Tank sight glass and **PERFORM** one of the following:
 - 2.1.3.2.1 When Blow Down Tank is empty, **PROCEED** to Step 2.1.4.
 - 2.1.3.2.2 When Blow Down Tank is not empty, **PERFORM** the following:
 - 2.1.3.2.2.1 **OPEN** valves 108 and 109 to drain Blow Down Tank to water Supply Tank 1.

- 2.1.3.2.2.2 **OBSERVE** Blow Down Tank water sight glass and when Blow Down Tank is empty, **CLOSE** valves 109 and 108.
- 2.1.3.2.2.3 **OPEN** valve 110. **WAIT** 5 seconds. **CLOSE** valve 110.
- 2.1.4 **VERIFY** valves 100, 103, 105, 106, 107, 115B, and 115C are CLOSED on Steam Boiler.
- 2.1.5 **VERIFY** valves 102, 111, 112, and 115A are OPEN.
- 2.1.6 **CHECK** both water sight glasses for damage. **REPLACE** as needed.
- 2.1.7 **CHECK** Steam Boiler Logbook for amount of water passed through water softener cartridge. **PROCEED** as follows:
 - 2.1.7.1 When current reading is less than replacement value, for water softener cartridge, **PROCEED** to Step 2.1.8.
 - 2.1.7.2 When current reading is equal to or greater than replacement value, **PERFORM** the following:
 - 2.1.7.2.1 **REMOVE** and **DRAIN** water softener cartridge housing.
 - 2.1.7.2.2 **REMOVE** old water softener cartridge and **INSTALL** new water softener cartridge.

CALLOUT: Record water softener cartridge changeout time.

- 2.1.7.2.3 **INSTALL** water softener cartridge housing.
- 2.1.7.2.4 **OPEN** valve 100.
- 2.1.7.2.5 **BLEED** air from water softener cartridge housing by pushing red bleed button on top of water softener cartridge housing.
- 2.1.7.2.6 **PLACE** 1 liter sample container under valve 115B.
- 2.1.7.2.7 **OPEN** valve 115B and **COLLECT** water sample. **CLOSE** valve 115B.

2.1.7.2.8 **CLOSE** valve 100.

2.1.7.2.9 **VERIFY** total water hardness is less than 10 ppm. **RECORD** water hardness results.

CALLOUT: Announce water hardness sample results.

Note

When process shutdown button on Boiler Control Panel is pulled out during setup, the steam boiler low water alarm will sound through the HMI units.

2.1.8 **VERIFY** PROCESS SHUTDOWN button on BOILER CONTROL PANEL is out.

2.1.9 **PUSH** red BOILER ALARM ACKNOWLEDGE button on UTILITY CONTROL 1 Panel to silence Water Boiler alarm.

2.1.10 **VERIFY** amber CHEMICAL INJECTION selector switch on BOILER CONTROL PANEL is in the AUTO position.

2.1.11 **VERIFY** green BOILER ON/OFF button on BOILER CONTROL PANEL is not illuminated.

2.2 **PREPARE** ascorbic acid feed pump.

2.2.1 **PROCEED** as follows:

2.2.1.1 When ascorbic acid feed tank contains at least one (1) liter of ascorbic acid solution and it is no older than 7 days, **PROCEED** to Step 2.2.2.

2.2.1.2 When ascorbic acid feed tank contains less than one (1) liter of ascorbic acid solution and/or it is older than 7 days, **PERFORM** the following:

2.2.1.2.1 **PREPARE** ascorbic acid solution by dissolving one (1) pre-measured vial of solid ascorbic acid per 0.5 liters of water.

2.2.1.2.2 **REMOVE** lid from ascorbic acid reservoir and **POUR** ascorbic acid solution into reservoir.

- 2.2.1.2.3 **SCREW** lid back onto ascorbic acid reservoir.
- 2.2.2 **VERIFY** ascorbic acid feed pump is primed. **PROCEED** as follows:
 - 2.2.2.1 When ascorbic acid feed pump is primed and pump inlet tubing has no air pockets greater than 0.5 inches, **PROCEED** to Step 2.2.3.
 - 2.2.2.2 When ascorbic acid feed pump is not primed and/or pump inlet tubing has air pockets greater than 0.5 inches, **PERFORM** the following:
 - 2.2.2.2.1 **OPEN** valve 115C on ascorbic acid feed pump.
 - 2.2.2.2.2 **TURN** amber CHEMICAL SELECTION selector switch to PRIME position.
 - 2.2.2.2.3 **OBSERVE** pump inlet tubing and when no air pockets greater than 0.5 inches are seen, **TURN** amber CHEMICAL SELECTION selector switch to AUTO position.
 - 2.2.2.2.4 **CLOSE** valve 115C.
- 2.2.3 **RECORD** ascorbic acid level in ascorbic acid feed tank.

Note

Valve 101 (Feed Water Solenoid) should open and water pump should start when Water Boiler ON/OFF button is pushed the first time.

- 2.3 **START** Water Boiler.
 - 2.3.1 **VERIFY** display on flow meter is 0.00.
 - 2.3.2 **OPEN** valve 100.
 - 2.3.3 **PUSH** green BOILER ON/OFF button on BOILER CONTROL PANEL (green BOILER ON/OFF button illuminates).

2.3.4 **RECORD** start time.

CALLOUT: Announce water boiler start time.

2.3.5 **VERIFY** flow meter is operating by observing display movement.

Note

Low-water alarm sounds when water is initially pumped into Water Boiler and continues until boiler tank is approximately 1/3 full.

2.3.6 **OBSERVE** water sight glass and when water sight glass shows the boiler tank is 1/2 full, **PUSH** white LOW WATER RESET button to start heating water in Water Boiler.

Note

Water Boiler pressure will not begin to rise until water temperature exceeds 300°F.

2.3.7 **MONITOR** Water Boiler by performing the following:

2.3.7.1 **VERIFY** water level stays within water sight glass.
PROCEED as follows:

2.3.7.1.1 When water level is 3/4 full, **PROCEED** to Step 2.3.7.2.

2.3.7.1.2 When water level is too high and blue high water warning light illuminates, **PERFORM** the following:

2.3.7.1.2.1 **OPEN** valve 105.

2.3.7.1.2.2 Slowly **OPEN** 106 to lower water level.

2.3.7.1.2.3 **OBSERVE** water sight glass and when water level is 3/4 full, **CLOSE** valves 105 and 106.

- 2.3.7.2 **VERIFY** steam pressure controls turn off Water Boiler heaters at setpoint (150 psig).
- 2.3.8 **VERIFY** valve 104 is CLOSED.
- 2.3.9 **OPEN** valve 103.
- 2.3.10 **CHECK** Water Boiler and piping for leaks.

Notes

Supply Tank 1 is for water only.

Supply Tank 2 is used for chemical reagents, solvents, or water.

Filling above 235 liters (62 gallons) will cause amber HIGH light on process control panel to illuminate.

- 3.0 **FILL** supply tanks with chemical reagent, solvent, or water IAW Table 3-1.
 - 3.1 **VERIFY** Reagent Hose is connected to Q67 and Q97.
 - 3.2 **VERIFY** valves 20, 21, 23, 40, 41, 42, 62, 64, 68, and 69 are CLOSED.
 - 3.3 **VERIFY** valves 52, 53, 54, and 55 are OPEN to working pump (white arrow on valve handle points to PUMP A or PUMP B).
 - 3.4 **VERIFY** AIR COMPRESSOR SYSTEM is operating.
 - 3.4.1 **VERIFY** AIR COMPRESSOR HOSE is connected to threaded coupling on EDS Trailer gooseneck.
 - 3.4.2 **VERIFY** valves 61 and 63 are open.
- 4.0 **FILL** supply tank(s) with water.
 - 4.1 **OPEN** valve 66 and **PROCEED** as follows:
 - 4.1.1 When sufficient pressure is supplied by water supply source, **PROCEED** to Step 4.2.
 - 4.1.2 When insufficient pressure is supplied by water supply source, **PERFORM** the following:
 - 4.1.2.1 **TURN ON** AIR COMPRESSOR SYSTEM.

- 4.1.2.2 **OPEN** valve 43.
- 4.2 **FILL** supply tank(s) with water by performing one of the following:
 - 4.2.1 **FILL** Supply Tank 1 by opening valve 40 and/or **FILL** supply Tank 2 by opening valve 41.
 - 4.2.2 **OBSERVE** appropriate TANK LEVEL GAUGE(S) and when designated volume is reached, **CLOSE** valve 40 for Supply Tank 1 and/or valve 41 for Supply Tank 2.
- 4.3 **PROCEED** as follows:
 - 4.3.1 When not having used the WATER SOURCE PUMP, **PROCEED** to Step 5.0.
 - 4.3.2 When having used the WATER SOURCE PUMP, **CLOSE** valve 43.
- 5.0 **FILL** reagent Supply Tank 2 using DRUM PUMP with chemical reagent or solvent IAW Table 3-1.
 - 5.1 **REMOVE** large bung plug from chemical reagent or solvent container.

Note

DP 3-10 R10 electrical outlet located on the EDS Trailer gooseneck is marked "DRUM PUMP CONTROL." The electrical receptacle inside of it is marked "DRUM PUMP" and is controlled by the on/off reagent pump buttons located on the Reagent Pump Panel.

- 5.2 **PLACE** DRUM PUMP into chemical reagent or solvent container and **CONNECT** ground wire.
- 5.3 **CONNECT** power cord to EDS Trailer electrical outlet, DP 3-10 R10.
- 5.4 **TURN** amber HIGH LEVEL INTERLOCK selector switch on REAGENT PUMP Panel to AUTO.
- 5.5 **PUSH** green ON button on REAGENT PUMP Panel.
- 5.6 **PUSH** START button on DRUM PUMP. **ADJUST** transfer rate by turning knob on DRUM PUMP, as needed.

- 5.7 **OBSERVE** supply Tank 2 TANK LEVEL GAUGE(S) and when designated volume is reached, **STOP** DRUM PUMP by pushing red DRUM PUMP OFF button on REAGENT PUMP Panel.
- 6.0 **RECORD** tank volumes, contents, and temperature setpoints onto EDS Pre-operations Checklist.
- 7.0 **PREPARE** to heat Supply Tank 2 water/reagent IAW Table 3-1.
- 7.1 **INSPECT** TANK 2 REAGENT HEATER CONTROLS Panel on PROCESS CONTROL PANEL and **VERIFY** red OFF button is illuminated.

Cautions

Do not turn on a supply tank heater if there is less than 30 liters (8 gallons) of liquid in the tank.

Do not heat solvents unless directed by EDS Crew Supervisor.

- 7.2 **TURN ON** reagent supply Tank 2 heater.
 - 7.2.1 **VERIFY** setpoint temperature for supply Tank 2 heater is set IAW Table 3-1 and **PROCEED** as follows:
 - 7.2.1.1 When setpoint temperature is IAW Table 3-1, **PROCEED** to Step 7.2.2.
 - 7.2.1.2 When setpoint temperature is not IAW Table 3-1, **ADJUST** setpoint temperature as needed with setpoint temperature modification arrows located on the TANK 2 REAGENT HEATER CONTROLS Panel.
 - 7.2.2 **PUSH** green ON button on TANK 2 REAGENT HEATER CONTROLS Panel to turn on supply Tank 2 heater.
 - 7.2.3 **OBSERVE** and **MONITOR** temperature displayed for supply Tank 2 to verify supply Tank 2 heater is ON and operating.

8.0 **TURN ON** Chiller Unit at PROCESS CONTROL PANEL.

8.1 **VERIFY** Supply Tank 1 Temperature Controller on TANK 1 WATER COOLER CONTROLS Panel on PROCESS CONTROL PANEL is set to 15°C.

8.2 **PUSH** green ON button on TANK 1 WATER COOLER CONTROLS Panel.

9.0 **PROCEED** as directed.

SPECIAL REQUIREMENTS:

1. PPE must be worn IAW Annex G, if applicable, and/or as specified in the applicable MSDS/SDS for reagent or solvent being transferred.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Primary tool kit	1 each
Absorbent paper towels	as required
Water Hardness Test Kit	1 each
Isoascorbic Acid, oxygen scavenger, 40 gram bottles	as required
Water softener cartridge	as required
Funnel	1 each

Table 3-1. Standard EDS Treatments for Chemical Fill

Chemical Fill	Military Symbol	Reagent or Solvent Name	Conc.	A Chemical Fill Quantity of			Comments	
				Less than 30 lbs.	>30 but <50 lbs.	>50 but ≤72 lbs.		
				Volume and Weight of Reagent or Solvent Required for Treatment				
			Liters (gal.) Weight	Liters (gal.) Weight	Liters (gal.) Weight			
Mustard	H	MEA	90%	133 (35) 300 lbs.	To	To	<p>NOTE: Reagent mixture parts are by liquid volume. H density is 1.27 g/cc. One liter weighs 2.81 lbs.</p> <p>Treatment ratio is 10 parts reagent to 1 part agent by liquid volume. Do not process more than 25.63 liters (72 lbs).</p> <p>1. Heat reagent supply tank to 60 ±5°C. Add reagent. Start agitation. Set STEAM CONTROL PANEL VESSEL TEMPERATURE Controller to a minimum of 60°C. Steam transfer to containment vessel to maintain set temperature. Agitate until treatment level is reached.^a Drain.</p> <p>2. Add a minimum of 114 liters of water for hot water treatment. Start agitation. Set STEAM CONTROL PANEL VESSEL TEMPERATURE Controller to a minimum of 100°C. Transfer steam to containment vessel and heat to 100°C. Agitate for a minimum 1 hour. Drain.</p> <p>3. Add a minimum of 133 liters of chilled water to rinse. Agitate for a minimum of 10 minutes. Drain. Repeat as necessary.</p>	
Mustard – Distilled	HD							
Mustard – Sulfur	HS							
Mustard – 60% HS, 40% T	HT							
Mustard (H) + Chlorobenzene								
Nitrogen Mustard-3	HN-3				133 (35) 300 lbs.	To	To	

Note:

^a When treatment level is not reached, consult with CMA Risk Management for further actions.

PROCEDURE 4 PREPARE EDS FIRING SYSTEM

The purpose of this operation is to provide operating guidelines for preliminary function checks of the EDS Firing System.

PRECONDITIONS:

1. Fireset Operator has possession of one safety interlock key and the remaining one is secured in the command post.

WARNINGS

FIRESET OPERATOR MUST MAINTAIN CONTROL OF SAFETY INTERLOCK PLUG AT ALL TIMES WHEN IT IS NOT BEING USED IN THE FIRING SYSTEM.

FAILURE TO DON LEATHER GLOVES MAY CAUSE CUTS AND ABRASIONS WHILE PERFORMING THE FOLLOWING STEPS.

CONTAINMENT VESSEL DOOR PRESENTS CRUSHING AND PINCHING HAZARDS. BE AWARE OF BODY POSITION WHEN PERFORMING THE FOLLOWING STEPS.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Note

Single round interior detonator jack assembly has four detonator cable assemblies attached to it; whereas, multiple interior detonator jack assembly has six detonator cable assemblies.

- 1.0 **CHECK** serviceability of INTERIOR DETONATOR JACK ASSEMBLY.
 - 1.1 **INSPECT** INTERIOR DETONATOR JACK ASSEMBLY for serviceability.
 - 1.2 **VERIFY** INTERIOR DETONATOR SHORTING PLUG is connected to INTERIOR DETONATOR JACK ASSEMBLY.

- 1.3 **PLACE** INTERIOR DETONATOR JACK ASSEMBLY back into shipping container until needed.

Notes

Alternate the use of the EDS Firing Systems each time a detonation occurs. Alternating EDS Firing System between sets A and B may prolong electronic component life.

EDS Firing System front cover may be re-installed to protect internal components from inclement weather.

- 2.0 **PREPARE** EDS FIRING SYSTEM for preliminary function checks.
- 2.1 **REMOVE** front cover and **SECURE** it to the right side of EDS FIRING SYSTEM CASE.

Note

There are two safety interlock plugs. One is in the possession of the Fireset Operator during operations and the other one is secured in the command post.

- 2.2 **CONFIRM** Fireset Operator has possession and maintains control of the SAFETY INTERLOCK PLUG.
- 2.3 **VERIFY** TEST INTERFACE CHASSIS 24-volt direct current (VDC) POWER switch and all CONTROL MODULE switches are in OFF positions.
- 2.4 **VERIFY** HI-POTTER line POWER switch is OFF.
- 2.5 **VERIFY** J3A connector is connected to internal connector of mating CONTROL connector located on left side of FIRING SYSTEM CASE.

Note

The control cable comes in four different lengths (12-inch, 29-inch internal, 30-foot, and 300-foot). System function checks should be conducted with the same control cable(s) that will be used during munition detonation.

2.6 **PERFORM** one of the following:

2.6.1 When not using the CONTROL MODULE in the remote configuration, **PROCEED** as follows:

2.6.1.1 **VERIFY** 29-inch internal control cable (J29A connector) is not connected to EDS FIRING SYSTEM CHASSIS J29B INPUT connector.

2.6.1.2 **CONNECT** 12-inch control cable to CONTROL MODULE J3B OUTPUT connector and **CONNECT** other end to EDS FIRING SYSTEM CHASSIS J29B INPUT connector.

2.6.1.3 **PROCEED** to Step 2.7.

2.6.2 When using the CONTROL MODULE in the remote configuration, **PROCEED** as follows:

2.6.2.1 **VERIFY** 29-inch control cable J29A connector is connected to EDS FIRING SYSTEM CHASSIS J29B INPUT connector.

2.6.2.2 **CONNECT** selected control cable to CONTROL MODULE J3B OUTPUT connector and **CONNECT** other end to external mating CONTROL connector located on left side of EDS FIRING SYSTEM CASE.

2.7 **CONNECT** extension power cord to 120 V ground fault circuit interrupter (GFCI) conditioned power outlet on EDS Trailer and to power receptacle on left side of EDS FIRING SYSTEM CASE.

3.0 **PERFORM** function checks of EDS FIRING SYSTEM.

3.1 **INSERT** SAFETY INTERLOCK PLUG into INTERLOCK connector on TEST INTERFACE CHASSIS.

3.2 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to ON (amber ON-OFF light and INTERLOCK light illuminate).

- 3.3 **VERIFY** EDS FIRING SYSTEM'S TRIGGER and CAPACITOR DISCHARGE UNIT (CDU) built-in test equipment (BITE) indicator windows display black and not white (**TURN** BITE indicator dial gently clockwise until indicators display black).
- 3.4 **PRESS** and **HOLD** TEST button on CONTROL MODULE and **OBSERVE** the following:
 - 3.4.1 **VERIFY** all lights illuminate with the READY light delayed approximately one (1) second. **REPLACE** burned out bulbs as needed and **RETEST**.
 - 3.4.2 **VERIFY** TRIGGER and CDU BITE indicators trip to white.
 - 3.4.3 **VERIFY** HIGH VOLTAGE meter illuminates and displays a reading of 2.85 ± 0.02 volts.
- 3.5 **RELEASE** TEST button and **RESET** BITE indicators to BLACK position.
- 3.6 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to OFF.
- 3.7 **REMOVE** SAFETY INTERLOCK PLUG.
- 4.0 **PREPARE** to conduct continuity checks of EDS FIRING SYSTEM.
 - 4.1 **VERIFY** dust caps (blue-dot) are connected to any exposed ends of 50-foot detonator cables.
- 5.0 **CONNECT** EDS FIRING SYSTEM to CONTAINMENT VESSEL door.
 - 5.1 **VERIFY** four detonator cables (CH1 through CH4) located on the inside of the left-side panel of EDS FIRING SYSTEM CASE are connected to back side of the TEST INTERFACE CHASSIS (CH1 through CH4).
 - 5.2 **VERIFY** 4-foot detonator cables located inside the SHORTING connectors compartment are connected to connectors CH1 through CH4 at rear of compartment and to SHORTING connectors on front of SHORTING CONNECTORS PANEL.
 - 5.3 **CONNECT** four 50-foot detonator cables to connectors (CH1 through CH4) located on exterior left-side panel of EDS FIRING SYSTEM CASE.

Caution

Stepping on detonator cable may cause loss of electrical continuity due to cable damage.

- 5.4 **ROUTE** four 50-foot detonator cables alongside of EDS Trailer to vicinity of open CONTAINMENT VESSEL door.
- 5.5 **CONNECT** INTERIOR SHORTING TEST JACK to the high voltage feedthrough banana plugs on inside of HIGH VOLTAGE FEEDTHROUGH FLANGE.
- 5.6 **REMOVE** and **RETAIN** barrel connectors and dust caps (blue-dot caps) from 50-foot detonator cables.
- 5.7 **ATTACH** four 50-foot detonator cables to EXTERIOR DETONATOR JACK in sequence (CH1 through CH4), as shown in Figure 4-1.
- 5.8 If installed, **REMOVE** EXTERNAL DETONATOR SHORTING JACK.

Note

Maintain numerical sequence of 50-foot detonator cables with numerical sequence of CDU module (CH1 through CH4). See Figure 4-1.

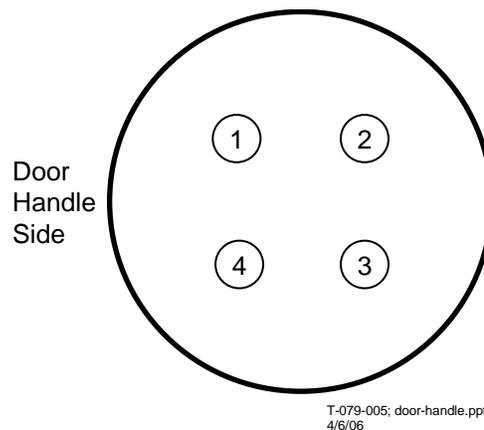


Figure 4-1. High Voltage Feedthrough Flange Exterior View

- 5.9 **INSTALL** EXTERIOR DETONATOR JACK to high voltage detonator feedthrough banana plugs located on HIGH VOLTAGE FEEDTHROUGH FLANGE exterior.
- 5.10 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to ON.
- 5.11 **TOGGLE** either of two LOAD CONTINUITY meter switches to ON.
- 6.0 **CONDUCT** continuity check of 50-foot detonator cables.
 - 6.1 **REMOVE** dust cap from connector below selected LOAD CONTINUITY meter on TEST INTERFACE CHASSIS.
 - 6.2 **DISCONNECT** 4-foot detonator cable from CH1 from SHORTING CONNECTORS PANEL and **CONNECT** to selected LOAD CONTINUITY connector located on TEST INTERFACE CHASSIS.

Notes

In the next step, acceptable meter display reading is no greater than 030 milliohms (30 mΩ).

When any detonator cable fails continuity test, check connections and internal 9 V batteries, and retest. If detonator cable fails again, replace cable and retest. If cable fails the third test, request maintenance support.

- 6.3 **VERIFY** load continuity. **OBSERVE** LOAD CONTINUITY meter display for a reading no greater than 30 mΩ.
- 6.4 **DISCONNECT** 4-foot detonator cable from LOAD CONTINUITY connector and **CONNECT** to CH1 on SHORTING CONNECTORS PANEL on TEST INTERFACE CHASSIS.
- 6.5 **REPEAT** Steps 6.2 through 6.4 for remaining three detonator cables.
- 6.6 **TOGGLE** LOAD CONTINUITY meter switch to OFF.
- 6.7 **RE-INSTALL** dust cap to LOAD CONTINUITY connector.
- 6.8 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to OFF.

7.0 **PROCEED** as follows:

- 7.1 When donor explosives are not present, **PROCEED** to Step 8.0.
- 7.2 When donor explosives are present, **CONDUCT** continuity check of INTERIOR DETONATOR JACK ASSEMBLY as follows:
 - 7.2.1 **REMOVE** INTERIOR SHORTING TEST JACK.
 - 7.2.2 **PLACE** INTERIOR DETONATOR JACK ASSEMBLY into CONTAINMENT VESSEL.
- 7.3 **REMOVE** INTERIOR DETONATOR SHORTING PLUG from INTERIOR DETONATOR JACK ASSEMBLY.

Notes

Maintain numerical sequence of interior detonator jack assembly with numerical sequence of CDU module (CH1 through CH4). See Figure 4-2.

When only three detonator leads are connected to the interior detonator jack assembly, unused fourth firing cable *MUST* remain unobstructed. Exterior detonator jack will be connected IAW the SOP to high voltage feedthrough flange. During continuity checks, one of four detonator cables will read OPEN when checked.

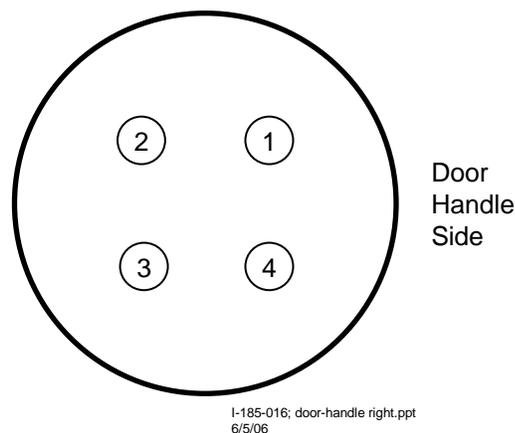


Figure 4-2. High Voltage Feedthrough Flange Interior View

- 7.4 Securely **CONNECT** INTERIOR DETONATOR JACK ASSEMBLY to high voltage feedthrough plugs on inside of HIGH VOLTAGE FEEDTHROUGH FLANGE.
- 7.5 Team Leader will **PERFORM** the following:
 - 7.5.1 **VERIFY** all detonator lead wires are properly connected to INTERIOR DETONATOR JACK ASSEMBLY.
 - 7.5.2 **CALL OUT** which exploding bridge wire detonator (conical-shaped charge [CSC] or linear-shaped charge [LSC]) is connected to which feedthrough IAW Figure 4-2.

CALLOUT: Announce feedthrough connections.

- 7.6 Partially **CLOSE** CONTAINMENT VESSEL DOOR.
 - 7.6.1 **VERIFY** clamps are positioned so as not to interfere with movement of CONTAINMENT VESSEL door.
 - 7.6.2 **DON** leather gloves.
 - 7.6.3 Carefully **ROUTE** detonator lead wires to avoid pinching them when CONTAINMENT VESSEL door is partially CLOSED.
 - 7.6.4 Partially **CLOSE** CONTAINMENT VESSEL door without pinching detonator lead wires or contacting sealing surfaces.
- 7.7 **TOGGLE** TEST INTERFACE CHASSIS 24-VOLT POWER switch to ON.
- 7.8 **TOGGLE** one of the two LOAD CONTINUITY meter switches to ON.
- 7.9 **REMOVE** dust cap from connector below selected LOAD CONTINUITY meter on TEST INTERFACE CHASSIS.
- 7.10 **DISCONNECT** 4-foot detonator cable from CH1 on SHORTING CONNECTORS PANEL and **CONNECT** to selected LOAD CONTINUITY connector located on TEST INTERFACE CHASSIS.

Notes

In the next step, acceptable meter display reading is no greater than 030 mΩ.

If any interior detonator jack assembly detonator lead fails continuity test, check connections and internal 9 V batteries, and retest. If detonator lead fails again, replace interior detonator jack assembly and retest. If test fails for third time, request maintenance support.

- 7.11 **VERIFY** load continuity. **OBSERVE** LOAD CONTINUITY meter display for a reading no greater than 030 (30 mΩ).
- 7.12 **DISCONNECT** 4-foot detonator cable from LOAD CONTINUITY connector, and **CONNECT** to CH1 on SHORTING CONNECTORS PANEL on TEST INTERFACE CHASSIS.
- 7.13 **REPEAT** Steps 7.9 through 7.12 for remaining three detonating cables.
- 7.14 **TOGGLE** LOAD CONTINUITY meter switch to OFF.
- 7.15 **RE-INSTALL** dust cap to LOAD CONTINUITY connector.
- 7.16 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to OFF.
- 7.17 **DISCONNECT** INTERIOR DETONATOR JACK ASSEMBLY from high voltage feedthrough plugs on inside of HIGH VOLTAGE FEEDTHROUGH FLANGE.
- 7.18 **CONNECT** INTERIOR DETONATOR SHORTING PLUG to INTERIOR DETONATOR JACK ASSEMBLY.
- 7.19 **PLACE** INTERIOR DETONATOR JACK ASSEMBLY back into shipping container until needed.

WARNING

AN ELECTRICAL SHOCK HAZARD POTENTIAL EXISTS DURING FOLLOWING STEPS. EDS TRAILER MUST BE CLEARED OF ALL PERSONNEL AND CONTACT WITH EXPOSED METAL PARTS MUST BE AVOIDED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 8.0 **PREPARE** to conduct high potential (HI-POT) test on 50-foot detonator cables and high voltage feedthroughs.
 - 8.1 **CONFIRM** Fireset Operator has possession and maintains control of SAFETY INTERLOCK PLUG.
 - 8.2 **VERIFY** INTERIOR SHORTING TEST JACK is not installed.
 - 8.3 **VERIFY** personnel are clear of EDS Trailer and detonator cables throughout remainder of HI-POT test.

- 9.0 **CONNECT** EDS FIRING SYSTEM to HI-POTTER OUTPUT MODULE.
 - 9.1 **INSERT** and **SECURE** SAFETY INTERLOCK PLUG into HI-POTTER INTERLOCK connector located on right side of HI-POTTER OUTPUT CHASSIS.
 - 9.2 **TOGGLE** HI-POTTER LINE POWER switch to ON position and **OBSERVE** that LINE POWER switch light and green READY light illuminate.
 - 9.3 **REMOVE** dust cap from HI-POTTER INTERFACE HIGH VOLTAGE connector.
 - 9.4 If required, **PRESS** RESET button to return OUTPUT VOLTAGE display to 0.00 volts.
 - 9.5 **DISCONNECT** CH1 4-foot detonator cable from SHORTING CONNECTORS PANEL on TEST INTERFACE CHASSIS and **CONNECT** to HIGH VOLTAGE connector on HI-POTTER INTERFACE CHASSIS.

WARNING

FOLLOWING STEP APPLIES DANGEROUS LEVELS OF ELECTRICITY (4.2 KILOVOLTS (kV) AT 30 MICRO AMPS) TO DETONATOR CABLE UNDER TEST. DO NOT REMOVE CONNECTION TO HI-POTTER OUTPUT PANEL BEFORE DIRECT CURRENT VOLTMETER RETURNS TO ZERO AND HIGH VOLTAGE ON LIGHT STOPS FLASHING. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Note

Faulty high voltage feedthrough conductor, exterior detonator jack, or detonator cable will cause an audible alarm to sound and the FAIL light to illuminate.

10.0 CONDUCT HI-POT test.

10.1 PRESS and RELEASE START button on HI-POTTER INTERFACE CHASSIS to test CH1 detonator cable and OBSERVE for the following:

10.1.1 DC voltmeter OUTPUT VOLTAGE increases to 4,210 volts and remains there for approximately 10 seconds.

10.1.2 WATCH for high voltage ON light to begin to flash and then stop.

10.1.3 PRESS RESET button to return OUTPUT VOLTAGE display to 0.00 volts.

10.1.4 PROCEED as follows:

10.1.4.1 When VOLTAGE OUTPUT displays 0.00 volts, high voltage ON light stops flashing, and there is no audible alarm, PROCEED to Step 10.3.

10.1.4.2 When audible alarm sounds and/or the high voltage ON light does not illuminate, PERFORM the following:

10.1.4.2.1 TOGGLE HI-POTTER LINE POWER switch to OFF position and RE-INSTALL dust cap.

- 10.1.4.2.2 **REMOVE** SAFETY INTERLOCK PLUG from HI-POTTER INTERLOCK connector on HI-POTTER INTERFACE CHASSIS.
- 10.1.4.2.3 **INSPECT** all connections and **REPLACE** faulty cable(s) or connection(s).
- 10.1.4.2.4 **RETURN** to Step 9.1 and **RESUME** HI-POT test.

- 10.2 **DISCONNECT** CH1 detonator cable from HIGH VOLTAGE connector on HI-POTTER INTERFACE CHASSIS and **CONNECT** to SHORTING CONNECTORS PANEL (CH1) on TEST INTERFACE CHASSIS.
- 10.3 **REPEAT** Steps 9.5 through 10.2 for remaining detonator cables (CH2 through CH4) and then **PROCEED** to Step 11.0.

- 11.0 **SHUT DOWN** HI-POTTER INTERFACE CHASSIS.
 - 11.1 **TOGGLE** HI-POTTER LINE POWER switch to OFF position and **RE-INSTALL** dust cap.
 - 11.2 **REMOVE** SAFETY INTERLOCK PLUG from HI-POTTER INTERLOCK connector on HI-POTTER INTERFACE CHASSIS.

- 12.0 **STOW** 50-foot detonator cables.
 - 12.1 **DISCONNECT** EXTERIOR DETONATOR JACK from high voltage feedthrough banana plugs on outside of HIGH VOLTAGE FEEDTHROUGH FLANGE.
 - 12.2 **STOW** 50-foot detonator cables with attached EXTERIOR DETONATOR JACK in designated area.
 - 12.3 **INSTALL** EXTERIOR DETONATOR SHORTING JACK to high voltage feedthrough banana plugs on outside of HIGH VOLTAGE FEEDTHROUGH FLANGE.

- CALLOUT: Announce time HI-POT test completed.**

- 13.0 **RECORD** HI-POT test is complete.

Caution

Excessive Dry Run Load testing of CDU module may cause unnecessary wear on CDU module components.

14.0 **PERFORM** one of the following:

14.1 When not conducting Dry Run Load Test, **PROCEED** to Procedure 5.

14.2 When Dry Run Load Test is being conducted due to initial setup or EDS FIRING SYSTEM CHASSIS was replaced, **PROCEED** as follows:

14.2.1 **PREPARE** to conduct Dry Run Load Test of EDS FIRING SYSTEM CHASSIS by performing one of the following:

14.2.1.1 When not using the CONTROL MODULE in the remote configuration, **PROCEED** as follows:

14.2.1.1.1 **VERIFY** 29-inch internal control cable J29A connector is not connected to EDS FIRING SYSTEM CHASSIS J29B INPUT connector.

14.2.1.1.2 **CONNECT** 12-inch control cable to CONTROL MODULE J3B OUTPUT connector and **CONNECT** other end to EDS FIRING SYSTEM CHASSIS J29B INPUT connector.

14.2.1.1.3 **PROCEED** to Step 14.2.2.

14.2.1.2 When using the CONTROL MODULE in the remote configuration, **PROCEED** as follows:

14.2.1.2.1 **VERIFY** 29-inch internal control cable J29A connector is connected to EDS FIRING SYSTEM CHASSIS J29B INPUT connector.

14.2.1.2.2 **CONNECT** selected control cable to CONTROL MODULE J3B OUTPUT connector and **CONNECT** other end to external mating CONTROL connector on left side of EDS FIRING SYSTEM CASE.

- 14.2.2 **CONNECT** LOAD MODULE test cable to any channel (CH1 through CH4) on CDU MODULE.
- 14.2.3 **INSERT** SAFETY INTERLOCK PLUG into INTERLOCK connector on TEST INTERFACE CHASSIS.
- 14.2.4 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to ON.
- 14.2.5 **VERIFY** TRIGGER and CDU BITE indicators are set to BLACK position (**TURN** BITE indicator dial gently clockwise until indicators are set to BLACK).
- 14.2.6 **TOGGLE** CONTROL MODULE POWER switch to ON. **OBSERVE** red light emitting diode HIGH VOLTAGE meter and green POWER light illuminate.
- 14.2.7 **TOGGLE** CONTROL MODULE ARM switch to ON and **OBSERVE** that amber READY light and red ARM light illuminate.

WARNING

THE FOLLOWING STEP APPLIES DANGEROUS LEVELS OF ELECTRICITY (UP TO 3.1 kV) TO THE DETONATOR CABLES UNDER TEST. DO NOT DISCONNECT CABLES WHILE SYSTEM IS ARMED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 14.2.8 To fire, **TOGGLE UP** and **RELEASE** CONTROL MODULE FIRE switch and **OBSERVE** for the following:
 - 14.2.8.1 Amber READY light should momentarily flash OFF and then ON.
 - 14.2.8.2 Blue FIRE light illuminates.
 - 14.2.8.3 TRIGGER and CDU BITE indicators trip to white.

15.0 **COMPLETE** Dry Run Load Test.

- 15.1 **CLOSE** cover on FIRE and ARM switches.
- 15.2 **VERIFY** that voltage on HIGH VOLTAGE meter achieves 0 volts.
- 15.3 **TOGGLE** CONTROL MODULE POWER switch to OFF.
- 15.4 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to OFF.
- 15.5 **REMOVE** SAFETY INTERLOCK PLUG from INTERLOCK connector on TEST INTERFACE CHASSIS.
- 15.6 **DISCONNECT** LOAD MODULE test cable from selected channel on CDU MODULE.
- 15.7 **STOW** LOAD MODULE in EDS FIRING SYSTEM accessories drawer.

CALLOUT: Announce time Dry Run Load Test completed.

16.0 **PROCEED** as follows:

- 16.1 When having performed initial EDS FIRING SYSTEM setup, **PROCEED** to Procedure 5.
- 16.2 When having prepared and replaced defective EDS FIRING SYSTEM while preparing to detonate munition(s), **PROCEED** to Procedure 9.

SPECIAL REQUIREMENTS:

None.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
EDS operator log	1 each
Indelible ink pen	1 each
50-foot detonator cable	4 each
4-foot detonator cable	4 each
300-foot control cable	1 each
30-foot control cable	1 each
12-inch control cable	1 each
29-inch internal control cable	1 each
Dust cap (blue-dot)	8 each
Exterior detonator jack	1 each
Exterior detonator shorting jack	1 each
Exterior ground rod base	1 each
Safety interlock plug	2 each
High voltage feedthrough assembly	4 each
Interior ground rod/spider assembly	1 each
Interior detonator jack assembly	as required
Interior detonator shorting plug	3 each
Interior detonator test jack	1 each
Duct tape	1 roll
50-foot extension cord	1 each
EDS Firing System	2 each

**PROCEDURE 5
SELECT MUNITIONS HOLDER
AND EXPLOSIVES FOR MUNITION**

The purpose of this procedure is to secure loading table in front of EDS containment vessel opening and to allow pre-positioning of the munition(s) holder(s) and explosives prior to loading munition.

- 1.0 **VERIFY** Grayloc[®] metal seal is in place.
- 2.0 **SECURE** front and rear **LOADING TABLES** to grating.

WARNINGS

FRONT LOADING TABLE WEIGHS APPROXIMATELY 65 POUNDS AND IS CUMBERSOME TO HANDLE. USE TWO OPERATORS WHEN LIFTING AND POSITIONING TABLE.

REAR LOADING TABLE WEIGHS APPROXIMATELY 78 POUNDS AND IS CUMBERSOME TO HANDLE. USE TWO OPERATORS WHEN LIFTING AND POSITIONING TABLE.

WEAR LEATHER GLOVES WHEN HANDLING HEAVY OBJECTS OR OBJECTS WITH SHARP EDGES.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 2.1 **PRE-POSITION** FRONT LOADING TABLE.
 - 2.1.1 **POSITION** FRONT LOADING TABLE (Teflon[®] bumper toward **CONTAINMENT VESSEL** with beveled guides to the rear) in front of **CONTAINMENT VESSEL** with **EDS CONTAINMENT VESSEL** door open.

Note

Loading table swivel loading mounts may require readjustment after a complete munitions holder assembly is placed on it.

- 2.1.2 **ADJUST** swivel leveling mounts on each table leg until table top is slightly above bottom, inside edge of metal door seal.
 - 2.1.3 **TURN** adjusting handles counterclockwise to lower T-clamps attached to LOADING TABLE through floor grating.
 - 2.1.4 **POSITION** T-clamps to catch under bar of grating.
 - 2.1.5 **SECURE** clamps by pulling up T-clamp handles and **TIGHTEN** jam nuts as necessary.
 - 2.1.6 When used, **LIFT/SLIDE** single round splash shield onto top support plate so that it is centered along the long axis. **DRAW** first line across opening of splash shield onto top support plate. **MEASURE** and **DRAW** second line 2.5 inches $\pm 1/4$ inch behind first line.
- 2.2 **PRE-POSITION REAR LOADING TABLE.**
- 2.2.1 **POSITION** REAR LOADING TABLE so table hook on front of table is placed over the rear catch on the FRONT LOADING TABLE.
 - 2.2.2 **ADJUST** table hook to pull REAR LOADING TABLE in close to FRONT LOADING TABLE.
 - 2.2.3 **ADJUST** swivel leveling mounts on each table leg until table top is flush with forward table top.
 - 2.2.4 **TURN** adjusting handles counterclockwise to lower T-clamps attached to LOADING TABLE through floor grating.
 - 2.2.5 **POSITION** T-clamp to catch under bar of grating.
 - 2.2.6 **SECURE** clamps by pulling up T-clamp handles and **TIGHTEN** jam nuts as necessary.
 - 2.2.7 **REPEAT** Steps 2.2.1 through 2.2.6 to install an additional REAR LOADING TABLE, if necessary.

Notes

4.2-Inch mortars, 105mm projectiles, or like sized items can be processed in either the new style 3-Round, or 6-Round 4.2-Inch munitions holder configuration.

For munition types not listed, consultation with Sandia National Laboratories (SNL) explosive engineers is required.

Munition holders vary in size and/or shape to accommodate the following:

- a. **4.2-Inch mortar munition holder (Procedure 7, Figure 7-1)**
- b. **6-Round 155mm projectile multiple munitions (Procedure 7, Figure 7-2)**
- c. **6-Round mixed multiple munitions (Procedure 7, Figure 7-3)**
- d. **New style 4.2-Inch mortar 3-round multiple munitions (Procedure 7, Figure 7-8).**
- e. **New style 4.2-Inch mortar 6-round multiple munitions (Procedure 7, Figure 7-9).**

3.0 **DON** leather gloves, as needed. **PROCEED** as follows:

3.1 When using AFSS, **PERFORM** the following:

- 3.1.1 **VERIFY** AFSS has been installed in CONTAINMENT VESSEL.
- 3.1.2 **VERIFY** eight (8) friction tabs (four in front and four in rear) are installed on AFSS.
- 3.1.3 If used, **VERIFY** top and bottom support plates are installed in AFSS and are level and securely resting on AFSS rods.

Note

Generally, aft end of munition(s) holder is positioned facing rear end of containment vessel.

- 3.1.4 If used, **VERIFY** munitions holder track is installed and sliding surfaces are lubricated using N-7000™.

4.0 **INSPECT** munition(s) holder and explosives.

4.1 **REMOVE** assembly from shipping container.

- 4.2 **CHECK** serviceability and **VERIFY** completeness of assembly.
 - 4.2.1 Stopper block or bottom block, if applicable.
 - 4.2.2 Munition(s) holder.
 - 4.2.3 Optional strain relief clips (binder clips).
 - 4.2.4 Teflon skid buttons in place, if applicable.
- 4.3 **CHECK** serviceability and **VERIFY** completeness of donor explosive items.
 - 4.3.1 LSC(s).
 - 4.3.2 RP-1 LSC detonator assemblies (two per LSC).
 - 4.3.3 **INSPECT** LSC(s). **REPLACE** damaged LSCs.
 - 4.3.4 **PLACE** items back into shipping container until final munition(s) holder assembly.

Note

Generally, aft end of munition(s) holder is positioned facing rear end of containment vessel.

- 5.0 **POSITION** munition(s) holder onto LOADING TABLE and **PROCEED** as follows:
 - 5.1 When using a single round munition holder, **PLACE** munition holder so munition holder tab (tall end for 105mm projectile or 4.2-Inch mortar) is facing rear of CONTAINMENT VESSEL. **PROCEED** as follows:
 - 5.1.1 **VERIFY** sheet metal splash shield has been placed into CONTAINMENT VESSEL.
 - 5.1.2 **PROCEED** to Step 6.0.
 - 5.2 When using the new style munitions holder, **PROCEED** as follows:
 - 5.2.1 **VERIFY** INTERIOR DETONATOR SHORTING PLUG is connected to INTERIOR DETONATOR JACK ASSEMBLY.

- 5.2.2 **SEPARATE** RP-1 detonators by color of shrink wrap surrounding detonator lead wires and by set (one set of red, white, and black for use on forward LSC ends and other set for aft LSC ends). (See Figures 7-5 and 7-7.)

Note

Front end of LSC holder has two small wings with a hole in each wing to secure LSC holder to the munitions holder.

- 5.2.3 **PLACE** munitions holder on LOADING TABLE(s).
- 5.2.4 **INSTALL** topmost LSC in LSC holder.
- 5.2.5 **ROUTE** one set of detonator lead wires through the two slots in topmost LSC slot from the front to the rear of the LSC holder.
- 5.2.6 **INSTALL** remaining LSC(s) in LSC holder.
- 5.2.7 **SECURE** LSC(s) and detonator lead wires in LSC holder using two zip ties.
- 5.2.8 **ASSEMBLE** and **CONNECT MULTIPLE INTERIOR DETONATOR JACK ASSEMBLY** to LSC holder as follows:
- 5.2.8.1 **SLIDE** detonator lead assembly wires through detonator adapter slot.
- 5.2.8.2 **SECURE** RP-1 detonator in detonator adapter by gently pulling on detonator lead assembly wires until RP-1 detonator is fully seated in detonator adapter.
- 5.2.8.3 **SCREW** detonator adapter into LSC holder.

Note

Detonator tip must touch the end of the LSC.

- 5.2.8.4 **OBSERVE** and **VERIFY** RP-1 detonator tip touches LSC end.
- 5.2.8.5 **VERIFY** matching shrink-wrapped color detonator lead wires are on opposite ends of the same LSC.

- 5.2.8.6 **PERFORM** Steps 5.3.8.1 through 5.3.8.5 for remaining detonator lead assemblies. **PROCEED** to Step 5.3.8.7.
- 5.2.8.7 **CALLOUT** which shrink-wrapped color detonator lead wire is attached to which LSC.

CALLOUT: Announce detonator lead connections (LSC to CH2, LSC to CH3, etc.).

Note

Groove in bottom of LSC holder rides on top of munitions holder center rod when LSC holder is being inserted into munitions holder.

- 5.2.9 **SLIDE** LSC holder (groove side down) into munitions holder and **SECURE** it.
- 5.2.10 **COIL** detonator lead wires and **ATTACH** strain relief clips to munitions holder, if necessary.
- 5.2.11 **INSTALL** protective endplates onto munitions holder.
- 5.2.12 Team Leader will **PERFORM** the following:
 - 5.2.12.1 **VERIFY** LSC holder is properly installed in munitions holder.

Note

Detonator tip must touch the end of the LSC.

- 5.2.12.2 **VERIFY** RP-1 detonator tips touch ends of LSC(s).
- 5.2.12.3 **VERIFY** matching shrink-wrapped color detonator lead wires are on opposite ends of the same LSC.
- 5.2.12.4 **CALL OUT** which shrink-wrapped color detonator lead wire is connected to which LSC.

CALLOUT: Announce detonator lead connections (LSC to CH2, LSC to CH3, etc.).

- 5.2.13 **PROCEED** to Step 8.0.

6.0 **PROCEED** to Procedure 6.

SPECIAL REQUIREMENTS:

1. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Front loading table	1 each
Rear loading tables	2 each
Primary tool kit	1 each
Strain relief clips (large binder clips)	4 each
Leather gloves	as required
Duct tape	1 roll
Dead blow hammer	1 each
AFSS	1 each as required
- AFSS Main Unit	1 each
- AFSS rod	92 each
- Friction tabs	4 each
- Paddle gap cover	1 each
- Top support plate	1 each as required
- Bottom support plate	1 each as required
Munition Holder (4.2-Inch, Livens, 105mm, M125 Cluster Bomb, or Typical Munition)	1 each per munition
- Munition holder	1 each
LSC	1 each
LSC detonator clips	2 each
Exploding bridge wire detonator, RP-1	2 each
Interior detonator jack assembly	1 each
Interior detonator shorting plug	1 each
Splash shield	1 each
New Style 4.2-Inch Mortar 3-Round Munitions Holder (1 to 3 Rounds)	1 each per operation
- Munitions holder	1 each as specified
LSC	as required
LSC holder	1 each
Exploding bridge wire detonator, RP-1	as required
Interior detonator jack assembly	1 each
Interior detonator shorting plug	1 each
LSC disrupter	as required
Detonator adapter	as required

EQUIPMENT, TOOLS, AND SUPPLIES: (Continued)

<u>ITEM:</u>	<u>QUANTITY:</u>
New Style 4.2-Inch Mortar 6-Round Munitions Holder (4 to 6 Rounds)	
- Munitions holder	1 each per operation
LSC	1 each as specified
LSC holder	as required
Exploding bridge wire detonator, RP-1	1 each
Interior detonator jack assembly	as required
Interior detonator shorting plug	1 each
LSC disrupter	1 each
Detonator adapter	as required
Protective endplate	as required
	2 each
New Style 155mm 6-Round Munitions Holder (4 to 6 Rounds)	
- Munitions holder	1 each per operation
LSC	1 each as specified
LSC holder	as required
Exploding bridge wire detonator, RP-1	1 each
Interior detonator jack assembly	as required
Interior detonator shorting plug	1 each
LSC disrupter	1 each
Detonator adapter	as required
Protective endplate	as required
Munitions holder track	2 each
	1 each
New Style Mixed 6-Round Munitions Holder (4 to 6 Rounds)	
- Munitions holder	1 each per operation
LSC	1 each as specified
LSC holder	as required
Exploding bridge wire detonator, RP-1	1 each
Interior detonator jack assembly	as required
Interior detonator shorting plug	1 each
LSC disrupter	1 each
Detonator adapter	as required
Protective endplate	as required
	2 each

PROCEDURE 6 TRANSFER MUNITION

The purpose of this procedure is to provide operating guidelines for the custody transfer of the munition being processed in the EDS.

PRECONDITIONS:

1. Review data for chemical munition(s) being processed.
2. EDS must be set up and ready to receive a munition(s) for processing.
3. PDS must be available.
4. Air monitoring must be operational.
5. Pre-operations checklist must be completed.

WARNINGS

PPE LEVELS WILL BE WORN ACCORDING TO THE TASK BEING PERFORMED AND IN CONJUNCTION WITH MONITORING RESULTS IAW ANNEX G, PPE LEVELS.

DON PPE WHEN MUNITION IS NOT OVERPACKED.

EXTREME CARE MUST BE USED WHEN HANDLING AN ARMED MUNITION. UNDUE MOVEMENT OR ROUGH HANDLING MAY CAUSE THE MUNITION TO DETONATE.

WHEN OVERPACK/MUNITION IS TOO HEAVY FOR ONE PERSON TO HAND CARRY, USE TWO OPERATORS OR HANDTRUCK.

PROCESS ONLY MUNITION(S) THAT HAVE BEEN PROPERLY IDENTIFIED.

FAILURE TO DON LEATHER GLOVES MAY CAUSE RUBBER GLOVES TO BE COMPROMISED WHEN COMING INTO CONTACT WITH SHARP EDGES.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Notes

Two-Person Rule will be strictly enforced when having access to and/or conducting operations involving chemical surety material. At least two Chemical Personnel Reliability Program (CPRP) personnel (only one may be interim-certified) of which both must be equally qualified in the task(s) being performed, capable of recognizing an unsafe act, performing self- or buddy-aid in case of chemical agent exposure, and able to detect unauthorized acts on the part of the other are required when the Two-Person Rule is in effect.

When chemical surety material (CSM) cannot be removed from environmental enclosure and returned to permitted storage igloo (H1102), compensatory measures will be activated and will be in compliance with AR 190-59, Para 15-4a. At a minimum, measures will include notifying Pueblo Chemical Depot (PCD) Operations Center and coordinating with PCD for security support (CSM has to be protected at all times against sabotage, theft, loss, seizure, or unauthorized access, use, or diversion).

1.0 **CLEAR** area.

1.1 **ARRANGE** for security personnel to exclude all non-essential personnel from the EDS site (Figure 1-1).

CALLOUT: Obtain authorization for munition to be delivered to the EDS site.

2.0 **VERIFY** receipt of munition.

2.1 **COMPARE** the munition container serial number or other inventory control marking against accompanying documentation.

CALLOUT: Announce munition identification number and verify Monitoring is aware of number.

2.2 **COMPLETE** and **SIGN** accompanying documentation.

2.3 **TAKE** custody of the munition item and **RECORD** serial number and time.

CALLOUT: Announce time transfer completed.

3.0 **DON** PPE.

3.1 **DON** appropriate PPE IAW Annex G.

3.2 **PROCEED** to PDS for PPE checkout by PDS operators.

4.0 **PERFORM** one of the following:

4.1 When munition is not overpacked, **PROCEED** to Step 10.0.

4.2 When munition is overpacked, **PROCEED** as follows:

4.2.1 **EXAMINE** exterior of munition overpack for leaks and structural damage that may indicate damage to the contents.

4.2.2 If necessary, **SECURE** overpack to MHE.

4.2.3 **VERIFY** plastic bag(s) have been placed in hazardous waste catch tray.

5.0 **PREPARE** overpack(s).

5.1 **DON** leather gloves, as required.

5.2 **PROCEED** as follows:

5.2.1 When not headspace monitoring overpack(s) contents, **PROCEED** to Step 5.3.

5.2.2 When headspace monitoring overpack(s) contents, **NOTIFY** Monitoring that monitoring activities will commence shortly.

5.3 **PERFORM** one of the following:

5.3.1 When munition overpack can be hand carried to unpack area, **PROCEED** to Step 6.0.

5.3.2 When munition overpack is too heavy to hand carry, **USE** MHE to move munition overpack to unpack area.

WARNING

FAILURE TO REMAIN IN ENVIRONMENTAL ENCLOSURE WHILE WAITING FOR VAPOR MONITORING RESULTS COULD CAUSE THE SPREAD OF CONTAMINATION. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Notes

Monitor items IAW local monitoring program.

When processing multiple items, monitor overpacks and munitions one at a time, all at once, or as directed by command post.

Decontaminate overpacks and packaging material IAW Annex I.

6.0 **PERFORM** one of the following:

6.1 When not headspace monitoring, **PROCEED** to Step 7.1.

6.2 When headspace monitoring only a single overpack without inner sealed containers, **PROCEED** to Step 7.0.

6.3 When headspace monitoring overpack(s) containing sealed container(s), **PROCEED** to Step 8.0.

7.0 **PERFORM** headspace monitoring of a single overpack without inner sealed containers.

7.1 **BREAK** overpack seal.

7.2 **REMOVE** overpack lid and **PLACE** overpack lid into hazardous waste catch tray.

7.3 **PERFORM** one of the following:

7.3.1 When headspace monitoring, **PROCEED** to Step 7.4.

7.3.2 When not headspace monitoring, **PROCEED** to Step 9.0.

7.4 When munition is in a plastic bag, **OPEN** plastic bag.

- 7.5 **PLACE** and **SECURE** monitoring line into overpack, **PERFORM** one of the following:
 - 7.5.1 When headspace monitoring results are non-detect, **REMOVE** monitoring line. **PROCEED** to Step 9.0.
 - 7.5.2 When headspace monitoring results are not non-detect, **PROCEED** as directed.

- 8.0 **MONITOR** headspace of overpack(s) holding sealed container(s).
 - 8.1 **PROCEED** as follows:
 - 8.1.1 When monitoring only one overpack at a time, **PROCEED** to Step 8.2.
 - 8.1.2 When monitoring more than one overpack at a time, **PROCEED** to Step 8.3.

 - 8.2 When monitoring only one overpack at a time, **PERFORM** the following:
 - 8.2.1 **BREAK** overpack seal, **REMOVE** overpack lid, and **PLACE** lid into hazardous waste catch tray.

 - 8.2.2 **PERFORM** one of the following:
 - 8.2.2.1 When overpack does not have inner sealed containers, **PROCEED** to Step 8.2.3.

 - 8.2.2.2 When overpack has inner sealed containers, **PROCEED** as follows:
 - 8.2.2.2.1 **BREAK** seal(s) on container(s).

 - 8.2.2.2.2 **REMOVE** container(s) lid(s) and **PLACE** lid(s) into hazardous waste catch tray.

 - 8.2.3 When munition(s) is in a plastic bag, **OPEN** plastic bag(s).

Note

Monitor items IAW local monitoring program.

- 8.2.4 **PLACE** and **SECURE** monitoring line into overpack, **PERFORM** one of the following:
 - 8.2.4.1 When headspace monitoring results are non-detect, **REMOVE** monitoring line and **PERFORM** one of the following:
 - 8.2.4.1.1 When processing another overpack, **RETURN** to Step 8.2.
 - 8.2.4.1.2 When there are no more overpacks, **PROCEED** to Step 9.0.
 - 8.2.4.2 When headspace monitoring results are not non-detect, **PROCEED** as directed.
- 8.3 When monitoring more than one overpack at a time, **PERFORM** the following:
 - 8.3.1 **BREAK** overpack seals, **REMOVE** overpack lids, and **PLACE** lids into hazardous waste catch tray.
 - 8.3.2 **PERFORM** one of the following:
 - 8.3.2.1 When overpack does not have inner sealed containers, **PROCEED** to Step 8.3.3.
 - 8.3.2.2 When overpack has inner sealed containers, **PROCEED** as follows:
 - 8.3.2.2.1 **BREAK** seal(s) on container(s).
 - 8.3.2.2.2 **REMOVE** container(s) lid(s) and **PLACE** lid(s) into hazardous waste catch tray.
 - 8.3.3 When munition(s) is in a plastic bag, **OPEN** plastic bag(s).

8.3.4 **COVER** overpacks with plastic sheeting.

Note

Monitor items IAW local monitoring program.

8.3.5 **PLACE** and **SECURE** monitoring line under plastic sheeting and **PERFORM** one of the following:

8.3.5.1 When headspace monitoring results are non-detect, **PROCEED** as follows:

8.3.5.1.1 **REMOVE** monitoring line.

8.3.5.1.2 **REMOVE** plastic sheeting and **PLACE** plastic sheeting into solid wastes drum.

8.3.5.1.3 **PROCEED** to Step 9.0.

8.3.5.2 When headspace monitoring results are not non-detect, **PROCEED** as directed.

9.0 **REMOVE** munition(s) from overpack(s).

9.1 **PROCEED** as follows:

9.1.1 When munition(s) is not heavy, **PERFORM** the following:

9.1.1.1 Carefully **SLIDE** munition(s) out of overpack(s) to minimize impact.

9.1.1.2 **CLOSE** and **SEAL** overpack(s) and overpack lid(s) inside of plastic sheeting/bag(s).

9.1.1.3 **PROCEED** to Step 10.0.

WARNING

A 155MM PROJECTILE WEIGHS APPROXIMATELY 100 POUNDS. USE APPROPRIATE LIFTING TECHNIQUES AND MAINTAIN POSITIVE CONTROL WHEN MOVING PROJECTILE. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

9.1.2 When munition(s) is heavy, **PERFORM** the following:

9.1.2.1 **VERIFY** hazardous waste catch tray has been positioned on EDS Trailer.

9.1.2.2 **VERIFY** plastic bag(s) have been placed in hazardous waste catch tray

9.1.2.3 **OPEN** loading gate.

9.1.2.4 **USE** MHE and **MOVE** munition overpack to EDS Trailer.

9.1.2.5 **POSITION** overpack beside EDS Trailer and **REMOVE** MHE.

Note

Refer to Annex L for use of EDS Lift Assist Subsystem.

9.1.2.6 **REMOVE** heavy munition(s) from overpack and **POSITION** munition(s) into hazardous waste catch tray on EDS Trailer.

- 10.0 **CONDUCT** a visual inspection of munition(s) for leaks or patches.
RECORD information and **PERFORM** as follows:
 - 10.1 When munition is not in a plastic bag, **PROCEED** to Step 10.3.
 - 10.2 When munition is in a plastic bag, **PROCEED** to Step 10.4.
 - 10.3 **PROCESS** munition not in a plastic bag as follows:
 - 10.3.1 When munition is not leaking, **PROCEED** to Step 11.0.
 - 10.3.2 When munition is leaking, **NOTIFY** EDS Crew Supervisor and **PROCEED** as follows:
 - 10.3.2.1 When PPE level is appropriate, **PROCEED** to Step 10.3.2.3.
 - 10.3.2.2 When PPE level is not appropriate, **PROCEED** as follows:
 - 10.3.2.2.1 **EVACUATE** Exclusion Zone and **PROCESS** through PDS.
 - 10.3.2.2.2 **UPGRADE** PPE and **PROCESS** through PDS to re-enter Exclusion Zone.
 - 10.3.2.3 **PLACE** munition into plastic bag and seal plastic bag. **PROCEED** to Step 10.5.
 - 10.4 **PROCESS** munition in a plastic bag as follows:
 - 10.4.1 When munition is not leaking, **REMOVE** munition from the plastic bag, as directed. **PROCEED** to Step 11.0.
 - 10.4.2 When munition is leaking, **DO NOT REMOVE** it from plastic bag. **NOTIFY** EDS Crew Supervisor and **PROCEED** as follows:
 - 10.4.2.1 When PPE level is appropriate, **PROCEED** to Step 10.4.2.3.
 - 10.4.2.2 When PPE level is not appropriate, **PROCEED** as follows:
 - 10.4.2.2.1 **EVACUATE** Exclusion Zone and **PROCESS** through PDS.

10.4.2.2.2 **UPGRADE** PPE and **PROCESS** through PDS to re-enter Exclusion Zone.

10.4.2.3 **PLACE** bagged munition into plastic bag and seal plastic bag. **PROCEED** to Step 10.5.

Note

Monitor items IAW local monitoring program.

10.5 When required, **DECONTAMINATE** the immediate work area and **PERFORM** monitoring.

11.0 **ASSESS** fuze and munition.

11.1 When fuze is present, **RECORD** fuze information.

11.2 **EVALUATE** and **RECORD** munition information.

11.2.1 Visually **INSPECT** munition for key identification features attributable to high explosive munitions (welded base plate, absence of burster adapter, color-coding, and permanent markings).

11.2.2 **RECORD** munition information.

CALLOUT: Describe munition configuration (bagged/unbagged, fuze wrapped with plaster of Paris, munition leak sealed, level of deterioration, overpacked/not overpacked) and obtain photographs.

12.0 **CONTINUE** processing munition(s) as follows:

12.1 When processing only a single round, **PERFORM** the following:

12.1.1 **REQUEST** permission to place munition into munition holder.

CALLOUT: Obtain permission to load munition into munition holder.

12.1.2 **PROCEED** to Step 13.0.

12.2 When processing multiple munitions, **PERFORM** the following:

12.2.1 **REQUEST** permission to place munition into munitions holder.

CALLOUT: Obtain permission to load munition into munitions holder.

12.2.2 **PERFORM** one of the following:

12.2.2.1 When the next munition needs headspace monitoring, **PERFORM** one of the following:

12.2.2.1.1 **RETURN** to Step 8.2.2.2.1 to headspace monitor next munition.

12.2.2.1.2 When no more munitions need headspace monitoring, **PROCEED** to Step 13.0.

12.2.2.2 When next munition does not need headspace monitoring, **PERFORM** one of the following:

12.2.2.2.1 **RETURN** to Step 9.0 and **REMOVE** next munition from overpack.

12.2.2.2.2 When all munitions have been removed from overpack(s), **PROCEED** to Step 13.0.

13.0 **PERFORM** one of the following:

13.1 When heavy munition(s) are already located on EDS Trailer, **PROCEED** as follows:

13.1.1 When loading gate is open, **CLOSE** loading gate and **PROCEED** to Procedure 7.

13.1.2 When loading gate is closed, **PROCEED** to Procedure 7.

13.2 **MOVE** munition(s) to munitions holder on EDS Trailer. **PROCEED** to Procedure 7.

SPECIAL REQUIREMENTS:

1. PPE must be worn IAW Annex G.
2. The EDS operations area must be evacuated.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
PPE IAW Annex G	1 per EDS crew member
Loading table	2 each
Hand truck	1 each
DD Form 1911, Materiel Courier Receipt	1 per item
EDS operator log	1 each
Indelible ink pen	1 each
Primary tool kit	1 each
Solids waste container	1 each
Water	5 gallons
Rags or paper towels	as required
Spill pillows	2 each
Household bleach solution (5 percent)	4 gallons
Digital camera	1 each
Hazardous waste catch tray	1 each

**PROCEDURE 7
ASSEMBLY OF MUNITIONS HOLDER AND MUNITION**

The purpose of this operation is to provide operating guidelines for the final assembly of the munitions holder(s) with a munition(s) prior to loading in the EDS containment vessel.

PRECONDITIONS:

1. EDS must be set up and ready to receive a munition for processing.
2. PDS must be available.
3. Air monitoring must be operational.
4. EDS Firing System must be operational.
5. Fireset Operator must have control of the safety interlock plug.

WARNINGS

PPE LEVELS WILL BE WORN ACCORDING TO THE TASK BEING PERFORMED AND IN CONJUNCTION WITH MONITORING RESULTS IAW PPE ANNEX OF THIS SOP.

FAILURE TO DON LEATHER GLOVES MAY CAUSE RUBBER GLOVES TO BE COMPROMISED WHEN COMING INTO CONTACT WITH SHARP EDGES.

EXERCISE CARE WHEN HANDLING OR INSTALLING MUNITION HOLDERS.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Notes

Two-Person Rule will be strictly enforced when having access to and/or conducting operations involving chemical surety material. At least two CPRP personnel (only one may be interim-certified) of which both must be equally qualified in the task(s) being performed, capable of recognizing an unsafe act, performing self- or buddy-aid in case of chemical agent exposure, and able to detect unauthorized acts on the part of the other are required when the Two-Person Rule is in effect.

Single round interior detonator jack assembly has four detonator cable assemblies attached to it; whereas, multiple round interior detonator jack assembly has six detonator cable assemblies.

- 1.0 **DON** leather gloves, as needed.
- 2.0 **ASSEMBLE** Munition(s) Holder by munition type.

Note

For munition types not listed below, consult with SNL explosive engineers for proper munition(s) holder selection and/or modification.

- 2.1 **PROCEED** to Step 3.0 for single 4.2-Inch mortar, 105mm projectile, or similar sized Department of Transportation (DOT) cylinder in single round Munition Holder.
- 2.2 **PROCEED** to Step 4.0 for New Style 155mm 6-Round Munitions Holder.
- 2.3 **PROCEED** to Step 5.0 for New Style Mixed Item 6-Round Munitions Holder.
- 2.4 **PROCEED** to Step 6.0 for New Style 4.2-Inch, 3-Round, and 6-Round Munitions Holders.

- 3.0 **LOAD** one 4.2-Inch mortar, 105mm projectile, or similar sized DOT cylinder into single round Munition Holder.
- 3.1 **PERFORM** one of the following:
- 3.1.1 When loading a 4.2-Inch mortar, **PLACE** mortar onto munition holder so it rests securely in holder with aft end of munition flush with end of holder. Munition holder tab at aft end provides exact positioning for LSC. Tapered end of munition will be coincident with short holder tab (Figure 7-1). **PROCEED** to Step 3.2.
 - 3.1.2 When loading a 105mm projectile, **PLACE** projectile onto munition holder so it is centered with aft end of munition towards rear of the CONTAINMENT VESSEL. **PROCEED** to Step 3.2.
 - 3.1.3 When loading similar sized DOT cylinder, **PLACE** cylinder onto munition holder so it is centered.
- 3.2 **VERIFY** INTERIOR DETONATOR SHORTING PLUG is connected to INTERIOR DETONATOR JACK ASSEMBLY.

Note

Tape may be used to hold LSC in place.

- 3.3 **POSITION** LSC so it extends along the centerline of the munition with open ends pointed toward nose and resting in munition holder.
- 3.4 **SECURE** RP-1 detonator to each end of LSC by sliding a detonator clip on each end of LSC.

CALLOUT: Obtain photographs, if possible.

- 3.5 **INSPECT** munition and explosive components for configuration.

Note

Detonator tip must touch the end of the LSC.

- 3.5.1 **VERIFY** RP-1 detonator tips touch LSC ends.
- 3.5.2 **CALL OUT** which detonator lead wire is connected to LSC.

CALLOUT: Announce detonator lead connections (CSC to CH1, LSC to CH3, etc.).

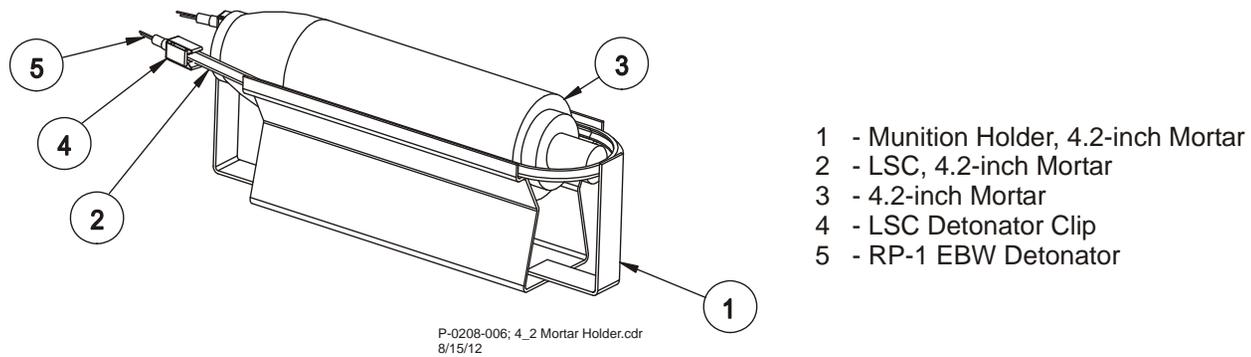


Figure 7-1. 4.2-Inch Mortar Munition Holder

3.5.3 **PHOTOGRAPH** prepared munition in munition holder, if possible.

CALLOUT: Obtain photographs, if possible.

3.6 If desired, **COIL** detonator lead wires and **ATTACH** strain relief clips to frame, if necessary.

3.7 **PROCEED** to Step 7.0.

WARNING

A 155MM PROJECTILE WEIGHS APPROXIMATELY 100 POUNDS. USE APPROPRIATE LIFTING TECHNIQUES AND MAINTAIN POSITIVE CONTROL WHEN MOVING PROJECTILE. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Notes

When processing plastic-wrapped item(s) and to maintain even spacing, either place one plastic-wrapped item on top or more than one plastic-wrapped item on the bottom of the munitions holder.

When loading munitions in new style 155mm 6-Round Munitions Holder, munition base is against center upright support of munitions holder.

When loading more than one item in munitions holder, place items in tandem to minimize number of LSCs required.

4.0 **LOAD** 155mm projectile(s) into New Style 155mm 6-Round Munitions Holder.

4.1 **PLACE** first item in aft end bottom of new style 155mm 6-Round munitions holder with aft end of item against center upright of munitions holder (Figure 7-2).

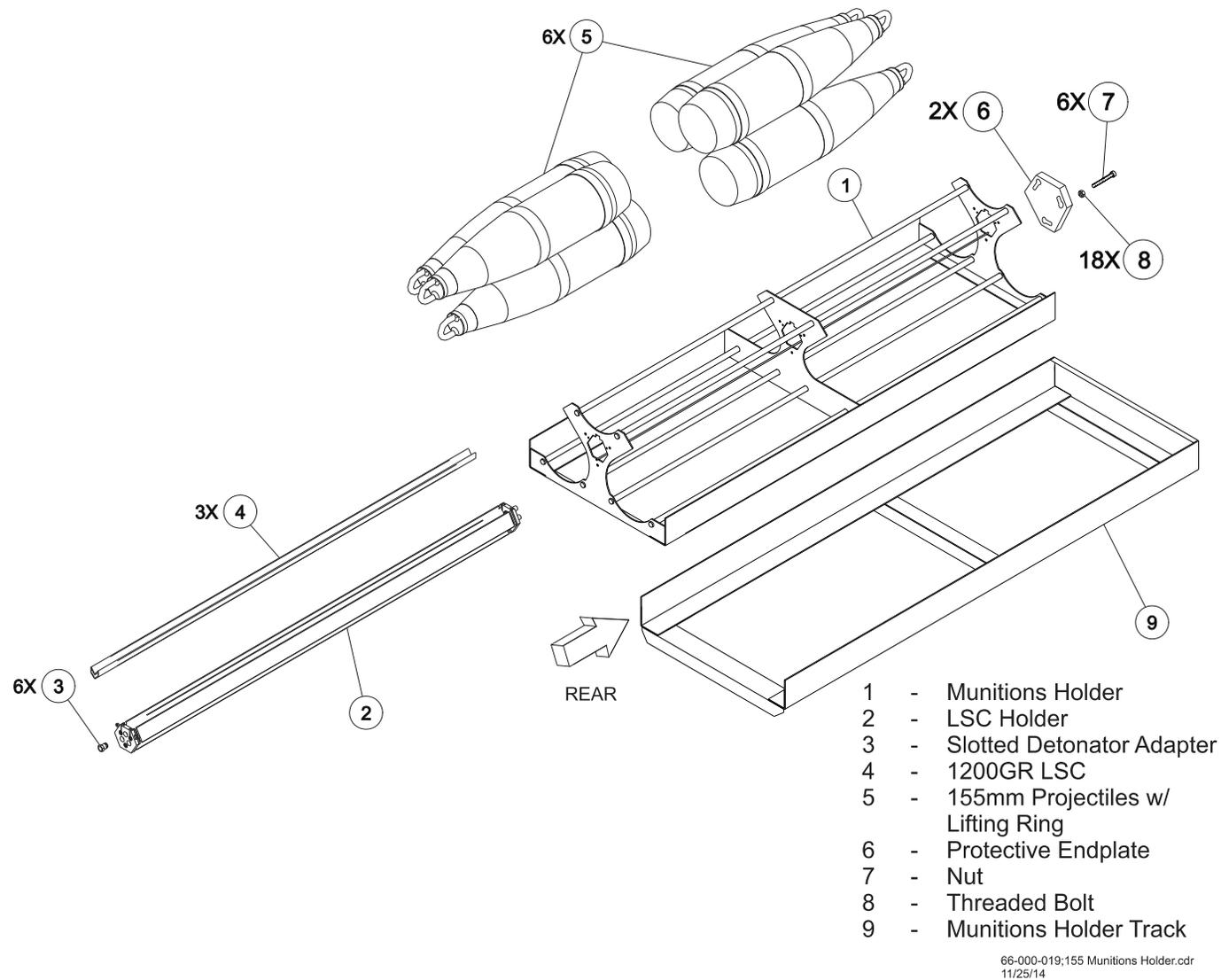


Figure 7-2. New Style 155mm 6-Round Munitions Holder

- 4.2 **PROCEED** as follows:
 - 4.2.1 When only loading only one item in munitions holder, **PROCEED** to Step 4.4.
 - 4.2.2 When loading only two items in munitions holder, **PLACE** second item in forward end bottom of new style 155mm 6-Round munitions holder in line with previously loaded item and with aft end of item against center upright of munitions holder. **PROCEED** to Step 4.4.
 - 4.2.3 When loading three or more items in munitions holder, **PROCEED** to Step 4.3.
- 4.3 **LOAD** three or more items in New Style 155mm 6-Round Munitions Holder as follows:
 - 4.3.1 WHEN loading only three items in munitions holder, **PERFORM** the following:
 - 4.3.1.1 **PLACE** second item in forward end bottom of munitions holder in line with first item with aft end of item against center upright of munitions holder.
 - 4.3.1.2 **PLACE** third item in aft end bottom of munitions holder with aft end of item against center upright of munitions holder.
 - 4.3.1.3 **PROCEED** to Step 4.4.
 - 4.3.2 When loading only four items in munitions holder, **PERFORM** the following:
 - 4.3.2.1 **PLACE** second item in the aft end bottom of munitions holder beside the first item with aft end of item against center upright of munitions holder.
 - 4.3.2.2 **PROCEED** to Step 4.4.
 - 4.3.3 When loading five to six items in munitions holder, **PLACE** second and third items in the aft end bottom of munitions holder with aft end of item against center upright of munitions holder.
- 4.4 If necessary, **SECURE** items in munitions holder using tape.
- 4.5 **COIL** detonator lead wires and **ATTACH** strain relief clips to munitions holder, if necessary.

- 4.6 **INSPECT** munitions holder and explosive components for configuration.

Note

Detonator tip must touch the end of the LSC.

- 4.6.1 **VERIFY** RP-1 detonator tips touch LSC ends and LSC disrupter(s) are still in place, if used.
- 4.6.2 **CALL OUT** which colored detonator lead wire is connected to LSC.

CALLOUT: Announce detonator lead connections (LSC to CH2, LSC to CH3, etc.).

- 4.7 Team Leader will **PERFORM** the following:

- 4.7.1 **VERIFY** item(s) is properly installed in munitions holder.

Note

Detonator tip must touch the end of the LSC.

- 4.7.2 **VERIFY** RP-1 detonator tips touch LSC ends and LSC disrupter(s) are still in place, if used.
- 4.7.3 **CALL OUT** which colored detonator lead wire is connected to which LSC.

CALLOUT: Announce detonator lead connections (LSC to CH2, LSC to CH3, etc.).

- 4.8 **PHOTOGRAPH** prepared item(s) in munitions holder, if possible.

CALLOUT: Obtain photographs, if possible.

- 4.9 **VERIFY** CONTAINMENT VESSEL DOOR will not hamper loading of new style 155mm 6-Round Munitions Holder.

WARNING

FIRESET OPERATOR MUST MAINTAIN CONTROL OF SAFETY INTERLOCK PLUG AT ALL TIMES WHEN IT IS NOT BEING USED IN THE EDS FIRING SYSTEM. FAILURE TO DO SO MAY RESULT IN UNAUTHORIZED DETONATION.

- 4.10 **VERIFY** Fireset Operator has SAFETY INTERLOCK PLUG and VESSEL ROTATION CONTROL key.
- 4.11 **VERIFY** both door seals are in place and any setup or extraneous materials have been removed from CONTAINMENT VESSEL and the immediate vicinity.
- 4.12 **VERIFY** LOADING TABLE is properly positioned so there is no abrupt transition for New Style 155mm Munitions Holder from LOADING TABLE to CONTAINMENT VESSEL and munitions holder will not impinge on or impact CONTAINMENT VESSEL opening/sealing surfaces.
- 4.13 **VERIFY** INTERIOR DETONATOR JACK ASSEMBLY will reach high voltage feedthrough plugs on inside of HIGH VOLTAGE FEEDTHROUGH FLANGE.
- 4.14 **VERIFY** EXTERIOR DETONATOR SHORTING JACK is connected to high voltage feedthrough plugs on outside of HIGH VOLTAGE FEEDTHROUGH FLANGE.
- 4.15 **PROCEED** as follows:
 - 4.15.1 When loading one to three items, **PROCEED** to Step 7.8.
 - 4.15.2 When loading four or more items, **PROCEED** to Step 4.16.

Caution

Take care that munitions holder does not contact and damage any sealing surface. Inability to achieve sufficient containment vessel seal will abort operations.

- 4.16 **LIFT/SLIDE** munitions holder halfway into CONTAINMENT VESSEL so it is resting in munitions holder track.
- 4.17 **FINISH** loading munitions holder.
 - 4.17.1 **PLACE** item(s) in forward portion of munitions holder with aft end of item against center upright of munitions holder (Figure 7-2).
 - 4.17.2 **REPEAT** Step 4.17.1 as necessary for any remaining item(s) and then **PROCEED** to Step 4.17.3.
 - 4.17.3 If necessary, **SECURE** items in munitions holder using tape.
 - 4.17.4 **INSTALL** LSC disrupter(s) into LSC(s), as needed.
- 4.18 Team Leader will **PERFORM** the following:
 - 4.18.1 **VERIFY** item(s) is properly installed in munitions holder.

Note

Detonator tip must touch the end of the LSC.

- 4.18.2 **VERIFY** RP-1 detonator tips touch ends of LSCs.
- 4.18.3 **CALL OUT** which detonator lead wire is connected to which LSC.

CALLOUT: Announce detonator lead connections (LSC to CH2, LSC to CH3, etc.).

- 4.18.4 **VERIFY** LSC adapters are properly placed and secured, if used.
- 4.19 **PHOTOGRAPH** item(s) in munitions holder, if possible.

CALLOUT: Obtain photographs, if possible.

- 4.20 **PROCEED** to Step 7.8.

WARNING

A 155MM PROJECTILE WEIGHS APPROXIMATELY 100 POUNDS. USE APPROPRIATE LIFTING TECHNIQUES AND MAINTAIN POSITIVE CONTROL WHEN MOVING PROJECTILE. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Notes

When processing plastic-wrapped item(s) and to maintain even spacing, either place one plastic-wrapped item on top or more than one plastic-wrapped item on the bottom of the munitions holder.

When loading munitions in new style 155mm 6-Round Munitions Holder, munition base is flush against center upright support of munitions holder.

When loading more than one item in munitions holder, place items in tandem to minimize number of LSCs required.

5.0 **LOAD** New Style Mixed 6-Round Munitions Holder.

5.1 **PLACE** smaller item(s) in aft end of munitions holder with aft end of projectiles flush against center upright of munitions holder (Figure 7-3).

5.2 If necessary, **SECURE** items in munitions holder using tape.

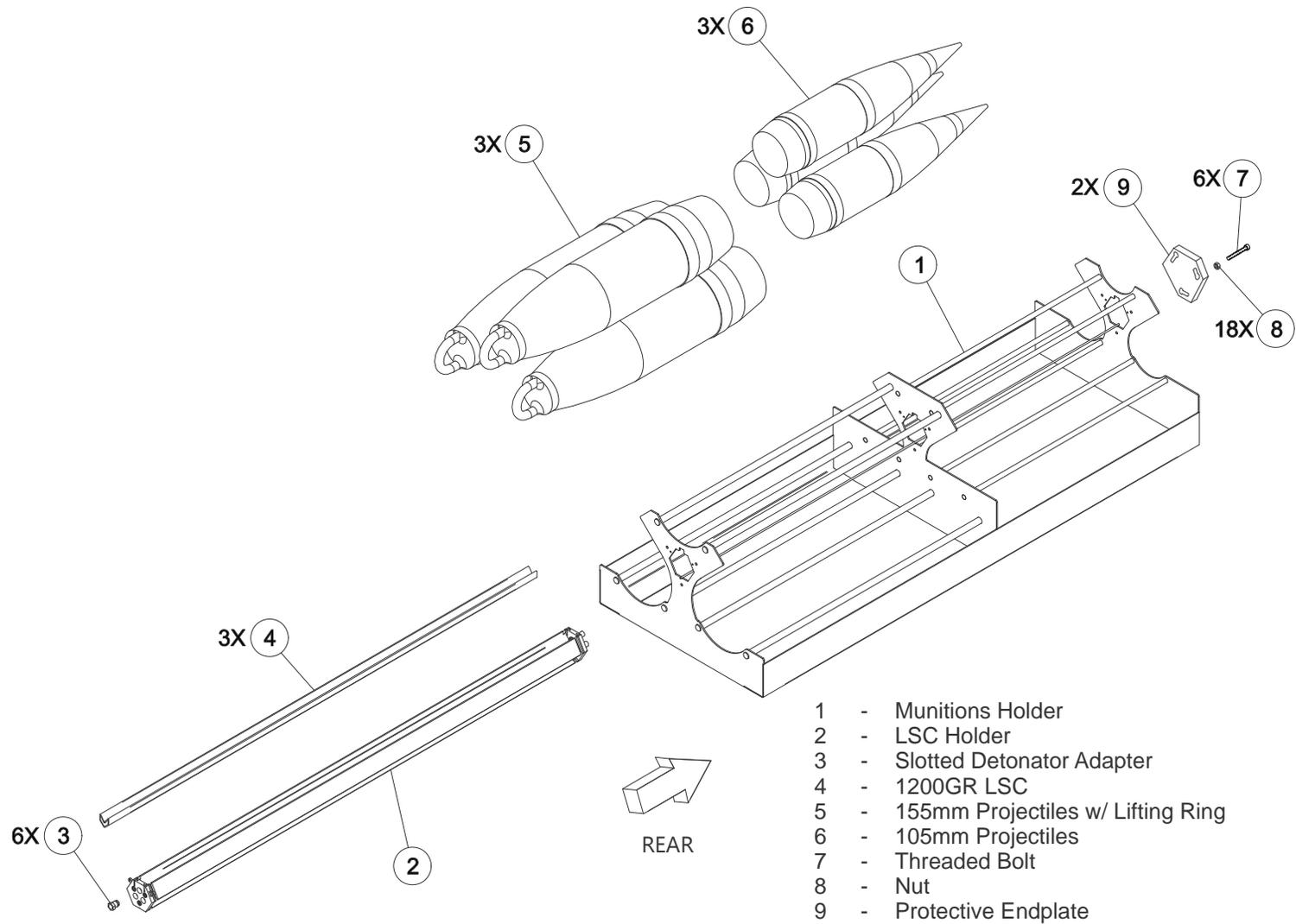
5.3 **COIL** detonator lead wires and **ATTACH** strain relief clips to munitions holder, if necessary.

5.4 **INSPECT** munitions holder and explosive components for configuration.

Note

Detonator tip must touch the end of the LSC.

5.4.1 **VERIFY** RP-1 detonator tips touch LSC ends and LSC disrupter(s) are still in place, if used.



X-XXX-XXX/105 155 Munitions Holder.cdr
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Figure 7-3. New Style Mixed 6-Round Munitions Holder

- 5.4.2 **CALL OUT** which colored detonator lead wire is connected to LSC.

CALLOUT: Announce detonator lead connections (LSC to CH2, LSC to CH3, etc.).

- 5.5 Team Leader will **PERFORM** the following:

- 5.5.1 **VERIFY** item(s) is properly installed in munitions holder.

Note

Detonator tip must touch the end of the LSC.

- 5.5.2 **VERIFY** RP-1 detonator tips touch LSC ends and LSC disrupter(s) are still in place, if used.
- 5.5.3 **CALL OUT** which colored detonator lead wire is connected to which LSC.

CALLOUT: Announce detonator lead connections (LSC to CH2, LSC to CH3, etc.).

- 5.6 **PHOTOGRAPH** prepared item(s) in munitions holder, if possible.

CALLOUT: Obtain photographs, if possible.

- 5.7 **VERIFY** CONTAINMENT VESSEL DOOR will not hamper loading of New Style Mixed 6-Round Munitions Holder.

WARNING

FIRESET OPERATOR MUST MAINTAIN CONTROL OF SAFETY INTERLOCK PLUG AT ALL TIMES WHEN IT IS NOT BEING USED IN THE FIRING SYSTEM. FAILURE TO DO SO MAY RESULT IN UNAUTHORIZED DETONATION.

- 5.8 **VERIFY** Fireset Operator has SAFETY INTERLOCK PLUG and VESSEL ROTATION CONTROL key.
- 5.9 **VERIFY** both door seals are in place and any setup or extraneous materials have been removed from CONTAINMENT VESSEL and the immediate vicinity.

- 5.10 **VERIFY** LOADING TABLE is properly positioned so there is no abrupt transition for new style 155mm munitions holder from LOADING TABLE to CONTAINMENT VESSEL and munitions holder will not impinge on or impact CONTAINMENT VESSEL opening/sealing surfaces.
- 5.11 **VERIFY** INTERIOR DETONATOR JACK ASSEMBLY will reach high voltage feedthrough plugs on inside of HIGH VOLTAGE FEEDTHROUGH FLANGE.
- 5.12 **VERIFY** EXTERIOR DETONATOR SHORTING JACK is connected to high voltage feedthrough plugs on outside of HIGH VOLTAGE FEEDTHROUGH FLANGE.

Caution

Take care that munitions holder does not contact and damage any sealing surface. Inability to achieve sufficient containment vessel seal will abort operations.

- 5.13 **LIFT/SLIDE** munitions holder halfway into CONTAINMENT VESSEL so it is centered along the long axis.
- 5.14 **FINISH** loading munitions holder.
 - 5.14.1 **PLACE** 155mm projectiles in forward portion of munitions holder with aft end of item against center upright of munitions holder (Figure 7-3).
 - 5.14.2 **REPEAT** Step 5.14.1 as necessary for any remaining item(s) and then **PROCEED** to Step 5.14.3.
 - 5.14.3 **INSTALL** LSC disrupter(s) into LSC(s), as needed.
- 5.15 Team Leader will **PERFORM** the following:
 - 5.15.1 **VERIFY** item(s) is properly installed in munitions holder.

Note

Detonator tip must touch the end of the LSC.

- 5.15.2 **VERIFY** RP-1 detonator tips touch ends of LSCs.

5.15.3 **CALL OUT** which detonator lead wire is connected to which LSC.

CALLOUT: Announce detonator lead connections (LSC to CH2, LSC to CH3, etc.).

5.15.4 **VERIFY** LSC adapters are properly placed and secured, if used.

5.16 **PHOTOGRAPH** item(s) in munitions holder, if possible.

CALLOUT: Obtain photographs, if possible.

5.17 **PROCEED** to Step 7.8.

Note

When processing plastic-wrapped item(s) and to maintain even spacing, either place one plastic-wrapped item on top or more than one plastic-wrapped item on the bottom of the munitions holder.

6.0 **LOAD** munition(s) into new style munitions holder(s).

6.1 **PERFORM** one of the following:

6.1.1 When loading one to three 4.2-Inch mortars, 105mm projectiles, or like sized item, **PROCEED** to Step 6.2.

6.1.2 When loading four to six 4.2-Inch mortars, 105mm projectiles, or like sized items, **PROCEED** to Step 6.3.

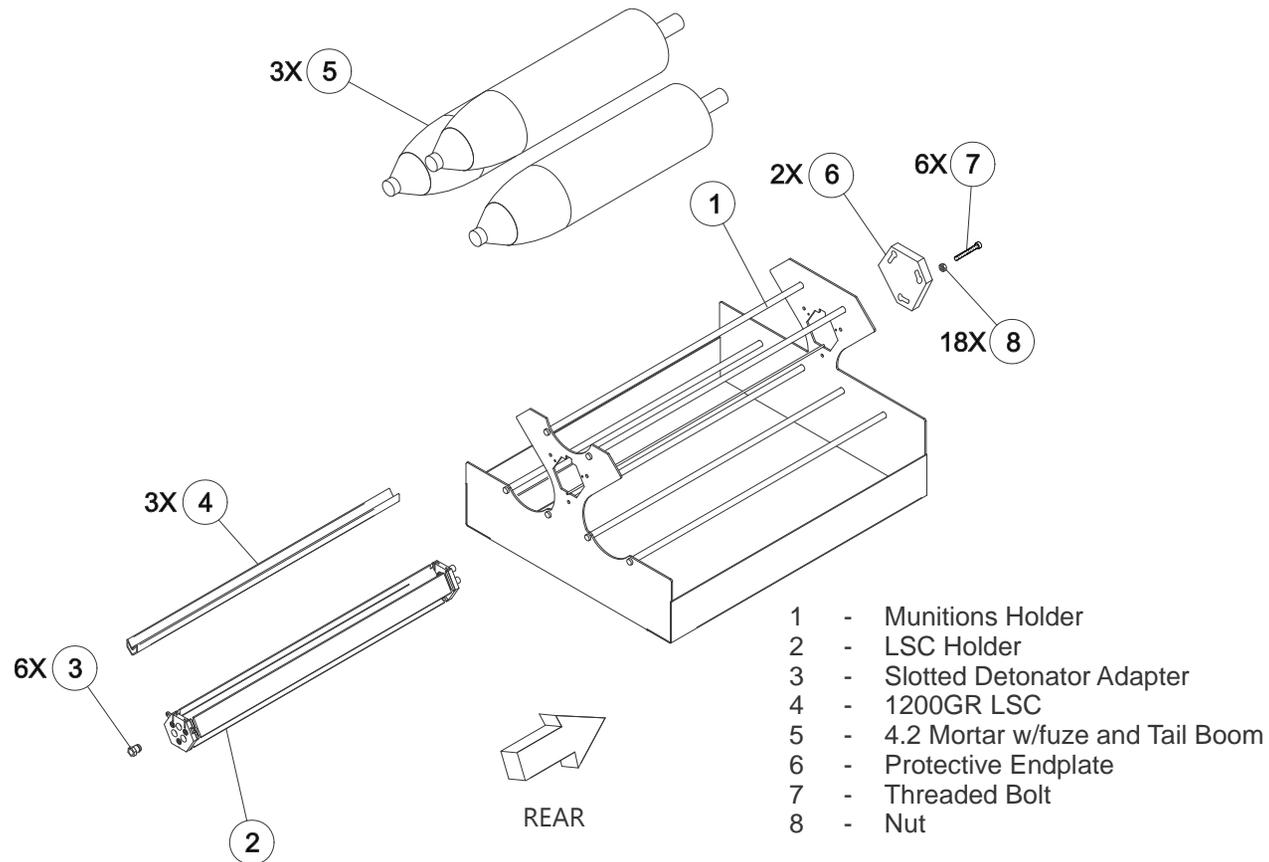
6.2 **LOAD** one to three 4.2-Inch mortars, 105mm projectiles, or like sized items into New Style 4.2-Inch Mortar 3-Round Munitions Holder.

Note

When loading munitions into the New Style 4.2-Inch Mortar 3-Round Munitions Holder, munition base is toward rear of containment vessel.

6.2.1 **PLACE** item in New Style 4.2-Inch Mortar 3-Round Munitions Holder (Figure 7-4) with aft end of item against aft end of munitions holder.

6.2.2 **REPEAT** Step 6.2.1 as necessary for any remaining items and then **PROCEED** to Step 6.2.3.



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Figure 7-4. New Style 4.2-Inch Mortar 3-Round Munitions Holder

- 6.2.3 If necessary, **SECURE** items in munitions holder using tape.
- 6.2.4 **INSTALL** LSC disrupter(s) into LSC(s), as needed.
- 6.2.5 **COIL** detonator lead wires and **ATTACH** strain relief clips to munitions holder, if necessary.
- 6.2.6 **INSPECT** munitions holder and explosive components for configuration.

Note

Detonator tip must touch the end of the LSC.

- 6.2.6.1 **VERIFY** RP-1 detonator tips touch LSC ends and LSC disrupter(s) are still in place, if used.
- 6.2.6.2 **CALL OUT** which colored detonator lead wire is connected to LSC.

CALLOUT: Announce detonator lead connections (LSC to CH2, LSC to CH3, etc.).

- 6.2.7 Team Leader will **PERFORM** the following:
 - 6.2.7.1 **VERIFY** item(s) is properly installed in munitions holder.

Note

Detonator tip must touch the end of the LSC.

- 6.2.7.2 **VERIFY** RP-1 detonator tips touch LSC ends and LSC disrupter(s) are still in place, if used.
- 6.2.7.3 **CALL OUT** which colored detonator lead wire is connected to which LSC.

CALLOUT: Announce detonator lead connections (LSC to CH2, LSC to CH3, etc.).

- 6.2.7.4 **VERIFY** LSC adapters are properly placed and secured, if used.

6.2.8 **PHOTOGRAPH** prepared item(s) in munitions holder, if possible.

CALLOUT: Obtain photographs, if possible.

6.3 **LOAD** four to six 4.2-Inch mortars, 105mm projectiles, or like sized items into New Style 4.2-Inch Mortar 6-Round Munitions Holder.

Note

When loading munitions into the New Style 4.2-Inch Mortar 6-Round Munitions Holder, munition ogives face each other.

6.3.1 **PLACE** item in aft portion of munitions holder with aft end of item toward middle upright of munitions holder (Figure 7-5).

6.3.2 **REPEAT** Step 6.3.1 as necessary for remaining item(s) and then **PROCEED** to Step 6.3.3.

6.3.3 If necessary, **SECURE** items in munitions holder using tape.

6.3.4 **INSTALL** LSC disrupter(s) into LSC(s), as needed.

6.3.5 **COIL** detonator lead wires and **ATTACH** strain relief clips to munitions holder, if necessary.

6.3.6 Team Leader will **PERFORM** the following:

6.3.6.1 **VERIFY** items are properly installed in munitions holder.

Note

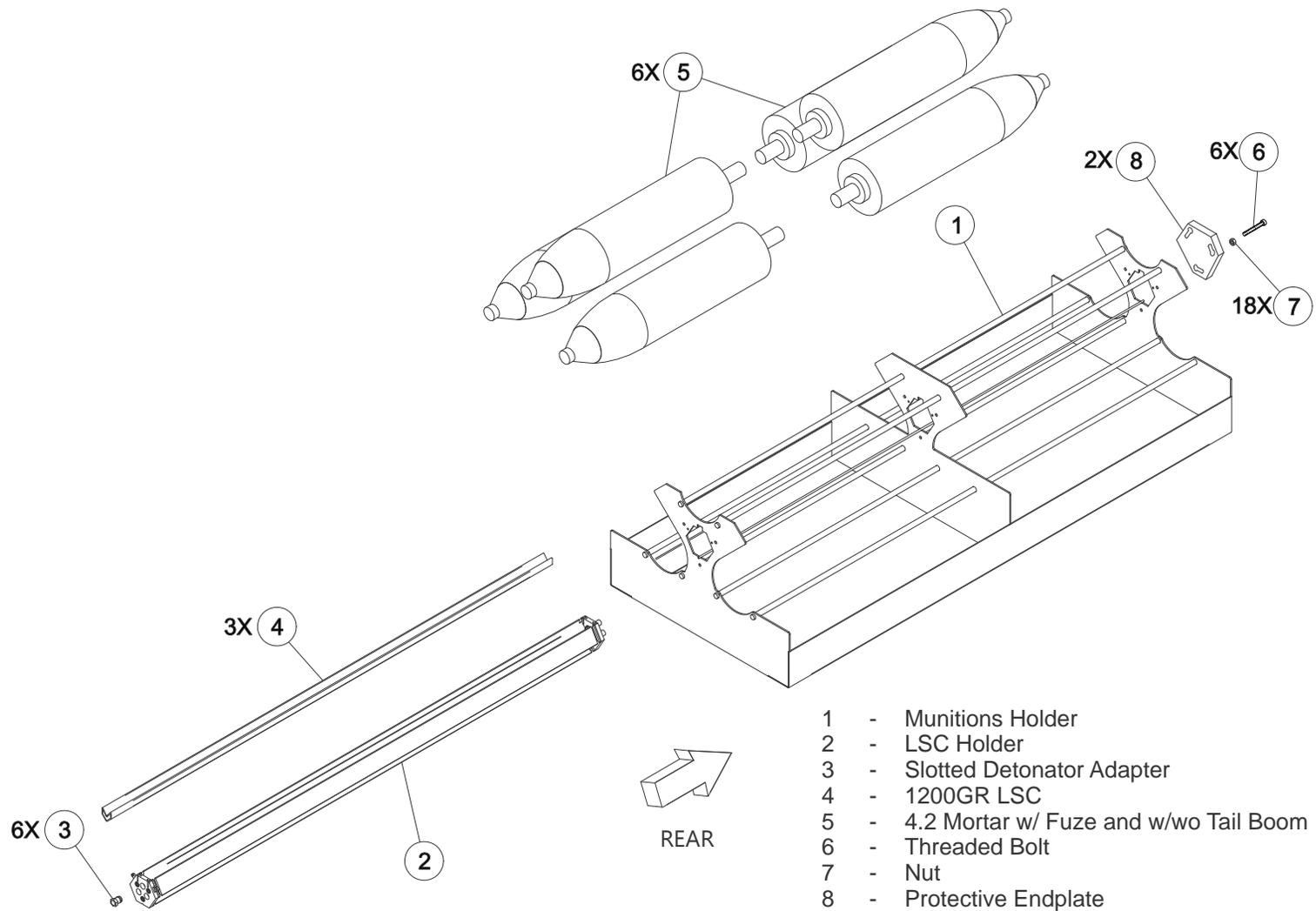
Detonator tip must touch the end of the LSC.

6.3.6.2 **VERIFY** RP-1 detonator tips touch LSC ends and LSC disrupter(s) are still in place, if used.

6.3.6.3 **CALL OUT** which colored detonator lead wire is connected to which LSC.

CALLOUT: Announce detonator lead connections (LSC to CH2, LSC to CH3, etc.).

6.3.6.4 **VERIFY** LSC adapters are properly placed and secured, if used.



X-XXX-XXX/6 Pack Munitions Holder.cdr
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Figure 7-5. New Style 4.2-Inch Mortar 6-round Munitions Holder

- 6.3.7 **PHOTOGRAPH** item(s) in new style 6-Round munitions holder, if possible.

CALLOUT: Obtain photographs, if possible.

- 6.3.8 **VERIFY** CONTAINMENT VESSEL DOOR will not hamper loading of new style 4.2-Inch Mortar 6-Round Munitions Holder.

WARNING

FIRESET OPERATOR MUST MAINTAIN CONTROL OF SAFETY INTERLOCK PLUG AT ALL TIMES WHEN IT IS NOT BEING USED IN THE FIRING SYSTEM. FAILURE TO DO SO MAY RESULT IN UNAUTHORIZED DETONATION.

- 6.3.9 **VERIFY** Fireset Operator has SAFETY INTERLOCK PLUG and VESSEL ROTATION CONTROL key.
- 6.3.10 **VERIFY** both door seals are in place and any setup or extraneous materials have been removed from CONTAINMENT VESSEL and the immediate vicinity.
- 6.3.11 **VERIFY** LOADING TABLE is properly positioned so there is no abrupt transition for munitions holder from LOADING TABLE to CONTAINMENT VESSEL and munitions holder will not impinge on or impact CONTAINMENT VESSEL opening/sealing surfaces.
- 6.3.12 **VERIFY** INTERIOR DETONATOR JACK ASSEMBLY will reach high voltage feedthrough plugs on inside of HIGH VOLTAGE FEEDTHROUGH FLANGE.
- 6.3.13 **VERIFY** EXTERIOR DETONATOR SHORTING JACK is connected to high voltage feedthrough plugs on outside of HIGH VOLTAGE FEEDTHROUGH FLANGE.

Caution

Take care munitions holder does not contact and damage any sealing surface. Inability to achieve sufficient containment vessel seal will abort operations.

- 6.3.14 **LIFT/SLIDE** munitions holder halfway into CONTAINMENT VESSEL so it is centered along the long axis.
- 6.3.15 **FINISH** loading munitions holder as follows:
 - 6.3.15.1 **PLACE** item in forward portion of munitions holder with aft end of item against middle upright of munitions holder (Figure 7-5).
 - 6.3.15.2 **REPEAT** Step 6.3.15.1 as necessary for any remaining item(s) and then **PROCEED** to Step 6.3.15.3.
 - 6.3.15.3 If necessary, **SECURE** items in munitions holder using tape.
 - 6.3.15.4 **INSTALL** LSC disrupter(s) into LSC(s), as needed.
 - 6.3.15.5 **COIL** detonator lead wires and **ATTACH** strain relief clips to munitions holder, if necessary.
- 6.3.16 Team Leader will **PERFORM** the following:
 - 6.3.16.1 **VERIFY** item(s) is properly installed in munitions holder.

Note

Detonator tip must touch the end of the LSC.

- 6.3.16.2 **VERIFY** RP-1 detonator tips touch ends of the new style 6-Round 4.2-Inch munitions holder LSCs.
- 6.3.16.3 **CALL OUT** which detonator lead wire is connected to which LSC.

CALLOUT: Announce detonator lead connections (LSC to CH2, LSC to CH3, etc.).

6.3.16.4 **VERIFY** LSC adapters are properly placed and secured, if used.

6.3.17 **PHOTOGRAPH** item(s) in munitions holder, if possible.

CALLOUT: Obtain photographs, if possible.

6.3.18 **PROCEED** to Step 7.8.

7.0 **LOAD** Munition(s) Holder in CONTAINMENT VESSEL.

7.1 **PERFORM** one of the following:

7.1.1 When munition(s) holder is assembled and on LOADING TABLE, **PROCEED** to Step 7.2.

7.1.2 When munition(s) holder is assembled, but not on LOADING TABLE, **PERFORM** the following:

WARNING

ASSEMBLED MUNITIONS HOLDER WITH MUNITION IS TOO HEAVY FOR ONE PERSON TO HAND CARRY. USE APPROPRIATE NUMBER OF OPERATORS TO MOVE ASSEMBLED MUNITIONS HOLDER TO LOADING TABLE. FAILURE TO COMPLY MAY RESULT IN INJURY OR DEATH.

7.1.2.1 **TRANSFER** munition(s) holder to LOADING TABLE.

7.1.2.2 **VERIFY** LSC detonator lead wires and CSC detonator lead wires, when used, are still connected to INTERIOR DETONATOR JACK ASSEMBLY and are shorted with INTERIOR DETONATOR SHORTING PLUG.

7.1.2.3 **VERIFY** all components are still properly configured and seated.

7.2 **VERIFY** CONTAINMENT VESSEL DOOR will not hamper loading of munition(s) holder.

WARNING

FIRESET OPERATOR MUST MAINTAIN CONTROL OF SAFETY INTERLOCK PLUG AT ALL TIMES WHEN IT IS NOT BEING USED IN THE EDS FIRING SYSTEM. FAILURE TO DO SO MAY RESULT IN UNAUTHORIZED DETONATION.

- 7.3 **VERIFY** Fireset Operator has SAFETY INTERLOCK PLUG and VESSEL ROTATION CONTROL key.
- 7.4 **VERIFY** both door seals are in place and any setup or extraneous materials have been removed from CONTAINMENT VESSEL and the immediate vicinity.
- 7.5 **VERIFY** LOADING TABLE is properly positioned so there is no abrupt transition for munition(s) holder from LOADING TABLE to CONTAINMENT VESSEL and munition(s) holder will not impinge on or impact CONTAINMENT VESSEL opening/sealing surfaces.
- 7.6 **VERIFY** INTERIOR DETONATOR JACK ASSEMBLY will reach high voltage feedthrough plugs on inside of HIGH VOLTAGE FEEDTHROUGH FLANGE.
- 7.7 **VERIFY** EXTERIOR DETONATOR SHORTING JACK is connected to high voltage feedthrough plugs on outside of HIGH VOLTAGE FEEDTHROUGH FLANGE.

Caution

Take care munition(s) holder does not contact and damage any sealing surface. Inability to achieve sufficient containment vessel seal will abort operations.

- 7.8 **LIFT/SLIDE** munition(s) holder into CONTAINMENT VESSEL so it is centered along the long axis.

CALLOUT: Obtain photographs, if possible.

WARNING

LOADING TABLE WEIGHS APPROXIMATELY 70 POUNDS AND IS CUMBERSOME TO HANDLE. TO PREVENT POSSIBLE INJURY, USE TWO OPERATORS WHEN LIFTING LOADING TABLE. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 7.9 **REMOVE** LOADING TABLE(S), if used.

WARNING

FIRESET OPERATOR MUST MAINTAIN CONTROL OF SAFETY INTERLOCK PLUG AT ALL TIMES WHEN IT IS NOT BEING USED IN THE EDS FIRING SYSTEM. FAILURE TO MAINTAIN POSITIVE CONTROL OF SAFETY INTERLOCK PLUG MAY RESULT IN UNAUTHORIZED DETONATION.

- 8.0 **CONNECT** INTERIOR DETONATOR JACK ASSEMBLY to HIGH VOLTAGE FEEDTHROUGH FLANGE.
- 8.1 If necessary, **REMOVE** BLAST COVER from BLAST COVER BASE.
- 8.2 Partially **CLOSE** CONTAINMENT VESSEL door enough to allow the INTERIOR DETONATOR JACK ASSEMBLY to reach high voltage feedthrough plugs on inside of HIGH VOLTAGE FEEDTHROUGH FLANGE.
- 8.3 **REMOVE** INTERIOR DETONATOR SHORTING PLUG from INTERIOR DETONATOR JACK ASSEMBLY.
- 8.4 Securely **CONNECT** INTERIOR DETONATOR JACK ASSEMBLY to high voltage feedthrough plugs on inside of HIGH VOLTAGE FEEDTHROUGH FLANGE.

Note

When only three exploding bridge wire detonator lead wires are connected to the interior detonator jack assembly, the unused fourth detonator lead wire **MUST** remain unobstructed. The exterior detonator jack will be connected IAW the SOP to the high voltage flange. During continuity checks, one of the four detonator cables will read **OPEN** when checked.

8.5 The Team Leader will **PERFORM** the following:

8.5.1 **VERIFY** munition(s) holder(s) with item(s) is properly assembled.

8.5.2 **VERIFY** all detonator lead wires are properly connected to the INTERIOR DETONATOR JACK ASSEMBLY.

8.5.3 **CALL OUT** which detonator lead wire is connected to which feedthrough IAW Figure 7-6.

CALLOUT: Announce feedthrough connections (CSC to CH1, LSC to CH3, etc.).

8.6 **INSTALL BLAST COVER** onto BLAST COVER BASE and **AVOID** pinching detonator lead wires. **TIGHTEN** shoulder bolts using the T-handled wrench until secure.

Note

Maintain numerical sequence of interior detonator jack assembly detonator lead wires with numerical sequence of fireset CDU (CH1 through CH4). See Figure 7-6.

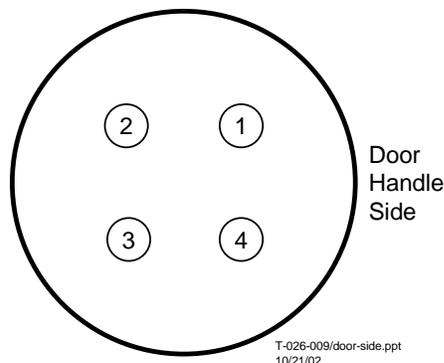


Figure 7-6. High Voltage Feedthrough Flange Interior View

8.7 **RECORD** time item(s) was loaded into CONTAINMENT VESSEL.

CALLOUT: Announce time item was loaded into containment vessel and obtain photographs, if possible.

9.0 **PROCEED** to Procedure 8.

SPECIAL REQUIREMENTS:

1. PPE must be worn IAW Annex G.
2. The EDS operations area must be evacuated.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Primary tool kit	1 each
Rubber mallet	1 each
Dead blow hammer	1 each
Front loading table	1 each
Rear loading table	2 each
Duct tape	1 roll
Strain relief clips (large binder clips)	4 each
Leather gloves	as required
Digital camera	1 each
Exterior detonator shorting jack	1 each
Safety interlock plug	1 each
Munition Holder (4.2-Inch, Livens, 105mm, M125 Cluster Bomb, or Typical Munition)	1 each per munition
- Munition holder	1 each
LSC	1 each
LSC detonator clips	2 each
Exploding bridge wire detonator, RP-1	2 each
Interior detonator jack assembly	1 each
Interior detonator shorting plug	1 each
Splash shield	1 each

EQUIPMENT, TOOLS, AND SUPPLIES: (Continued)

<u>ITEM:</u>	<u>QUANTITY:</u>
New Style 155mm 6-Round Munitions Holder (4 to 6-Rounds)	1 each per operation
- Munitions holder	1 each as specified
LSC	as required
LSC holder	1 each
Exploding bridge wire detonator, RP-1	as required
Interior detonator jack assembly	1 each
Interior detonator shorting plug	1 each
LSC disrupter	as required
Multiple detonator adapter	2 each
Munitions holder track	1 each
New Style Mixed 6-Round Munitions Holder (4 to 6-Rounds)	1 each per operation
- Munitions holder	1 each as specified
LSC	as required
LSC holder	1 each
Exploding bridge wire detonator, RP-1	as required
Interior detonator jack assembly	1 each
Interior detonator shorting plug	1 each
LSC disrupter	as required
Multiple detonator adapter	2 each
New Style 4.2-Inch Mortar 3-Round Munitions Holder (1 to 3-Rounds)	1 each per operation
- Munitions holder	1 each as specified
LSC	as required
LSC holder	1 each
Exploding bridge wire detonator, RP-1	as required
Interior detonator jack assembly	1 each
Interior detonator shorting plug	1 each
LSC disrupter	as required
Multiple detonator adapter	2 each
New Style 4.2-Inch Mortar 6-Round Munitions Holder (4 to 6-Rounds)	1 each per operation
- Munitions holder	1 each as specified
LSC	as required
LSC holder	1 each
Exploding bridge wire detonator, RP-1	as required
Interior detonator jack assembly	1 each
Interior detonator shorting plug	1 each
LSC disrupter	as required
Multiple detonator adapter	2 each

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**PROCEDURE 8
CLOSING AND SEALING EDS CONTAINMENT VESSEL DOOR**

The purpose of this procedure is to close and seal the EDS containment vessel prior to detonating the munition.

PRECONDITIONS:

1. Air monitoring must be operational.
2. Setup and daily startup checklists have been completed.
3. Helium leak detector must be set up, calibrated, and operational, and the main switch is in the ON position.
4. Metal seal has been inspected.

WARNINGS

FAILURE TO DON LEATHER GLOVES MAY CAUSE CUTS AND ABRASIONS WHILE PERFORMING THE FOLLOWING STEPS.

CONTAINMENT VESSEL DOOR PRESENTS CRUSHING AND PINCHING HAZARDS. BE AWARE OF BODY POSITION WHEN PERFORMING THE FOLLOWING STEPS.

USE TWO OPERATORS WHEN MOVING LOADING TABLE.

USE TWO OPERATORS WHEN CLOSING CONTAINMENT VESSEL DOOR.

FAILURE TO DON HEARING PROTECTION MAY CAUSE HEARING LOSS WHILE OPERATING NUT RUNNER DRIVERS.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Note

Two-Person Rule will be strictly enforced when having access to and/or conducting operations involving chemical surety material. At least two CPRP personnel (only one may be interim-certified) of which both must be equally qualified in the task(s) being performed, capable of recognizing an unsafe act, performing self- or buddy-aid in case of chemical agent exposure, and able to detect unauthorized acts on the part of the other are required when the Two-Person Rule is in effect.

- 1.0 **CLOSE** CONTAINMENT VESSEL door.
 - 1.1 **VERIFY** clamps are positioned so as not to interfere with movement of CONTAINMENT VESSEL door.
 - 1.2 **DON** leather gloves.
 - 1.3 Carefully **ROUTE** detonator lead wires to avoid pinching them when CONTAINMENT VESSEL door is CLOSED.
 - 1.4 **CLOSE** CONTAINMENT VESSEL door without pinching detonator lead wires.
- 2.0 **SECURE** CONTAINMENT VESSEL door clamps.
 - 2.1 **VERIFY** four PROCESS SHUTDOWN buttons are out and red STEAM LINE MOTION FAULT light is not illuminated.
 - 2.2 **VERIFY** hydraulic nuts are fully retracted.

Notes

Clamp control key is same key used in vessel rotation control panel.

Use of clamp hanger control pendant may be required when local control mode is not operating correctly. See Annex D.

When closing containment vessel door, it may be necessary for an operator to maintain pressure on door until door clamps are closed.

- 2.3 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.
- 2.4 **TURN** amber speed switch on CLAMP HANGER DRIVE CONTROL Panel to SLOW.
- 2.5 **PUSH** and **HOLD** green IN button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel and **RELEASE** IN button when CLAMP HANGER LEAD SCREW stops rotating.

WARNING

REMOVE CLAMP CONTROL KEY BEFORE ATTEMPTING TO PRY APART CLAMP HANGER ASSEMBLIES OR BEFORE USING SCREW DRIVE WHEEL. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 2.6 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and remove.
- 3.0 **TIGHTEN** hydraulic nuts on CONTAINMENT VESSEL door clamp.
 - 3.1 **PLACE** drive switch on small high speed low torque nut runner driver to counterclockwise position.
 - 3.2 **ATTACH** nut runner driver using 1-3/8 inch socket to upper nut runner HIGH SPEED nut.
 - 3.3 **DEPRESS** trigger and when nut runner driver stalls, **RELEASE** trigger.
 - 3.4 **REMOVE** nut runner driver from upper nut runner and **ATTACH** it to lower nut runner HIGH SPEED nut.

- 3.5 **DEPRESS** trigger and when nut runner driver stalls, **RELEASE** trigger.
- 3.6 **REMOVE** nut runner driver from lower nut runner and **PLACE** it in storage location.
- 3.7 **PROCEED** as follows:
 - 3.7.1 When EDS FIRING SYSTEM is located in environmental enclosure, **PROCEED** to Step 5.0.
 - 3.7.2 When EDS FIRING SYSTEM is not located in environmental enclosure, **PERFORM** one of the following:
 - 3.7.2.1 When performing EDS FIRING SYSTEM continuity check during CONTAINMENT VESSEL door closing and sealing steps, **PROCEED** to Step 4.0.
 - 3.7.2.2 When not performing EDS FIRING SYSTEM continuity check during CONTAINMENT VESSEL door closing and sealing steps, **PROCEED** to Step 5.0.

WARNING

FIRESET OPERATOR MUST MAINTAIN POSSESSION OF SAFETY INTERLOCK PLUG AT ALL TIMES WHEN IT IS NOT BEING USED IN THE EDS FIRING SYSTEM. FAILURE TO DO SO MAY RESULT IN UNAUTHORIZED DETONATION.

- 4.0 **PERFORM** EDS FIRING SYSTEM continuity check.
 - 4.1 **VERIFY** Fireset Operator has possession of SAFETY INTERLOCK PLUG.
 - 4.2 **REMOVE** EXTERIOR DETONATOR SHORTING JACK from HIGH VOLTAGE FEEDTHROUGH FLANGE.
 - 4.3 **CONNECT** EXTERIOR DETONATOR JACK on HIGH VOLTAGE FEEDTHROUGH FLANGE in sequence: CH1 to CH1, CH2 to CH2, etc.
 - 4.4 **VERIFY** four detonator cables (CH1 through CH4) located on the inside of the left-side panel of EDS FIRING SYSTEM CASE are connected to the connectors on the backside of the TEST INTERFACE CHASSIS (CH1 through CH4).

- 4.5 **VERIFY** four 4-foot detonator cables located in SHORTING CONNECTORS compartment are connected to SHORTING CONNECTORS (CH1 through CH4) on front face panel of TEST INTERFACE CHASSIS.

Note

When only three detonator lead wires are connected to the interior detonator jack assembly, all 50-foot detonator cables MUST be connected to the exterior detonator jack. During continuity checks, one of the four detonator cables will read “OPEN” when checked.

- 4.6 Team Leader will **PERFORM** the following:

- 4.6.1 **VERIFY** the connections in sequence of each 50-foot detonator cable attached to the high voltage feedthroughs IAW Figure 8-1.

WARNING

ENVIRONMENTAL ENCLOSURE MUST BE CLEARED OF ALL PERSONNEL DURING CONTINUITY CHECK. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 4.6.2 **VERIFY** all personnel have exited environmental enclosure.

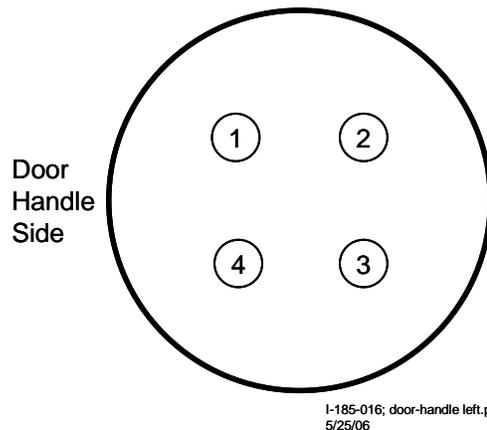


Figure 8-1. High Voltage Feedthrough Flange Exterior View

Note

Maintain numerical sequence of 50-foot detonator cables with numerical sequence of fireset CDU (CH1 through CH4). (See Figure 8-1.)

- 4.7 **VERIFY** appropriate interface control cable to EDS FIRING SYSTEM is connected between CONTROL MODULE J3B OUTPUT connector and mating connector located externally on left side of the EDS FIRING SYSTEM CASE.

CALLOUT: Announce which EDS Fireset is being used.

- 4.8 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to ON.
- 4.9 **TOGGLE** one of two LOAD CONTINUITY meter switches to ON.
- 4.10 **REMOVE** dust cap from connector below selected LOAD CONTINUITY meter.
- 4.11 **DISCONNECT** 4-foot detonator cable from CH1 on SHORTING CONNECTORS PANEL located on TEST INTERFACE CHASSIS and **CONNECT** to selected LOAD CONTINUITY meter.

Notes

In the following step, acceptable meter display reading is no greater than 030 milliohms (30 mΩ).

When any detonator cable fails continuity test, check connections and internal 9 V batteries and retest. If detonator cable fails again, replace detonator cable and retest. If test fails for third time, request maintenance support.

- 4.12 **VERIFY** load continuity. **OBSERVE** LOAD CONTINUITY meter display for a reading no greater than 030 (30 mΩ).

CALLOUT: Announce ohm values obtained for CH1 through CH4.

- 4.13 **DISCONNECT** 4-foot detonator cable from LOAD CONTINUITY meter and **CONNECT** to CH1 on shorting connectors panel on TEST INTERFACE CHASSIS.
- 4.14 **REPEAT** Steps 4.11 through 4.13 for remaining detonator cables (CH2 through CH4) and then **PROCEED** to Step 4.15.

- 4.15 **TOGGLE** LOAD CONTINUITY meter switch to OFF.
- 4.16 **RE-INSTALL** dust cap to LOAD CONTINUITY connector.
- 4.17 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER to OFF.

CALLOUT: Announce time continuity check is complete.

- 4.18 **REMOVE** EXTERIOR DETONATOR JACK from high voltage feedthrough plugs located on outside of HIGH VOLTAGE FEEDTHROUGH FLANGE and **INSTALL** EXTERIOR DETONATOR SHORTING JACK.
 - 4.19 **MOVE** 50-foot detonator cables and EXTERIOR DETONATOR JACK to a safe location.
- 5.0 **COMPLETE** tightening of hydraulic nuts.

Caution

Top and bottom gaps of clamp faces must be within 1/4-inch difference and closed to 2-1/2 inches or less. Inconsistent gaps may damage hydraulic nuts and result in seal leakage. Do not use screw drive wheel to close the gaps.

- 5.1 **PLACE** drive switch on large low speed high torque nut runner driver to counterclockwise position.
- 5.2 **ATTACH** nut runner driver to HIGH TORQUE nut and **ALTERNATE** tightening upper and lower nut runners 1/2 inch at a time until top and bottom gaps between clamp faces are 2-1/2 inches or less (green HANGERS CLOSED light illuminates).
- 5.3 **REMOVE** nut runner driver from nut runner and **PLACE** it in storage location.
- 5.4 **RECORD** upper and lower gap space measurement.

CALLOUT: Announce upper and lower gap measurements.

- 5.5 Simultaneously **ROTATE** clamp hanger adjustment wheels to the right (Lower) until the clamps rest on the CONTAINMENT VESSEL door.

WARNING

NEVER ATTEMPT TO GRASP LEAKING HYDRAULIC HOSE UNDER PRESSURE WITH HANDS. FORCE OF ESCAPING HYDRAULIC FLUID COULD CAUSE SERIOUS INJURY. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

6.0 START HYDRAULIC NUT SUBSYSTEM.

- 6.1 **CONNECT** Hydraulic Pump Hose to hydraulic manifold.
- 6.2 **VERIFY** all three hydraulic nut hoses and Hydraulic Pump Hose are securely connected to hydraulic manifold.
- 6.3 **TURN** red PRESSURE switch on VESSEL CONTROL PANEL to LOW.
- 6.4 **PRESS** green ON button on HYDRAULIC NUT PUMP Panel to start hydraulic pump.

WARNING

NEVER STAND OR PLACE ANY PARTS OF THE BODY IN LINE WITH THREADED RODS WHEN TENSIONER IS UNDER PRESSURE. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 6.5 **VERIFY** all personnel are clear of hydraulic nuts and hydraulic hoses.
- 6.6 **PUSH** and **HOLD** ADVANCE button on HYDRAULIC NUT PUMP Panel and **MONITOR** all four hydraulic nuts.
- 6.7 When hydraulic pump shuts off, **CHECK** hydraulic pump pressure gauge for reading between 5,000 and 5,300 psig.
- 6.8 **TURN** locking ring clockwise on each hydraulic nut until hand-tight.
- 6.9 **PUSH** and **HOLD** RETRACT button on HYDRAULIC NUT PUMP Panel to release hydraulic pressure.

- 6.10 **VERIFY** that pump pressure gauge reads approximately 0 psig and then **RELEASE** RETRACT button.
- 6.11 **PUSH** and **HOLD** RETRACT button to release any residual pressure. **RELEASE** RETRACT button.
- 7.0 **STOP** HYDRAULIC NUT SUBSYSTEM.
 - 7.1 **PRESS** red OFF button on HYDRAULIC NUT PUMP Panel to stop hydraulic pump.
 - 7.2 **DISCONNECT** Hydraulic Pump Hose from hydraulic manifold and **CONNECT** it to Hose Docking Station.
 - 7.3 **RECORD** upper and lower gap space measurement.

CALLOUT: Announce upper and lower gap measurements.

- 8.0 **RELEASE** and **STOW** CLAMP HANGER ASSEMBLIES.
 - 8.1 **VERIFY** clamp hanger adjustment wheels have been rotated to the right (Lower) so that clamp hanger rails are fully clear of clamp slide locks.

Notes

Clamp control key is same key used in vessel rotation control panel.

Use of clamp hanger control pendant may be required when local control mode is not operating correctly. See Annex D.

- 8.2 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.
- 8.3 **TURN** amber speed switch on CLAMP HANGER DRIVE CONTROL Panel to FAST.
- 8.4 **PUSH** and **HOLD** green OUT button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel and **RELEASE** OUT button when green HANGERS STOWED POSITION light illuminates.
- 8.5 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and **REMOVE** it.
- 8.6 **RECORD** time CONTAINMENT VESSEL door closed and secured.

CALLOUT: Announce time containment vessel door closed and secured.

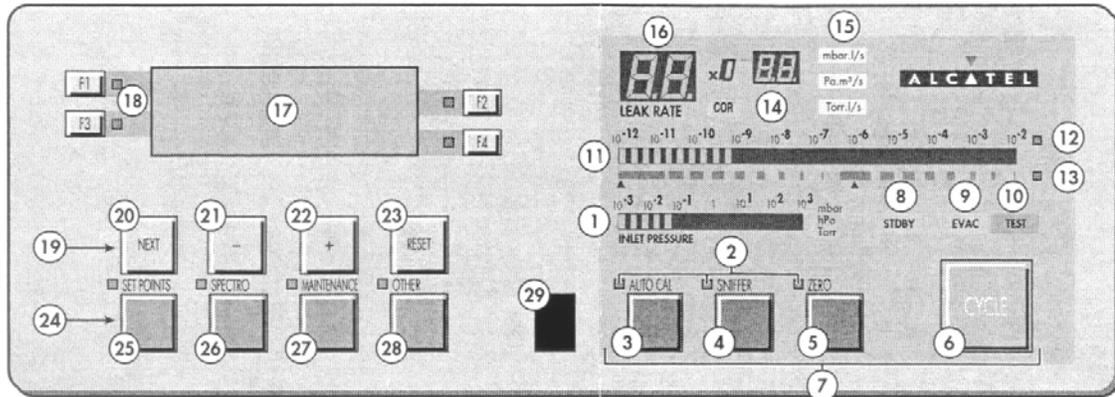
- 9.0 **EVACUATE** CONTAINMENT VESSEL door annular space using HELIUM LEAK DETECTOR (ASM 142).
- 9.1 **VERIFY** all valves on CONTAINMENT VESSEL door are CLOSED.
- 9.2 **ATTACH** remote control to remote control connection (29 in Figure 8-2) on the control panel, if used.
- 9.3 **PRESS** main POWER switch to ON, if not previously turned on.

Note

Leak detector will automatically go through a setup procedure and calibration. This will typically take 2 to 3 minutes.

- 9.4 **OBSERVE** that alphanumeric display (17 in Figure 8-2) displays “READY FOR CYCLE.”
- 9.5 **REMOVE** clamp and vacuum flange (V-F) cover from Leak Detector Hose LD and dust cap from V-F fitting on CONTAINMENT VESSEL door.
- 9.6 **CLAMP** Leak Detector Hose LD to V-F fitting on CONTAINMENT VESSEL door.
- 9.7 **PLACE** HELIUM LEAK DETECTOR in cycle mode by performing one of the following:
 - 9.7.1 When not using remote control, **PRESS** CYCLE button (6 in Figure 8-2) on control panel. **PROCEED** to Step 9.8.
 - 9.7.2 When using remote control, **PRESS** CYCLE button on remote control (6 in Figure 8-3) (green CYCLE ON indicator [5 in Figure 8-3] illuminates).

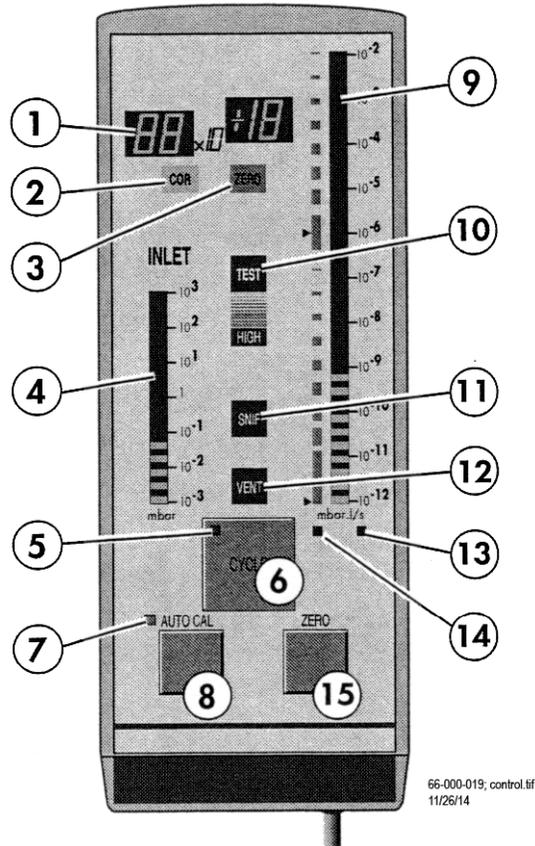
Control panel



- 1 Inlet port pressure analog display
- 2 Control and menu selection indicators (ON when activated)
- 3 Auto-calibration START/ABORT control key
- 4 Sniffing mode ON/OFF control key
- 5 Auto-zero ON/OFF control key
- 6 Cycle START/STOP control key
- 7 Control keys (4 keys)
- 8 Standby ON/OFF indicator
- 9 Evacuation ON/OFF indicator
- 10 Test ON/OFF indicator
- 11 Helium signal analogic display
- 12 Helium signal analogic scale ON/OFF indicator
- 13 Helium signal Zero scale ON/OFF indicator
- 14 Correction factor COR indicator (applied to digital display)
- 15 Units ON/OFF indicator
- 16 Helium signal digital display
- 17 Alphanumeric display (4 lines x 20 characters)
- 18 Parameter function keys (1 key per display line)
- 19 Modification access keys (4 keys)
- 20 NEXT : next display/parameter circular function
- 21 & 22 Plus or minus value adjustment, parameter selection, audio volume adjustment keys
- 23 RESET of previously displayed values (cancels temporary inputs)
- 24 Menu selection access keys (4 keys)
- 25 SET POINT menu selection key
- 26 SPECTRO calibration and analyzer cell configuration menu selection key
- 27 MAINTENANCE menu selection key
- 28 OTHER menus selection key (test mode selection, inlet VENT selection, date/time)
- 29 Remote control connection (accessory)

Figure 8-2. ASM 142 Helium Leak Detector Control Panel

Remote control interface



- | | | | |
|---|---|----|---|
| 1 | Helium signal digital display | 9 | Helium signal analogic display |
| 2 | Correction factor COR indicator | 10 | Test ON indicator |
| 3 | Zero function indicator | 11 | Sniffing test mode ON indicator |
| 4 | Inlet port pressure analog display | 12 | Inlet VENT ON indicator |
| 5 | Test cycle ON indicator
(ON when activated) | 13 | Helium signal standard scale ON indicator |
| 6 | Cycle Start/Stop control key | 14 | Helium signal Zero scale ON indicator |
| 7 | Calibration in progress indicator | 15 | Zero ON/OFF control key |
| 8 | Auto-calibration start control key | | |

Figure 8-3. ASM 142 Helium Leak Detector Remote Control

Notes

When helium leak detector control panel alphanumeric display (17 in Figure 8-2) shows an error code, refer to vendor manual for troubleshooting procedures.

Containment vessel seal integrity is checked by creating a vacuum in the vessel door annular space and verifying the numerical reading on the helium leak detector is stable. When required, helium is used to check seal integrity. Refer to Annex E for guidance concerning annular space and helium leak check.

Allow up to 5 minutes for helium leak detector numerical reading to become stable. However a minimum of 3 minutes of the 5 minutes must elapse before any numerical reading is deemed acceptable as reflecting a stable vessel seal vacuum. Annular space vacuum reading will be verified by two personnel.

Helium leak checks will be performed for the first 36 detonations in new containment vessels and then every 28th detonation after the last helium leak check was performed.

9.8 **PROCEED** as follows:

9.8.1 While observing helium signal digital display (16 in Figure 8-2) or remote control (1 in Figure 8-3), **WAIT** a minimum of 3 minutes for the helium leak detector numerical reading to become stable. **VERIFY** annular space vacuum reading by two personnel.

9.8.2 **RECORD** CONTAINMENT VESSEL annular space vacuum numerical reading.

CALLOUT: Announce annular space vacuum numerical reading.

9.8.3 **REQUEST** permission to continue with CONTAINMENT VESSEL door sealing activities. **PERFORM** one of the following:

9.8.3.1 When permission is granted, **PROCEED** to Step 9.9.

9.8.3.2 When permission is not granted, **TURN OFF** HELIUM LEAK DETECTOR as follows:

9.8.3.2.1 **PRESS** main POWER switch to OFF.

9.8.3.2.2 **RELEASE** LEAK DETECTOR HOSE from V-F fitting on CONTAINMENT VESSEL door. **INSTALL** dust cap on V-F fitting.

9.8.3.2.3 **PLACE** blank V-F cover and clamp on end of LEAK DETECTOR HOSE and **CONNECT** to Hose Docking Station.

9.8.3.2.4 **VERIFY** all valves on CONTAINMENT VESSEL door are CLOSED.

9.8.3.2.5 **RECORD** CONTAINMENT VESSEL door seal check completed.

CALLOUT: Announce time annular space vacuum check completed.

9.8.3.2.6 **PROCEED** to Step 12.3.

9.9 **PERFORM** one of the following:

9.9.1 When having to perform the helium leak check, **PROCEED** to Step 9.10.

9.9.2 When not having to perform the helium leak check, **TURN OFF** HELIUM LEAK DETECTOR as follows:

9.9.2.1 **PRESS** main POWER switch to OFF.

9.9.2.2 **RELEASE** Leak Detector Hose from V-F fitting on CONTAINMENT VESSEL door. **INSTALL** dust cap on V-F fitting.

9.9.2.3 **PLACE** blank V-F cover and clamp on end of Leak Detector Hose and **CONNECT** to Hose Docking Station.

9.9.2.4 **VERIFY** all valves on CONTAINMENT VESSEL door are CLOSED. **RECORD** CONTAINMENT VESSEL door seal check completed.

CALLOUT: Announce time annular space vacuum check completed.

9.9.2.5 **REQUEST** permission to proceed. When permission is granted, **PROCEED** to Procedure 9.

9.10 **PERFORM** helium transfer to CONTAINMENT VESSEL.

9.10.1 **VERIFY** valves 71 and 72 are OPEN.

9.10.2 **VERIFY** helium regulator gauge on helium cylinder is set to 10 psig.

Notes

Containment vessel internal pressure can be monitored by observing containment vessel pressure indicator on containment vessel control panel.

If unable to obtain proper pressure in containment vessel, verify all valves on containment vessel door are CLOSED. Refer to O&M Manual for EDS P2R for helium cylinder setup.

Venting the containment vessel is not required if containment vessel pressure exceeds 10 psig.

9.10.3 **PERFORM** one of the following:

9.10.3.1 When using Supply Hose, **PROCEED** as follows:

9.10.3.1.1 **CONNECT** Supply Hose to Q5.

9.10.3.1.2 **OPEN** valves 25, 27, and 5.

9.10.3.1.3 **OPEN** valve 6.

9.10.3.1.4 When CONTAINMENT VESSEL internal pressure is between 5 to 10 psig, **CLOSE** valve 5.

9.10.3.1.5 **PROCEED** to Step 9.10.4.

9.10.3.2 When using Steam Supply Line, **PROCEED** as follows:

9.10.3.2.1 **VERIFY** valve 16 is CLOSED.

9.10.3.2.2 **OPEN** valve 6.

9.10.3.2.3 **OPEN** valves 25, 26, 13, and 14.

9.10.3.2.4 When CONTAINMENT VESSEL internal pressure is between 5 to 10 psig, **CLOSE** valve 14.

Notes

Leak rate is achieved when it has reached equilibrium. Allow up to 5 minutes for helium leak detector to reach equilibrium. Refer to Annex F for guidance concerning helium leak rate.

Helium leak rate will be verified by two personnel.

9.10.4 **MONITOR** the helium signal digital display on control panel (16 in Figure 8-2) or remote control (1 in Figure 8-3) until display figures stabilize.

9.11 **RECORD** helium leak rate for CONTAINMENT VESSEL door.

9.11.1 **READ** leak rate on helium signal digital display on control panel (16 in Figure 8-2) or remote control (1 in Figure 8-3). **VERIFY** helium leak rate reading by two personnel.

9.11.2 **RECORD** CONTAINMENT VESSEL door helium leak rate.

CALLOUT: Announce value of containment vessel door helium leak rate obtained.

9.11.3 **PLACE** HELIUM LEAK DETECTOR in out-of-cycle mode by performing one of the following:

9.11.3.1 When not using remote control, **PRESS** CYCLE button (6 in Figure 8-2) on control panel and **PROCEED** to Step 9.12.

9.11.3.2 When using remote control, **PRESS** CYCLE button on remote control (6 in Figure 8-3) (green CYCLE ON indicator [5 in Figure 8-3] goes out).

9.12 **PERFORM** helium leak check on HIGH VOLTAGE FEEDTHROUGH FLANGE:

9.12.1 **RELEASE** Leak Detector Hose from V-F fitting on CONTAINMENT VESSEL door. **INSTALL** dust cap on V-F fitting.

9.12.2 **REMOVE** dust cap from HIGH VOLTAGE FEEDTHROUGH FLANGE and **CLAMP** Leak Detector Hose to V-F fitting.

Note

Leak detector will automatically go into cycle mode and evacuate the leak detector hose assembly and high voltage feedthrough flange.

9.12.3 **PLACE** HELIUM LEAK DETECTOR in cycle mode by performing one of the following:

9.12.3.1 When not using remote control, **PRESS** CYCLE button (6 in Figure 8-2) on control panel. **PROCEED** to Step 9.12.4.

9.12.3.2 When using remote control, **PRESS** CYCLE button on remote control (6 in Figure 8-3) (green CYCLE ON indicator [5 in Figure 8-3] illuminates).

Notes

Leak rate is achieved when it has reached equilibrium. Allow up to 5 minutes for helium leak detector to reach equilibrium. Refer to Annex F for guidance concerning helium leak rate.

Helium leak rate will be verified by two personnel.

9.12.4 **MONITOR** the helium signal digital display (16 in Figure 8-2) or remote control (1 in Figure 8-3) until display figures stabilize.

9.12.5 **READ** leak rate on helium signal digital display (16 in Figure 8-2) or remote control (1 in Figure 8-3). **VERIFY** helium leak rate reading by two personnel.

9.12.6 **RECORD** HIGH VOLTAGE FEEDTHROUGH FLANGE leak rate.

CALLOUT: Announce value of high voltage feedthrough flange helium leak rate obtained.

9.12.7 **PLACE** HELIUM LEAK DETECTOR in out-of-cycle mode by performing one of the following:

9.12.7.1 When not using remote control, **PRESS** CYCLE button (6 in Figure 8-2) on control panel. **PROCEED** to Step 9.13.

9.12.7.2 When using remote control, **PRESS** CYCLE button on remote control (6 in Figure 8-3) (green CYCLE ON indicator [5 in Figure 8-3] goes out).

9.13 **REQUEST** permission to proceed. **PERFORM** one of the following:

9.13.1 When permission is granted, **PROCEED** to Step 10.0.

9.13.2 When directed to open CONTAINMENT VESSEL door to inspect sealing surfaces, **PROCEED** to Step 12.0.

10.0 **VENT** Supply Manifold.

10.1 **VERIFY** Waste Hose 1 is connected from Q80A to Q95A.

10.2 **VERIFY** valve 80 is OPEN to "WASTE 1" position (white arrow on lever points to WASTE 1).

10.3 **VERIFY** valve 93 is OPEN.

10.4 **CLOSE** valves 6 and 25.

10.5 Slowly **OPEN** valve 31. **WAIT** 5 seconds. **CLOSE** valve 31.

10.6 **PERFORM** one of the following:

10.6.1 When having used Supply Hose, **PROCEED** as follows:

10.6.1.1 **CLOSE** valve 27.

10.6.1.2 **DISCONNECT** Supply Hose from Q5 and **CONNECT** it to Hose Docking Station.

10.6.1.3 **PROCEED** to Step 11.0.

10.6.2 When having used Steam Supply Line, **CLOSE** valves 13 and 26.

11.0 **TURN OFF** HELIUM LEAK DETECTOR.

11.1 **PRESS** main POWER switch to OFF.

- 11.2 **RELEASE** Leak Detector Hose from V-F fitting on HIGH VOLTAGE FEEDTHROUGH FLANGE. **INSTALL** dust cap on V-F fitting.
- 11.3 **PLACE** blank V-F cover and clamp on end of Leak Detector Hose and **CONNECT** it to Hose Docking Station.
- 11.4 **VERIFY** all valves are CLOSED on CONTAINMENT VESSEL door.
- 11.5 **RECORD** time helium leak check completed.

CALLOUT: Announce time containment vessel door leak check completed.

- 11.6 **REQUEST** permission to proceed. When permission is granted, **PROCEED** to Procedure 9.

UNUSUAL OPERATION:

WARNING

NEVER OPEN CONTAINMENT VESSEL DOOR WHEN CONTAINMENT VESSEL PRESSURE EXCEEDS ATMOSPHERIC PRESSURE. INTERNAL PRESSURE MAY FORCE DOOR OPEN PREMATURELY WHEN CLAMPS ARE LOOSENED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 12.0 **OPEN** CONTAINMENT VESSEL door.
- 12.1 **VENT** CONTAINMENT VESSEL.
 - 12.1.1 **PLACE** HELIUM LEAK DETECTOR in out-of-cycle mode by performing one of the following:
 - 12.1.1.1 When not using remote control, **PRESS** CYCLE button (6 in Figure 8-2) on control panel. **PROCEED** to Step 12.1.2.
 - 12.1.1.2 When using remote control, **PRESS** CYCLE button on remote control (6 in Figure 8-3) (green CYCLE ON indicator [5 in Figure 8-3] goes out).
 - 12.1.2 **CONNECT** Vessel Effluent Hose to Q5.

- 12.1.3 **VERIFY** valve 80 is OPEN to “WASTE 1” position (white arrow on valve 80 lever points to WASTE 1).
- 12.1.4 **VERIFY** valve 93 is OPEN.
- 12.1.5 **VERIFY** valve 91 is OPEN to “IBC” position (green IBC light is illuminated).
- 12.1.6 Slowly **OPEN** valve 5 until CONTAINMENT VESSEL is heard to begin venting. **OPEN** valve 5 completely.
- 12.1.7 When CONTAINMENT VESSEL pressure is at atmospheric pressure, **CLOSE** valves 5 and 6.
- 12.1.8 **DISCONNECT** Vessel Effluent Hose to Q5 and **CONNECT** it to Hose Docking Station.
- 12.2 **RELEASE** HELIUM LEAK DETECTOR Hose.
 - 12.2.1 **RELEASE** Leak Detector Hose from V-F fitting on HIGH VOLTAGE FEEDTHROUGH FLANGE. **INSTALL** dust cap on V-F fitting.
 - 12.2.2 **INSTALL** blank V-F cover and clamp on end of Leak Detector Hose and **CONNECT** to Hose Docking Station.
 - 12.2.3 **VERIFY** all valves on CONTAINMENT VESSEL door are CLOSED.

WARNINGS

WHEN OPENING CONTAINMENT VESSEL DOOR AS A RESULT OF STEPS PERFORMED IN PROCEDURE 9, VERIFY EXTERIOR DETONATOR SHORTING JACK HAS BEEN INSTALLED ON HIGH VOLTAGE FEEDTHROUGH FLANGE BEFORE PROCEEDING WITH PROCEDURE 8, STEP 12.3 (UNUSUAL OPERATION).

REMOVE CLAMP CONTROL KEY BEFORE ATTEMPTING TO PRY APART THE CLAMP HANGER ASSEMBLIES OR BEFORE USING THE SCREW DRIVE WHEEL.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 12.3 **ATTACH** CLAMP HANGER ASSEMBLIES to CONTAINMENT VESSEL door clamps.

Notes

Clamp control key is same key used in vessel rotation control panel.

Use of clamp hanger control pendant may be required when local control mode is not operating correctly. See Annex D.

- 12.3.1 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.
- 12.3.2 **TURN** amber speed switch on CLAMP HANGER DRIVE CONTROL Panel to FAST.
- 12.3.3 **PUSH** and **HOLD** green IN button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel.
- 12.3.4 **RELEASE** IN button when CLAMP HANGER ASSEMBLIES are approximately 6 inches from outer edge of CLAMP SLIDE LOCKS on top of door clamps.
- 12.3.5 **TURN** amber speed switch on CLAMP HANGER DRIVE CONTROL Panel to SLOW.

Caution

If leading edge of right CLAMP HANGER is driven beyond interior edge of CLAMP SLIDE LOCK, binding will occur, resulting in possible equipment damage.

12.3.6 **PUSH** and **HOLD** green IN button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel. When leading edge of right CLAMP HANGER is flush with interior edge of CLAMP SLIDE LOCK, **RELEASE** IN button and **PERFORM** one of the following:

12.3.6.1 When CLAMP HANGER ASSEMBLIES are free and not bound, **PUSH** both CLAMP HANGER ASSEMBLIES inward until clamp slide locks are fully enclosed in CLAMP HANGERS and pins are centered in CLAMP PIN DRIVE ASSEMBLY cutouts. **PROCEED** to Step 12.3.7.

12.3.6.2 When binding occurred and CLAMP HANGERS cannot move to center, **PERFORM** the following:

12.3.6.2.1 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and **REMOVE**.

12.3.6.2.2 **SWITCH** main disconnect switch to OFF position.

12.3.6.2.3 **REMOVE** power connector for screw drive motor in the junction box.

12.3.6.2.4 **TURN** hand wheel counterclockwise to free the binding of CLAMP HANGER LEAD SCREW.

12.3.6.2.5 **CONNECT** power connector for screw drive motor in the junction box.

12.3.6.2.6 **SWITCH** main disconnect switch to ON position.

12.3.6.2.7 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.

- 12.3.6.2.8 **PUSH** green OUT button to move CLAMP PIN DRIVE ASSEMBLIES until pins are centered in CLAMP HANGER ASSEMBLIES cutouts.
- 12.3.7 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and **REMOVE**.
- 12.3.8 Simultaneously **ROTATE** clamp hanger adjustment wheels to the left (Raise) until door clamps are firmly supported.

Note

Hydraulic Nut Subsystem will not operate unless green Hangers Closed light is illuminated.

12.4 **START HYDRAULIC NUT SUBSYSTEM.**

- 12.4.1 **CONNECT** Hydraulic Pump Hose to hydraulic manifold.
- 12.4.2 **VERIFY** all three hydraulic nut hoses are securely connected and are not leaking, and red Hydraulic Nut Pump OFF button is illuminated.
- 12.4.3 **TURN** red PRESSURE switch on CONTAINMENT VESSEL control panel to HIGH.
- 12.4.4 **PRESS** green ON button on HYDRAULIC NUT PUMP Panel to start hydraulic pump and **MONITOR** all four hydraulic nuts.

WARNING

NEVER STAND OR PLACE ANY PARTS OF BODY IN LINE WITH THREADED RODS WHEN HYDRAULIC NUTS ARE UNDER PRESSURE. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

12.5 **RELEASE** hydraulic nuts.

- 12.5.1 **VERIFY** all personnel are clear of nuts and hydraulic hoses.

- 12.5.2 **PUSH** and **HOLD ADVANCE** button on HYDRAULIC NUT PUMP Panel to tension hydraulic nuts. **MONITOR** all four hydraulic nuts.
- 12.5.3 When hydraulic pump shuts off, **CHECK** pump pressure gauge for reading between 5,900 and 6,200 psig.
- 12.5.4 **DON** leather gloves.
- 12.5.5 **TURN** locking rings counterclockwise simultaneously to loosen top and bottom until all four are flush with piston end and then **BACK OFF** 1/4 turn.
- 12.5.6 **PUSH** and **HOLD RETRACT** button on HYDRAULIC NUT PUMP Panel to release hydraulic pressure.
- 12.5.7 **VERIFY** pump pressure gauge reads approximately 0 psig. **RELEASE** RETRACT button when hydraulic nuts are fully seated against locking rings.
- 12.5.8 **PUSH** and **HOLD RETRACT** button to release any residual pressure. **RELEASE** RETRACT button.
- 12.6 **STOP** HYDRAULIC NUT SUBSYSTEM.
 - 12.6.1 **PRESS** red OFF button on HYDRAULIC NUT PUMP Panel.
 - 12.6.2 **DISCONNECT** Hydraulic Pump Hose from hydraulic manifold and **CONNECT** it to Hose Docking Station.
- 12.7 **OPEN** CONTAINMENT VESSEL DOOR.
 - 12.7.1 **DON** leather gloves.
 - 12.7.2 **PLACE** drive switch on large low speed high torque nut runner driver to clockwise position.
 - 12.7.3 **ATTACH** nut runner driver to lower nut runner using 1-3/8 inch socket to lower nut runner HIGH TORQUE nut.
 - 12.7.4 **DEPRESS** trigger and **LOOSEN** lower nut runner. **RELEASE** trigger.
 - 12.7.5 **REMOVE** nut runner driver from lower nut runner, and **ATTACH** nut runner driver to upper nut runner HIGH TORQUE nut.

- 12.7.6 **DEPRESS** trigger and **LOOSEN** upper nut runner. **RELEASE** trigger.
- 12.7.7 **REMOVE** nut runner driver from upper nut runner and **PLACE** it in storage location.
- 12.7.8 **PLACE** drive switch on small high speed low torque nut runner driver to clockwise position.
- 12.7.9 **ATTACH** nut runner driver to upper nut runner HIGH SPEED nut.
- 12.7.10 **DEPRESS** trigger and **LOOSEN** upper nut runner. **RUN** nut runner to within 1/2 inch of outer end of rods. **RELEASE** trigger.
- 12.7.11 **REMOVE** nut runner driver from upper nut runner and **ATTACH** to lower nut runner HIGH SPEED nut. **DEPRESS** trigger. **RUN** nut runner to within 1/2 inch of outer end of rods. **RELEASE** trigger.
- 12.7.12 **REMOVE** nut runner driver from lower nut runner and **PLACE** it in storage location.
- 12.7.13 Simultaneously **ROTATE** the clamp hanger adjustment wheels to the left (Raise) 1/2 turn.

Notes

Clamp control key is same key used in vessel rotation control panel.

Use of clamp hanger control pendant may be required when local control mode is not operating correctly. See Annex D.

- 12.7.14 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.
- 12.7.15 **TURN** amber speed switch on CLAMP HANGER DRIVE CONTROL Panel to SLOW.

Caution

Prying door clamps apart may damage metal surfaces over time.

Note

In the following step, it may be necessary to pry clamp hanger assemblies apart or turn lead screw drive wheel until free so clamp hanger motor will be able to move the assemblies.

12.7.16 **PUSH** and **HOLD** green OUT button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel to open CONTAINMENT VESSEL door clamps. **PERFORM** one of the following:

12.7.16.1 When door clamps move apart, **PROCEED** to Step 12.7.17.

12.7.16.2 When door clamps do not move apart, **PERFORM** the following:

WARNING

REMOVE CLAMP CONTROL KEY BEFORE ATTEMPTING TO PRY APART THE CLAMP HANGER ASSEMBLES OR BEFORE USING THE LEAD SCREW DRIVE WHEEL. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

12.7.16.2.1 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and **REMOVE**.

12.7.16.2.2 **ROTATE** LEAD SCREW DRIVE WHEEL to free door clamp hanger assemblies. **RETURN** to Step 12.7.10.

12.7.17 **RELEASE** OUT button when door clamps are clear of the CONTAINMENT VESSEL door and 1/4 to 1/2 inch away from DOOR OPEN INTERLOCK.

12.7.18 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and remove.

12.7.19 **OPEN** CONTAINMENT VESSEL door just enough to reach inside CONTAINMENT VESSEL, **REMOVE** BLAST COVER, and **DISCONNECT** INTERIOR DETONATOR JACK ASSEMBLY, when present.

12.7.20 **RECORD** CONTAINMENT VESSEL door opening time.

CALLOUT: Announce time when containment vessel door is opened.

12.7.21 **ATTACH** INTERIOR DETONATOR SHORTING PLUG to INTERIOR DETONATOR JACK ASSEMBLY, if necessary.

12.7.22 **OPEN** CONTAINMENT VESSEL door fully.

12.8 When directed by the EDS Crew Supervisor, **PERFORM** one of the following:

12.8.1 When directed not to remove munitions holder and munition(s), **PROCEED** to Step 12.9.

12.8.2 When directed to remove munitions holder and munition(s), **PERFORM** the following:

12.8.2.1 **POSITION** LOADING TABLE(S) (Teflon bumper toward CONTAINMENT VESSEL) in front of CONTAINMENT VESSEL with CONTAINMENT VESSEL door open.

12.8.2.2 **TURN** adjusting handles counterclockwise to lower T-clamps attached to LOADING TABLE(S) through floor grating.

12.8.2.3 **POSITION** T-clamps to catch under grating bar.

12.8.2.4 **SECURE** clamps by pulling up T-clamp handles and **TIGHTEN** jam nut as necessary.

Caution

Do not scratch or otherwise damage containment vessel sealing surfaces when removing FSS from containment vessel.

12.8.2.5 **REMOVE** munitions holder and munition(s) from CONTAINMENT VESSEL by performing one of the following:

12.8.2.5.1 When manually removing munitions holder and munition(s) from CONTAINMENT VESSEL, **PULL** munitions holder and munition(s) onto LOADING TABLE. **PROCEED** to Step 12.8.2.6.

12.8.2.5.2 When using EDS FSS Retrieval Tool, **PROCEED** as follows:

12.8.2.5.2.1 **VERIFY** leather gloves are worn.

12.8.2.5.2.2 **POSITION** EDS FSS Retrieval Tool on line with center of CONTAINMENT VESSEL.

Caution

Correctly secure EDS FSS Retrieval Tool under trailer sump cross member to prevent damage to deck grating.

12.8.2.5.2.3 **VERIFY** EDS FSS Retrieval Tool is correctly attached under sump cross member.

12.8.2.5.2.4 **ATTACH** grappeler bar or cam-lock lifting clamp to FSS, as needed.

WARNING

NEVER STAND OR PLACE ANY PARTS OF THE BODY IN LINE WITH CABLE, GRAPPLER BAR, OR CAM-LOCK LIFTING CLAMP WHEN EDS FSS RETRIEVAL TOOL IS BEING USED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

12.8.2.5.2.5 **TURN** hand crank and **PULL** munitions holder and munition(s) onto **LOADING TABLE** while using angled pry bar to control munitions holder.

12.8.2.5.2.6 **VERIFY** munitions holder is stable on **LOADING TABLE**.

12.8.2.5.2.7 **REMOVE** grappler bar or cam-lock lifting clamp from munitions holder.

12.8.2.5.2.8 **DETACH** EDS FSS Retrieval Tool from sump cross member.

12.8.2.5.2.9 **STORE** EDS FSS Retrieval Tool in appropriate location.

12.8.2.6 **REMOVE** detonators from LSC(s).

12.8.2.7 **PLACE** INTERIOR DETONATOR JACK ASSEMBLY with detonators attached into shipping container.

12.8.2.8 **REMOVE** LSC(s) from munitions holder, if possible. **PLACE** LSC(s) in shipping container.

12.8.2.9 **PROCEED** as follows:

12.8.2.9.1 When LSC holder is not present, **PROCEED** to Step 12.8.2.10.

12.8.2.9.2 When LSC holder is present, **REMOVE** LSC holder.

12.8.2.10 **REMOVE** munition(s) from munitions holder and **PLACE** munition(s) in a safe place.

12.8.2.11 **REMOVE** munitions holder from LOADING TABLE, and **REMOVE** LOADING TABLE(S).

12.9 **SERVICE CONTAINMENT VESSEL.**

12.9.1 **REMOVE** metal seal and/or O-ring from CONTAINMENT VESSEL door and/or HIGH VOLTAGE FEEDTHROUGH FLANGE seal IAW O&M Manual for EDS P2R, Chapter 5, Procedures CNV-15, CNV-16, and CNV-18.

12.9.2 **CLEAN** sealing surfaces IAW O&M Manual for EDS P2R, Chapter 5, Procedures CNV-15, CNV-16, and CNV-18.

12.9.3 **REPLACE** metal seal and/or O-ring on CONTAINMENT VESSEL door and/or HIGH VOLTAGE FEEDTHROUGH FLANGE IAW O&M Manual for EDS P2R, Chapter 5, Procedures CNV-15, CNV-16, and CNV-18.

12.10 **PROCEED** as follows:

12.10.1 When munitions holder and munition(s) are not in CONTAINMENT VESSEL, **PROCEED** to Step 12.11.

12.10.2 When munitions holder and munition(s) are in CONTAINMENT VESSEL, **VERIFY** INTERIOR DETONATOR JACK ASSEMBLY has been connected and BLAST COVER is installed.

12.11 **CLOSE** CONTAINMENT VESSEL DOOR.

12.11.1 **REPEAT** Steps 1.0 through 8.8 to close CONTAINMENT VESSEL door and then **PROCEED** to Step 12.11.2.

12.11.2 **REPEAT** Steps 9.0 through 9.9 to check CONTAINMENT VESSEL door seal and then **PROCEED** to Step 13.0.

CALLOUT: Announce time door annular space vacuum check completed.

- 13.0 **REQUEST** permission to proceed and **PERFORM** one of the following:
 - 13.1 When permission is granted, **PROCEED** as follows:
 - 13.1.1 When munitions holder and munition(s) are in CONTAINMENT VESSEL, **RETURN** to Step 10.0.
 - 13.1.2 When munitions holder and munition(s) are not in CONTAINMENT VESSEL, **PERFORM** the following:
 - 13.1.2.1 **RETURN** and **PERFORM** Steps 12.0 through 12.7.14 to open CONTAINMENT VESSEL door and then **RETURN** to Procedure 7.
 - 13.2 When permission is not granted to proceed, **PERFORM** the following:
 - 13.2.1 **RETURN** to and **PERFORM** Steps 12.0 through 12.7.14 to open CONTAINMENT VESSEL door.
 - 13.2.2 **PERFORM** one of the following:
 - 13.2.2.1 When munitions holder and munition(s) are in CONTAINMENT VESSEL, **PROCEED** as follows:
 - 13.2.2.1.1 When directed not to remove munitions holder and munition(s), **PROCEED** to Step 14.0.
 - 13.2.2.1.2 When directed to remove munitions holder and munition(s), **RETURN** and **PERFORM** Steps 12.8.2 through 12.8.2.11 and then **PROCEED** to Step 14.0.
 - 13.2.2.2 When munitions holder and munition(s) are not in the CONTAINMENT VESSEL, **PROCEED** to Step 14.0.
- 14.0 **INSPECT** and **TIGHTEN** fittings and fasteners on CONTAINMENT VESSEL DOOR.
 - 14.1 **USE** O&M Manual for EDS P2R, Chapter 5.
 - 14.2 **PROCEED** as directed by EDS Crew Supervisor.

SPECIAL REQUIREMENTS:

1. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Helium leak detector	1 each
Helium cylinder	as required
Vacuum flex hoses	as required
Primary tool kit	1 each
Pressure regulator assembly	1 each
Vessel rotation/Clamp Control Key	1 each
EDS operator log	1 each
Indelible ink pen	1 each
Strap wrench	1 each
Spanner bar, 30-1/4-inch	1 each
T-handle wrench, 1-5/16-inch	1 each
Leather gloves	as required
Tape measure	1 each
Spanner wrench	1 each
50-foot detonator cable	4 each
4-foot detonator cable	4 each
300-foot control cable	1 each
30-foot control cable	1 each
12-inch control cable	1 each
29-inch internal control cable	1 each
Dust cap (blue-dot)	8 each
Exterior detonator jack	1 each
Exterior detonator shorting jack	1 each
Safety interlock plug	2 each
High voltage feedthrough assembly	4 each
Interior detonator jack assembly	as required
Interior detonator shorting plug	3 each
50-foot extension cord	1 each
EDS Firing System	2 each
EDS FSS Retrieval Tool	1 each

PROCEDURE 9 DETONATE MUNITION

The purpose of this procedure is to destroy any explosive components and access the chemical fill in a munition.

PRECONDITIONS:

1. Door closure and door seal check was completed.
2. All valves must be closed on valve panel and EDS containment vessel door.
3. All non-essential personnel have cleared the area.
4. Notification of impending detonation must be communicated to all required officials.
5. Air monitoring must be operational.
6. Setup and daily operational checklists have been completed.
7. Steam generator must be operating.

WARNINGS

WHEN OPENING CONTAINMENT VESSEL DOOR WHILE PERFORMING STEPS IN THIS PROCEDURE, VERIFY EXTERIOR DETONATOR JACK IS DISCONNECTED AND EXTERIOR DETONATOR SHORTING JACK IS INSTALLED ON HIGH VOLTAGE FEEDTHROUGH FLANGE BEFORE PROCEEDING WITH PROCEDURE 8, STEP 12.0 (UNUSUAL OPERATIONS) TO OPEN CONTAINMENT VESSEL DOOR.

WHEN NOT BEING USED IN EDS FIRING SYSTEM, FIRESET OPERATOR MUST MAINTAIN CONTROL OF SAFETY INTERLOCK PLUG AT ALL TIMES. FAILURE TO MAINTAIN POSITIVE CONTROL OF SAFETY INTERLOCK PLUGS MAY RESULT IN UNAUTHORIZED DETONATION.

VERIFY ALL PERSONNEL HAVE CLEARED THE AREA PRIOR TO DETONATION.

DUE TO EXTREME TEMPERATURES, PERSONNEL SHOULD AVOID DIRECT SKIN CONTACT WITH STEAM SUPPLY HOSE.

VERIFY PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Note

Two-Person Rule will be strictly enforced when having access to and/or conducting operations involving chemical surety material. At least two CPRP personnel (only one may be interim-certified) of which both must be equally qualified in the task(s) being performed, capable of recognizing an unsafe act, performing self- or buddy-aid in case of chemical agent exposure, and able to detect unauthorized acts on the part of the other are required when the Two-Person Rule is in effect.

1.0 PERFORM EDS FIRING SYSTEM continuity check.

1.1 VERIFY Fireset Operator has control of SAFETY INTERLOCK PLUG.

- 1.2 **REMOVE** EXTERIOR DETONATOR SHORTING JACK from HIGH VOLTAGE FEEDTHROUGH FLANGE.
- 1.3 **CONNECT** EXTERIOR DETONATOR JACK on HIGH VOLTAGE FEEDTHROUGH FLANGE in sequence: CH1 to CH1, CH2 to CH2, etc.

Notes

When only three detonator lead wires are connected to the interior detonator jack assembly, all 50-foot detonator cables MUST be connected to the exterior detonator jack. The exterior detonator jack will be connected IAW the SOP to the high voltage feedthrough flange. During continuity checks, one of the four detonator cables will read "OPEN" when checked.

Maintain numerical sequence of 50-foot detonator cables with numerical sequence of Fireset CDU (CH1 through CH4). See Figure 9-1.

- 1.4 Team Leader will **VERIFY** the connections in sequence of each 50-foot detonator cable attached to the feedthroughs IAW Figure 9-1.
- 1.5 **VERIFY** valves 3, 6, 10, and 14 are CLOSED.
- 1.6 **VERIFY** four detonator cables (CH1 through CH4) located on the inside of the left-side panel of EDS FIRING SYSTEM CASE are connected to the connectors on the back side of the TEST INTERFACE CHASSIS (CH1 through CH4).
- 1.7 **VERIFY** four 4-foot detonator cables located in SHORTING CONNECTORS compartment are connected to SHORTING CONNECTORS (CH1 through CH4) on front face panel of TEST INTERFACE CHASSIS.

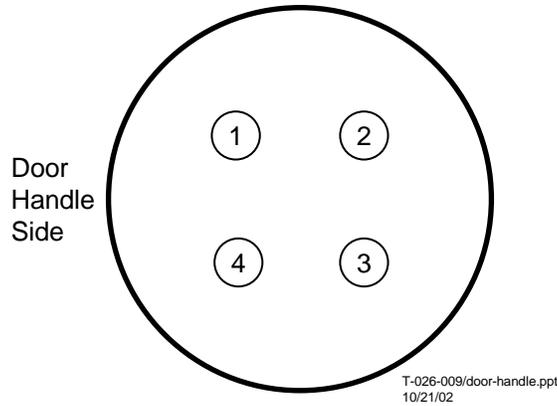


Figure 9-1. High Voltage Feedthrough Flange Exterior View

Note

Control cable comes in four different lengths (12-inch, 29-inch internal, 30-foot, and 300-foot). System continuity checks should be conducted with the same control cable that will be used during munition detonation.

1.8 **PERFORM** one of the following:

1.8.1 When not using the CONTROL MODULE in the remote configuration, **PROCEED** as follows:

1.8.1.1 **VERIFY** 12-inch control cable is connected to CONTROL MODULE J3B OUTPUT connector and to EDS FIRING SYSTEM CHASSIS J29B INPUT connector.

1.8.1.2 **PROCEED** to Step 1.9.

1.8.2 When using the CONTROL MODULE in the remote configuration, **PROCEED** as follows:

1.8.2.1 **VERIFY** 29-inch internal control cable (J29A connector) is connected to EDS FIRING SYSTEM CHASSIS J29B INPUT connector.

- 1.8.2.2 **VERIFY** selected control cable is connected to CONTROL MODULE J3B OUTPUT connector and to mating connector located externally on the left side of the EDS FIRING SYSTEM CASE.

CALLOUT: Announce which EDS Fireset is being used.

- 1.9 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to ON.
- 1.10 **TOGGLE** one of two LOAD CONTINUITY meter switches to ON.
- 1.11 **REMOVE** dust cap from connector below selected LOAD CONTINUITY meter.
- 1.12 **DISCONNECT** 4-foot detonator cable from CH1 on SHORTING CONNECTORS PANEL located on TEST INTERFACE CHASSIS and **CONNECT** to selected LOAD CONTINUITY meter.

Notes

In the following step, acceptable meter display reading is no greater than 030 milliohms (30 mΩ).

When a detonator cable fails continuity test, check connections and internal 9 V batteries and retest. If detonator cable fails again, replace cable and retest. If cable fails the third test, request maintenance support.

- 1.13 **VERIFY** load continuity. **OBSERVE** LOAD CONTINUITY meter display for a reading no greater than 30 mΩ.

CALLOUT: Announce ohm values obtained for CH1 through CH4.

- 1.14 **DISCONNECT** 4-foot detonator cable from LOAD CONTINUITY meter and **CONNECT** to CH1 on CDU MODULE.
- 1.15 **REPEAT** Steps 1.12 through 1.14 for remaining detonator cables (CH2 through CH4) and then **PROCEED** to Step 1.16.
- 1.16 **TOGGLE** LOAD CONTINUITY meter switch to OFF.
- 1.17 **RE-INSTALL** dust cap to LOAD CONTINUITY connector.
- 1.18 **RECORD** time continuity checks are completed.

CALLOUT: Announce time continuity check is complete.

- 2.0 **PERFORM** explosives firing sequence.
 - 2.1 **OBTAIN** permission to proceed with firing sequence. **COORDINATE** detonation time with Monitoring personnel, if required.
 - 2.2 **INSERT SAFETY INTERLOCK PLUG** into INTERLOCK connector on TEST INTERFACE CHASSIS.
 - 2.3 **VERIFY TRIGGER** and CDU BITE indicators are set to black position. Gently **TURN** dial clockwise until indicators are set to black.

CALLOUT: Obtain personnel accountability. Obtain permission to fire.

- 2.4 **TOGGLE CONTROL MODULE POWER** switch to ON position. **OBSERVE** illumination of red light emitting diode HIGH VOLTAGE meter and green POWER light.

Note

Front cover of EDS Firing System case may be attached to prevent contamination or during operations in inclement weather.

- 2.5 **PERFORM** one of the following:
 - 2.5.1 When not using CONTROL MODULE in the remote configuration, **PROCEED** to Step 2.6.
 - 2.5.2 When using CONTROL MODULE in the remote configuration, **PERFORM** the following:
 - 2.5.2.1 **TOGGLE CONTROL MODULE POWER** switch to OFF.
 - 2.5.2.2 **REMOVE** detachable CONTROL MODULE from EDS FIRING SYSTEM CHASSIS by turning wire knobs 1/4 turn counterclockwise and **MOVE** to designated firing position.
 - 2.5.2.3 **VERIFY** selected control cable is connected to CONTROL MODULE J3B OUTPUT connector.
 - 2.5.2.4 **TOGGLE CONTROL MODULE POWER** switch to ON position. **OBSERVE** illumination of green POWER light.

WARNING

AN ELECTRICAL SHOCK HAZARD POTENTIAL EXISTS DURING FOLLOWING STEPS. EDS TRAILER MUST BE CLEARED OF ALL PERSONNEL, AND CONTACT WITH EXPOSED METAL PARTS MUST BE AVOIDED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 2.6 **TOGGLE** ARM switch on CONTROL MODULE to ON position and **OBSERVE** that amber READY and red ARM lights illuminate.

CALLOUT: Announce countdown prior to firing in next step.

- 2.7 To fire, **TOGGLE UP** and **RELEASE** FIRE switch on CONTROL MODULE and **OBSERVE**:
- 2.7.1 Amber READY light should momentarily flash OFF and then back ON.
 - 2.7.2 Blue FIRE light illuminates.
 - 2.7.3 TRIGGER and CDU BITE indicators trip to white.

CALLOUT: Announce time firing system shutdown completed.

- 2.8 **CLOSE** cover on FIRE, ARM, and POWER switches.
- 2.9 If required, **COORDINATE** with Monitoring and **PERFORM** one of the following:
- 2.9.1 When firing sequence is successful, **PROCEED** to Step 3.0.
 - 2.9.2 When firing sequence is not successful (misfire or no-fire),
PROCEED to Step 9.0.
- 3.0 **PERFORM** EDS FIRING SYSTEM shutdown.
- 3.1 **TOGGLE** POWER switch on CONTROL MODULE to ON.
 - 3.2 **VERIFY** voltage on HIGH VOLTAGE meter achieved 0.00 volts.
 - 3.3 **TOGGLE** POWER switch to OFF on CONTROL MODULE.
 - 3.4 If necessary, **RE-INSTALL** detachable CONTROL MODULE in EDS FIRING SYSTEM CHASSIS.

- 3.5 **TOGGLE** TEST INTERFACE CHASSIS 24-VDC POWER switch to OFF.
- 3.6 **REMOVE** SAFETY INTERLOCK PLUG from TEST INTERFACE CHASSIS.
- 3.7 **DISCONNECT** four 4-foot detonator cables from CDU MODULE CH1 through CH4 and **CONNECT** to CH1 through CH4 on SHORTING CONNECTORS PANEL on TEST INTERFACE CHASSIS.
- 3.8 **REPLACE** dust caps on CH1 through CH4 CDU MODULE connectors on EDS FIRING SYSTEM CHASSIS.
- 3.9 **REMOVE** EXTERIOR DETONATOR JACK from high voltage feedthrough plugs located on outside of HIGH VOLTAGE FEEDTHROUGH FLANGE and **INSTALL** EXTERIOR DETONATOR SHORTING JACK.
- 3.10 **MOVE** 50-foot detonator cables and EXTERIOR DETONATOR JACK to a safe location. **RECORD** time EDS FIRING SYSTEM shutdown completed.

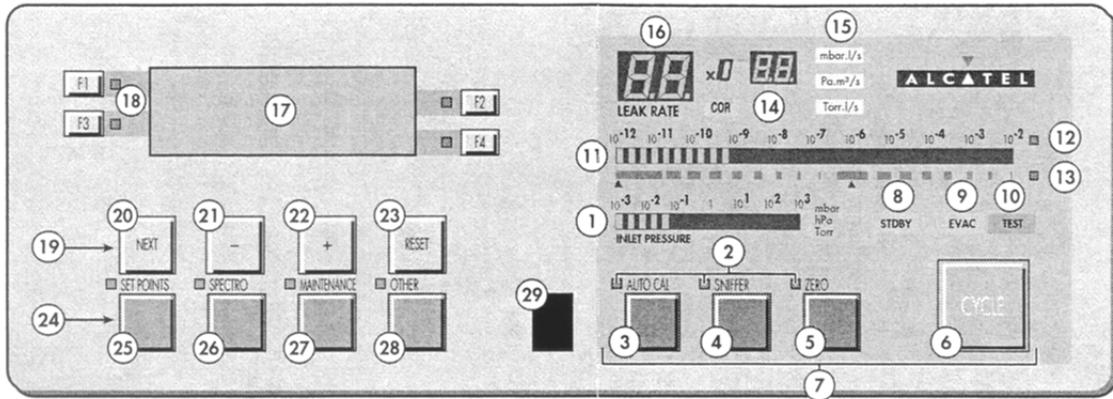
CALLOUT: Announce time firing system shutdown completed.

- 4.0 **MONITOR** CONTAINMENT VESSEL pressure.
 - 4.1 **VERIFY** valve 5 is CLOSED.
 - 4.2 **OPEN** valve 6.
 - 4.3 **MONITOR** and **RECORD** CONTAINMENT VESSEL pressure and temperature on VESSEL CONTROL PANEL.

CALLOUT: Announce containment vessel pressure and temperature. Obtain permission to treat chemical fill.

- 5.0 **PROCEED** as follows:
 - 5.1 When having to perform a post-detonation helium leak check, **PROCEED** to Step 6.0.
 - 5.2 When not having to perform a post-detonation helium leak check, **PROCEED** to Step 7.0.
- 6.0 **CONDUCT** post-detonation helium leak check using HELIUM LEAK DETECTOR (ASM 142).
 - 6.1 **VERIFY** valve 6 on CONTAINMENT VESSEL door is OPEN.
 - 6.2 **ATTACH** remote control to remote control connection (29 in Figure 9-2) on the control panel, if used.

Control panel



- 1 Inlet port pressure analog display
- 2 Control and menu selection indicators (ON when activated)
- 3 Auto-calibration START/ABORT control key
- 4 Sniffing mode ON/OFF control key
- 5 Auto-zero ON/OFF control key
- 6 Cycle START/STOP control key
- 7 Control keys (4 keys)
- 8 Standby ON/OFF indicator
- 9 Evacuation ON/OFF indicator
- 10 Test ON/OFF indicator
- 11 Helium signal analogic display
- 12 Helium signal analogic scale ON/OFF indicator
- 13 Helium signal Zero scale ON/OFF indicator
- 14 Correction factor COR indicator (applied to digital display)
- 15 Units ON/OFF indicator
- 16 Helium signal digital display
- 17 Alphanumeric display (4 lines x 20 characters)
- 18 Parameter function keys (1 key per display line)
- 19 Modification access keys (4 keys)
- 20 NEXT : next display/parameter circular function
- 21 & 22 Plus or minus value adjustment, parameter selection, audio volume adjustment keys
- 23 RESET of previously displayed values (cancels temporary inputs)
- 24 Menu selection access keys (4 keys)
- 25 SET POINT menu selection key
- 26 SPECTRO calibration and analyzer cell configuration menu selection key
- 27 MAINTENANCE menu selection key
- 28 OTHER menus selection key (test mode selection, inlet VENT selection, date/time)
- 29 Remote control connection (accessory)

Figure 9-2. ASM 142 Helium Leak Detector Control Panel

6.3 **PRESS** main POWER switch to ON, if not previously turned on.

Note

Leak detector will automatically go through a setup procedure and calibration. This will typically take 2 to 3 minutes.

6.4 **OBSERVE** that alphanumeric display (17 in Figure 9-2) displays “READY FOR CYCLE.”

6.5 **REMOVE** clamp and V-F cover from Leak Detector Hose LD and dust cap from V-F fitting on CONTAINMENT VESSEL door.

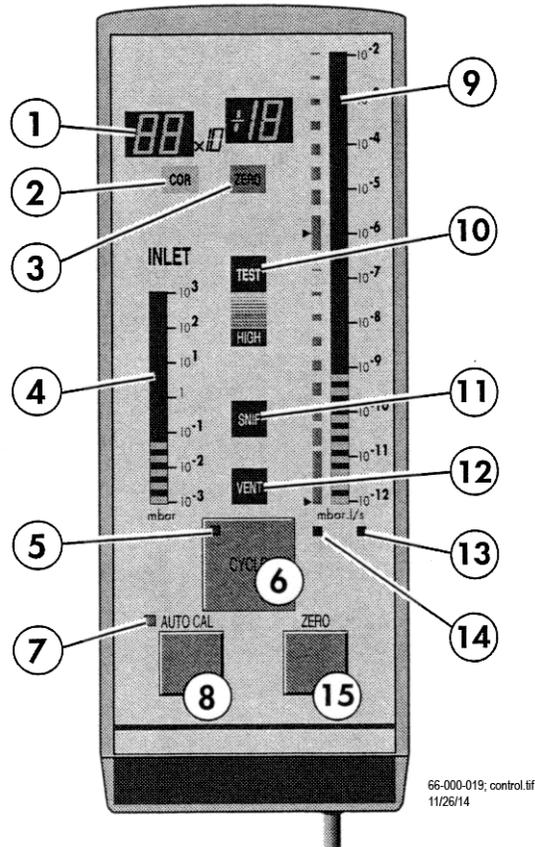
6.6 **CLAMP** Leak Detector Hose LD to V-F fitting on CONTAINMENT VESSEL door.

6.7 **PLACE** HELIUM LEAK DETECTOR in cycle mode by performing one of the following:

6.7.1 When not using remote control, **PRESS** CYCLE button (6 in Figure 9-2) on control panel. **PROCEED** to Step 6.8.

6.7.2 When using remote control, **PRESS** CYCLE button on remote control (6 in Figure 9-3) (green CYCLE ON indicator [5 in Figure 9-3] illuminates).

Remote control interface



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11/26/14

- | | | | |
|---|---|----|---|
| 1 | Helium signal digital display | 9 | Helium signal analogic display |
| 2 | Correction factor COR indicator | 10 | Test ON indicator |
| 3 | Zero function indicator | 11 | Sniffing test mode ON indicator |
| 4 | Inlet port pressure analog display | 12 | Inlet VENT ON indicator |
| 5 | Test cycle ON indicator
(ON when activated) | 13 | Helium signal standard scale ON indicator |
| 6 | Cycle Start/Stop control key | 14 | Helium signal Zero scale ON indicator |
| 7 | Calibration in progress indicator | 15 | Zero ON/OFF control key |
| 8 | Auto-calibration start control key | | |

Figure 9-3. ASM 142 Helium Leak Detector Remote Control

Notes

When helium leak detector control panel alphanumeric display (17 in Figure 9-2) shows an error code, refer to vendor manual for troubleshooting procedures.

It may take up to 5 minutes for helium leak detector numerical reading to become stable. However a minimum of 3 minutes of the 5 minutes must elapse before any numerical reading is deemed acceptable as reflecting a stable vessel seal vacuum.

Annular space vacuum reading will be verified by two personnel.

6.8 **PROCEED** as follows:

- 6.8.1 While observing helium signal digital display (16 in Figure 9-2) or remote control (1 in Figure 9-3), **WAIT** a minimum of 3 minutes for the helium leak detector numerical reading to become stable. **VERIFY** annular space vacuum reading by two personnel.
- 6.8.2 **RECORD** CONTAINMENT VESSEL annular space vacuum numerical reading.

CALLOUT: Announce annular space vacuum numerical reading.

6.9 **CHECK** CONTAINMENT VESSEL pressure and **PERFORM** one of the following:

- 6.9.1 When Helium Regulator psig exceeds CONTAINMENT VESSEL psig, **OPEN** valve 25. **PROCEED** to Step 6.10.
- 6.9.2 When CONTAINMENT VESSEL pressure exceeds 15 psig, **ADJUST** Helium Regulator until it exceeds CONTAINMENT VESSEL psig by 115 psig.

Notes

Containment vessel internal pressure can be monitored by observing containment vessel pressure indicator on containment vessel control panel.

Venting containment vessel is not required when containment vessel pressure exceeds 10 psig.

6.10 **PERFORM** one of the following:

6.10.1 When using Supply Hose, **PROCEED** as follows:

6.10.1.1 **CONNECT** Supply Hose to Q5.

6.10.1.2 **OPEN** valves 25, 27, and 5.

6.10.1.3 **OPEN** valve 6.

6.10.1.4 When CONTAINMENT VESSEL internal pressure has increased between 5 to 10 psig, **CLOSE** valve 5.

6.10.1.5 **PROCEED** to Step 6.11.

6.10.2 When using Steam Supply Line, **PROCEED** as follows:

6.10.2.1 **VERIFY** valve 16 is CLOSED.

6.10.2.2 **OPEN** valve 6.

6.10.2.3 **OPEN** valves 25, 26, 13, and 14.

6.10.2.4 When CONTAINMENT VESSEL internal pressure has increased between 5 to 10 psig, **CLOSE** valve 14.

Notes

Leak rate is achieved when it has reached equilibrium. Allow up to 5 minutes for helium leak detector to reach equilibrium.

Helium leak rate will be verified by two personnel.

- 6.11 **MONITOR** the helium signal digital display on control panel (16 in Figure 9-2) or remote control (1 in Figure 9-3) until display figures stabilize.
- 6.12 **READ** leak rate on helium signal digital display on control panel (16 in Figure 9-2) or remote control (1 in Figure 9-3). **VERIFY** helium leak rate reading by two personnel.
- 6.13 **RECORD** CONTAINMENT VESSEL door helium leak rate.

CALLOUT: Announce value of containment vessel door leak rate obtained.

- 6.14 **PLACE** HELIUM LEAK DETECTOR in out-of-cycle mode by performing one of the following:
 - 6.14.1 When not using remote control, **PRESS** CYCLE button (6 in Figure 9-2) on control panel. **PROCEED** to Step 6.15.
 - 6.14.2 When using remote control, **PRESS** CYCLE button on remote control (6 in Figure 9-3) (green CYCLE ON indicator [5 in Figure 9-3] goes out).
- 6.15 **PERFORM** helium leak check on HIGH VOLTAGE FEEDTHROUGH FLANGE.
 - 6.15.1 **RELEASE** Leak Detector Hose from V-F fitting on CONTAINMENT VESSEL door. **INSTALL** dust cap on V-F fitting.
 - 6.15.2 **REMOVE** dust cap from HIGH VOLTAGE FEEDTHROUGH FLANGE and **CLAMP** Leak Detector Hose to V-F fitting.

Note

Leak detector will automatically go into cycle mode and evacuate leak detector hose assembly and high voltage feedthrough flange.

6.15.3 **PLACE** HELIUM LEAK DETECTOR in cycle mode by performing one of the following:

6.15.3.1 When not using remote control, **PRESS** CYCLE button (6 in Figure 9-2) on control panel. **PROCEED** to Step 6.15.4.

6.15.3.2 When using remote control, **PRESS** CYCLE button on remote control (6 in Figure 9-3) (green CYCLE ON indicator [5 in Figure 9-3] illuminates).

Notes

Leak rate is achieved when it has reached equilibrium. Allow up to 5 minutes for helium leak detector to reach equilibrium. Refer to Annex F for guidance concerning helium leak rate.

Helium leak rate will be verified by two personnel.

6.15.4 **MONITOR** the helium signal digital display (16 in Figure 9-2) or remote control (1 in Figure 9-3) until display figures stabilize.

6.15.5 **READ** leak rate on helium signal digital display (16 in Figure 9-2) or remote control (1 in Figure 9-3). **VERIFY** helium leak rate reading by two personnel.

6.15.6 **RECORD** HIGH VOLTAGE FEEDTHROUGH FLANGE leak rate.

CALLOUT: Announce value of high voltage feedthrough flange leak rate obtained.

6.16 **REQUEST** permission to proceed. When permission is granted, **PROCEED** to Step 6.17.

6.17 **VENT** Supply Manifold.

6.17.1 **PLACE** HELIUM LEAK DETECTOR in out-of-cycle mode by performing one of the following:

6.17.1.1 When not using remote control, **PRESS** CYCLE button (6 in Figure 9-2) on control panel. **PROCEED** to Step 6.17.2.

6.17.1.2 When using remote control, **PRESS** CYCLE button on remote control (6 in Figure 9-3) (green CYCLE ON indicator [5 in Figure 9-3] goes out).

6.17.2 **CLOSE** valve 25.

6.17.3 **OPEN** valve 31. **WAIT** 5 seconds. **CLOSE** valve 31.

6.17.4 **PERFORM** one of the following:

6.17.4.1 When having used Supply Hose, **PROCEED** as follows:

6.17.4.1.1 **CLOSE** valve 27.

6.17.4.1.2 **DISCONNECT** Supply Hose from Q5 and **CONNECT** it to Hose Docking Station.

6.17.4.1.3 **PROCEED** to Step 6.18.

6.17.4.2 When having used Steam Supply Line, **CLOSE** valve 26.

6.18 **TURN OFF** HELIUM LEAK DETECTOR.

6.18.1 **PRESS** the main POWER switch to OFF.

6.18.2 **RELEASE** Leak Detector Hose from V-F fitting on HIGH VOLTAGE FEEDTHROUGH FLANGE. **INSTALL** dust cap on V-F fitting.

6.18.3 **INSTALL** blank V-F cover and clamp on end of Leak Detector Hose and **CONNECT** it to Hose Docking Station.

6.18.4 **VERIFY** all valves on CONTAINMENT VESSEL door are CLOSED except for valve 6.

6.18.5 **RECORD** time leak check completed.

CALLOUT: Announce time containment vessel door leak check completed.

- 6.19 **REQUEST** permission to proceed. When permission is granted, **PROCEED** to Step 7.0.
- 7.0 **CHECK** Steam Supply Subsystem.
 - 7.1 **VERIFY** INTERLOCK amber selector switch is turned to CLOSED.
 - 7.2 **VERIFY** red STEAM LINE MOTION LIMIT RESET button light is not illuminated. If illuminated, **PUSH** red RESET button.
- 8.0 **PROCEED** to Procedure 10.

ALTERNATE PROCEDURE:

WARNING

WAIT 30 MINUTES BEFORE APPROACHING EDS AFTER MISFIRE. EXPLOSIVES MAY BE BURNING AS A RESULT OF ATTEMPTED ELECTRICAL DETONATION. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 9.0 **PERFORM** explosive firing sequence using replacement EDS FIRING SYSTEM.
 - 9.1 **REMOVE** defective EDS FIRING SYSTEM.
 - 9.1.1 **VERIFY** TEST INTERFACE CHASSIS 24-volt direct current (VDC) POWER switch and all CONTROL MODULE switches are in the OFF position.
 - 9.1.2 **VERIFY** HI-POTTER line POWER switch is OFF.
 - 9.1.3 **VERIFY** SAFETY INTERLOCK PLUG has been removed from TEST INTERFACE CHASSIS.
 - 9.1.4 **VERIFY** four 4-foot detonator cables are disconnected from front of EDS FIRING SYSTEM and are stowed in SHORTING connectors compartment behind SHORTING CONNECTORS PANEL on TEST INTERFACE CHASSIS.
 - 9.1.5 **DISCONNECT** four 50-foot detonator cables from connectors (CH1 through CH4) located on exterior of the left-side panel of EDS FIRING SYSTEM CASE.

- 9.1.6 **VERIFY** remote control cable is not connected to CONTROL MODULE J3B OUTPUT connector and to EDS FIRING SYSTEM CHASSIS J29B INPUT connector.
- 9.1.7 **DISCONNECT** extension power cord from 120-volt GFCI conditioned power outlet on EDS Trailer and EDS FIRING SYSTEM. **STOW** extension power cord in EDS FIRING SYSTEM storage compartment.
- 9.1.8 **REMOVE** EXTERIOR DETONATOR JACK from high voltage feedthrough plugs on HIGH VOLTAGE FEEDTHROUGH FLANGE and **INSTALL** EXTERIOR DETONATOR SHORTING JACK.
- 9.1.9 **MOVE** 50-foot detonator cables and EXTERIOR DETONATOR JACK to a safe location.
- 9.1.10 **REPLACE** and **SECURE** front and rear covers on EDS FIRING SYSTEM CASE.
- 9.1.11 **STOW** EDS FIRING SYSTEM CASE in designated location.
- 9.2 **RETURN** to and **PERFORM** Procedure 4 and then **PROCEED** to Procedure 9 to perform firing sequence with replacement EDS FIRING SYSTEM.
- 9.3 **PROCEED** as directed in the event of a misfire or no-fire.

UNUSUAL PROCEDURE:

- 10.0 **PERFORM** the following when Steam Supply Line motion limit switch has functioned and halted operations.
 - 10.1 **DON** leather gloves.
 - 10.2 **MOVE** Steam Supply Line so u-shaped motion limit switch is centered between alignment marks.
 - 10.3 **PUSH** red STEAM LINE MOTION FAULT button to reset Steam Supply Line motion limit switch (red button light is not illuminated).

10.4 **PROCEED** as follows:

10.4.1 When steam transfer was not being conducted, **PROCEED** to Step 11.5.

10.4.2 When steam transfer was being conducted, **CHECK** green STEAM CONTROL ON button and **PROCEED** as follows:

10.4.2.1 When green STEAM CONTROL ON button is illuminated, **PROCEED** to Step 10.5.

10.4.2.2 When green STEAM CONTROL ON button is not illuminated, **PUSH** green STEAM CONTROL ON button to start Steam Supply Subsystem.

10.5 **PROCEED** as follows:

10.5.1 When Steam Supply Line motion limit switch functioned and CONTAINMENT VESSEL was not rotating, **PROCEED** as directed.

10.5.2 When Steam Supply Line motion limit switch functioned and CONTAINMENT VESSEL was rotating, **PUSH** green ROTATE button to resume CONTAINMENT VESSEL rotation. **PROCEED** as directed.

SPECIAL REQUIREMENTS:

1. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
300-foot interface control cable	1 each
30-foot interface control cable	1 each
12-inch interface control cable	1 each
4-foot detonator cables	4 each
50-foot detonator cables	4 each
Exterior detonator jack	1 each
Exterior detonator shorting jack	1 each
Dust caps (blue-dot)	8 each
EDS Firing System	2 each
Safety interlock plug	2 each
EDS operator log	1 each
Indelible ink pen	1 each

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PROCEDURE 10
CHEMICALLY TREAT EDS CONTAINMENT VESSEL CONTENTS

The purpose of this operation is to chemically treat the EDS containment vessel contents with the proper reagent.

PRECONDITIONS:

1. Air monitoring must be operational.
2. Setup and daily startup checklists have been completed.
3. Initial sampling must be complete, if required.
4. Vapor sample has been analyzed or proceed as directed by Site Manager.
5. Air compressor must be operating.

WARNINGS

WHEN CONTAINMENT VESSEL PRESSURE EXCEEDS 135 PSIG, DO NOT TRANSFER STEAM TO CONTAINMENT VESSEL.

VERIFY PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED.

DUE TO EXTREME TEMPERATURES, PERSONNEL SHOULD AVOID DIRECT SKIN CONTACT WITH STEAM SUPPLY HOSE.

BE AWARE OF BODY POSITION AND AVOID STEPPING OVER OR BEING IN PROXIMITY TO SUPPLY LINES UNDER PRESSURE.

FAILURE TO DON HEARING PROTECTION MAY CAUSE HEARING LOSS WHILE PERFORMING THE FOLLOWING STEPS.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Note

Two-Person Rule will be strictly enforced when having access to and/or conducting operations involving chemical surety material. At least two CPRP personnel (only one may be interim-certified) of which both must be equally qualified in the task(s) being performed, capable of recognizing an unsafe act, performing self- or buddy-aid in case of chemical agent exposure, and able to detect unauthorized acts on the part of the other are required when the Two-Person Rule is in effect.

- 1.0 **TREAT** munition fill IAW Table 3-1.
- 2.0 **TRANSFER** amount of reagent/water IAW Table 3-1 or as directed into CONTAINMENT VESSEL.
 - 2.1 **VERIFY** all valves located on REAGENT SUPPLY PANEL and CONTAINMENT VESSEL are CLOSED except valves 6, 61, 63, 92, and 93.
 - 2.2 **VERIFY** valves 52, 53, 54, and 55 are OPEN to position "PUMP A" (white arrow on valve handle points to PUMP A).
 - 2.3 **CHECK** CONTAINMENT VESSEL pressure and supply tank volumes and temperatures. **RECORD** initial weight of reagent/water container/tanks.

CALLOUT: Announce initial volume and temperature of supply tanks/containers.

- 2.4 **PERFORM** one of the following:
 - 2.4.1 When using Supply Hose, **PROCEED** as follows:
 - 2.4.1.1 **CONNECT** Supply Hose to Q5.
 - 2.4.1.2 **OPEN** valve 27.
 - 2.4.1.3 **PROCEED** to Step 2.5.
 - 2.4.2 When using Steam Supply Line, **PROCEED** as follows:
 - 2.4.2.1 **VERIFY** valve 16 is CLOSED.
 - 2.4.2.2 **OPEN** valves 26 and 13.

2.5 **COMMENCE** transfer by performing one of the following:

2.5.1 **START REAGENT SUPPLY PUMP A** by opening valves 21 and 22. **PROCEED** as follows:

2.5.1.1 When manifold pressure is greater than 250 psig, HP SUPPLY PUMP is primed, **PROCEED** to Step 2.6.

2.5.1.2 When manifold pressure is less than 250 psig, HP SUPPLY PUMP is not primed, **OPEN** valve 31 for 3 seconds and then **CLOSE** valve 31. **PROCEED** to Step 2.6.

2.5.2 **START WATER SUPPLY PUMP A** by opening valves 23 and 24. **PROCEED** as follows:

2.5.2.1 When manifold pressure is greater than 250 psig, HP SUPPLY PUMP is primed, **PROCEED** to Step 2.6.

2.5.2.2 When manifold pressure is less than 250 psig, HP SUPPLY PUMP is not primed, **OPEN** valve 31 for 3 seconds and then **CLOSE** valve 31.

2.6 **PROCEED** as follows:

2.6.1 When supply pump is operating correctly, **PROCEED** to Step 2.7.

2.6.2 When supply pump is not operating correctly, **PROCEED** to Step 10.0.

2.7 **PERFORM** one of the following:

2.7.1 When using Supply Hose, **PROCEED** as follows:

2.7.1.1 **OPEN** valve 5 to commence transfer and **MONITOR** CONTAINMENT VESSEL pressure throughout transfer.

2.7.1.2 **TURN OFF** supply tank heater, if applicable.

CALLOUT: Announce time supply tank heater turned OFF, if applicable.

2.7.1.3 When quantity specified in Table 3-1 has transferred to CONTAINMENT VESSEL, **CLOSE** valve 5. **PROCEED** to Step 3.0.

2.7.2 When using Steam Supply Line, **PROCEED** as follows:

2.7.2.1 **OPEN** valve 14 to commence transfer and **MONITOR** CONTAINMENT VESSEL pressure throughout transfer.

2.7.2.2 **TURN OFF** supply tank heater, if applicable.

CALLOUT: Announce time supply tank heater turned OFF, if applicable.

2.7.2.3 When quantity specified in Table 3-1 has transferred to CONTAINMENT VESSEL, **CLOSE** valve 14.

3.0 **STOP** supply pump to cease transfer.

3.1 **PERFORM** one of the following:

3.1.1 **STOP** REAGENT SUPPLY PUMP A by closing valves 22 and 21. **PROCEED** to Step 3.2.

3.1.2 **STOP** WATER SUPPLY PUMP A by closing valves 24 and 23.

3.2 **VERIFY** valve 80 is OPEN to "WASTE 1" position (white arrow on valve handle points to WASTE 1).

3.3 Slowly **OPEN** valve 31. **WAIT** 5 seconds. **CLOSE** valve 31.

3.4 **PERFORM** one of the following:

3.4.1 When having used Supply Hose, **PROCEED** as follows:

3.4.1.1 **CLOSE** valve 27.

3.4.1.2 **DISCONNECT** Supply Hose from Q5 and **CONNECT** it to Hose Docking Station.

3.4.1.3 **PROCEED** to Step 4.0.

3.4.2 When having used Steam Supply Line, **CLOSE** valves 13 and 26.

CALLOUT: Announce supply tank volume.

4.0 **CHECK** CONTAINMENT VESSEL pressure and temperature.

CALLOUT: Announce containment vessel pressure and temperature.

Note

Steam transfer to containment vessel can be stopped by closing valve 13. This will prevent any further heating of the contents.

5.0 **PREPARE** to operate Steam Supply Subsystem.

5.1 **VERIFY** valves 13, 16, and 50 are CLOSED.

5.2 **VERIFY** red OFF button on VESSEL STEAM CONTROL Panel is illuminated and valve 47 is OPEN.

5.3 **VERIFY** amber STEAM HEAT selector switch (valve 48) is turned to AUTO.

5.4 **VERIFY** setpoint temperature on VESSEL TEMPERATURE Controller on VESSEL STEAM CONTROL Panel is set IAW Table 3-1.

5.5 **PUSH** green ON button on VESSEL STEAM CONTROL Panel (valve 48 opens).

5.6 **VERIFY** SUPPLY pressure is between 140 to 150 psig on STEAM PRESSURES Controller on VESSEL STEAM CONTROL Panel.

5.7 **VERIFY** red STEAM LINE MOTION FAULT button is not illuminated. If illuminated, **PUSH** red RESET button.

- 5.8 **VERIFY** amber INTERLOCK selector switch (valve 49) is turned to AUTO.
- 6.0 **STEAM HEAT CONTAINMENT VESSEL** contents.
 - 6.1 **VERIFY** Steam Usage shows 0.0 lbs on Boiler Control Panel (BCP) screen of Human Machine Interface (HMI). If necessary, **PUSH RESET USAGE** button to set display to 0.0 lbs.
 - 6.2 Completely **OPEN** valve 14 and then **CLOSE** valve 14 one quarter turn.
 - 6.3 **CHECK** Steam Shut-off indicator on HMI. **PROCEED** as follows:
 - 6.3.1 When Steam Shut-off indicator on HMI is illuminated green (valve 49 is OPEN), **PROCEED** to Step 6.4.
 - 6.3.2 When Steam Shut-off indicator is not illuminated green (valve 49 is not OPEN), **PERFORM** the following:
 - 6.3.2.1 **VERIFY** amber INTERLOCK selector switch (valve 49) is turned to AUTO.
 - 6.3.2.2 **VERIFY** valve 103 is OPEN.
 - 6.3.2.3 **VERIFY** PROCESS SHUTDOWN buttons are out.
 - 6.3.2.4 **CHECK** red STEAM LINE MOTION FAULT button on VESSEL STEAM CONTROL Panel and **PROCEED** as follows:
 - 6.3.2.4.1 When red button is not illuminated, **PROCEED** to Step 6.3.2.5.
 - 6.3.2.4.2 When red button is illuminated, **VERIFY** Steam Supply Line is properly seated beneath CONTAINMENT VESSEL. **PUSH** red button.

6.3.2.5 **PROCEED** as follows:

6.3.2.5.1 When SUPPLY pressure exceeds INJECTION pressure by a minimum of 10 psig, **TURN** amber INTERLOCK selector switch to OPEN and **PROCEED** to Step 6.4.

6.3.2.5.2 When SUPPLY pressure does not exceed INJECTION pressure by a minimum of 10 psig, **PERFORM** the following:

6.3.2.5.2.1 **VERIFY** valves 6 and 14 are OPEN.

6.3.2.5.2.2 **CHECK CONTAINMENT** VESSEL pressure on VESSEL PRESSURE Controller on VESSEL STEAM CONTROL Panel. **PROCEED** as follows:

6.3.2.5.2.2.1 When CONTAINMENT VESSEL pressure is less than 140 psig, **PROCEED** to Step 6.3.2.5.2.3.

6.3.2.5.2.2.2 When CONTAINMENT VESSEL pressure is greater than 140 psig, **PROCEED** as directed.

6.3.2.5.2.3 **CHECK** SUPPLY pressure on STEAM PRESSURES Controller. **PROCEED** as follows:

6.3.2.5.2.3.1 When SUPPLY pressure is 150 ± 2 psig, **TURN** amber INTERLOCK selector switch to OPEN and **PROCEED** to Step 6.4.

6.3.2.5.2.3.2 When SUPPLY pressure is not 150 ± 2 psig, **PROCEED** as directed.

6.3.2.5.2.4 **COMPARE** CONTAINMENT VESSEL pressure against INJECTION pressure. **PROCEED** as follows:

6.3.2.5.2.4.1 When CONTAINMENT VESSEL pressure is within ± 5 psig of INJECTION pressure, **PROCEED** to Step 6.4.

6.3.2.5.2.4.2 When CONTAINMENT VESSEL pressure is not within ± 5 psig of INJECTION pressure, **PROCEED** as directed.

- 6.4 Completely **OPEN** valve 13 and then **CLOSE** valve 13 one quarter turn to commence steam transfer to CONTAINMENT VESSEL.
- 6.5 **RECORD** time steam transfer begins.

CALLOUT: Announce time steam transfer to containment vessel started.

Caution

Loose tools or other hardware left on top of or underneath rotating containment vessel may be damaged.

7.0 OPERATE ROTARY AGITATION SUBSYSTEM.

- 7.1 **VERIFY** four PROCESS SHUTDOWN buttons are out, red STEAM LINE MOTION FAULT button is not illuminated, red VESSEL ROTATION CONTROL OFF light is illuminated on VESSEL CONTROL PANEL, and JACK SUPPORT has been lowered.
- 7.2 **PUSH** green VESSEL ROTATION CONTROL ON button on VESSEL CONTROL PANEL.
- 7.3 **VERIFY** five green INTERLOCK READY lights are illuminated on the Hose Docking Station.
- 7.4 **VERIFY** CLAMP INTERLOCK READY light is illuminated (clamp hangers are in STOWED position).

Notes

Use of vessel rotation control pendant may be required when auto rotation mode is not operating correctly. See Annex D for using vessel rotation control pendant.

Vessel rotation control key must be inserted and turned to AUTO or MANUAL position before containment vessel will rotate.

Containment vessel will only stop during normal operations in the HOME, SAMPLE, and FILL/DRAIN position after moving in a counterclockwise direction.

Containment vessel will not start rotating unless all six interlock lights are illuminated and containment vessel door is closed. However, containment vessel will rotate in BYPASS mode.

- 7.5 **INSERT** and **TURN** Vessel Rotation Control Key in AUTO/OFF/MAN switch to AUTO position.
- 7.6 **VERIFY** INTERLOCKS key switch is set to ON.
- 7.7 **VERIFY** status of green INTERLOCKS READY light and **PROCEED** as follows:
 - 7.7.1 When green INTERLOCKS READY light is illuminated, **PROCEED** to Step 7.8.
 - 7.7.2 When green INTERLOCKS READY light is not illuminated, **PERFORM** the following:
 - 7.7.2.1 **VERIFY** all hoses in Hose Docking Station are secure.
 - 7.7.2.2 **VERIFY** HANGERS STOWED light is illuminated and **PROCEED** as follows:
 - 7.7.2.2.1 When green INTERLOCKS READY light is illuminated, **PROCEED** to Step 7.8.
 - 7.7.2.2.2 When green INTERLOCKS READY light is not illuminated, **REQUEST** permission to turn Interlocks Control Key to BYPASS position (BYPASS light illuminates).

- 7.8 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation. **PROCESS** chemical fill IAW Table 3-1.
- 7.9 **PROCEED** as follows:
 - 7.9.1 When CONTAINMENT VESSEL is rotating correctly, **PROCEED** to Step 7.10.
 - 7.9.2 When CONTAINMENT VESSEL is not rotating correctly, **PERFORM** one of the following.
 - 7.9.2.1 **PERFORM** troubleshooting procedures IAW O&M Manual for P2 Series, Table 3-1, Malfunction No. 4.
 - 7.9.2.2 **PROCEED** to Annex D to manually rotate CONTAINMENT VESSEL using VESSEL ROTATION CONTROL PENDANT.
 - 7.9.2.3 **PROCEED** as directed.
- 7.10 **RECORD** rotation start time.

CALLOUT: Announce time containment vessel rotation began.

- 8.0 **CONTROL** access to EDS Trailer during CONTAINMENT VESSEL rotation.
- 9.0 **PROCEED** as follows:
 - 9.1 When collecting a liquid neutralent sample, **PROCEED** to Procedure 11.
 - 9.2 When directed to drain CONTAINMENT VESSEL of neutralent, **PROCEED** to Procedure 12.

ALTERNATE PROCEDURE:

10.0 **IMPLEMENT** alternate pump procedures.

10.1 **IMPLEMENT** alternate pump procedure for faulty REAGENT SUPPLY PUMP A.

10.1.1 **CLOSE** valves 22 and 21.

10.1.2 **TURN** valves 55 and 53 (white arrow on valve handle points to PUMP B) to route reagent to REAGENT SUPPLY PUMP B.

10.1.3 **COMMENCE** reagent transfer using REAGENT SUPPLY PUMP B by opening valves 21 and 22.

10.1.4 **PERFORM** one of the following:

10.1.4.1 When using Supply Hose, **PROCEED** as follows:

10.1.4.1.1 **OPEN** valve 5 to commence transfer and **MONITOR** CONTAINMENT VESSEL pressure throughout transfer.

10.1.4.1.2 **TURN OFF** supply tank heater, if applicable.

CALLOUT: Announce time supply tank heater turned OFF, if applicable.

10.1.4.1.3 When quantity specified in Table 3-1 has transferred to CONTAINMENT VESSEL, **CLOSE** valve 5.

10.1.4.1.4 **CLOSE** valves 22 and 21. **RETURN** to Step 3.2.

10.1.4.2 When using Steam Supply Line, **PROCEED** as follows:

10.1.4.2.1 **OPEN** valve 14 to commence transfer and **MONITOR** CONTAINMENT VESSEL pressure throughout transfer.

10.1.4.2.2 **TURN OFF** supply tank heater, if applicable.

CALLOUT: Announce time supply tank heater turned OFF, if applicable.

10.1.4.2.3 When quantity specified in Table 3-1 has transferred to CONTAINMENT VESSEL, **CLOSE** valve 14.

10.1.4.2.4 **CLOSE** valves 22 and 21. **RETURN** to Step 3.2.

10.2 **IMPLEMENT** alternate pump procedure for faulty WATER SUPPLY PUMP A.

10.2.1 **CLOSE** valves 24 and 23.

10.2.2 **TURN** valves 54 and 52 (white arrow on valve handle points to PUMP B) to route water to WATER SUPPLY PUMP B.

10.2.3 **COMMENCE** water transfer using WATER SUPPLY PUMP B by opening valves 23 and 24.

10.2.4 **PERFORM** one of the following:

10.2.4.1 When using Supply Hose, **PROCEED** as follows:

10.2.4.1.1 **OPEN** valve 5 to commence transfer and **MONITOR** CONTAINMENT VESSEL pressure throughout transfer.

10.2.4.1.2 **TURN OFF** supply tank heater, if applicable.

CALLOUT: Announce time supply tank heater turned OFF, if applicable.

10.2.4.1.3 When quantity specified in Table 3-1 has transferred to CONTAINMENT VESSEL, **CLOSE** valve 5.

10.2.4.1.4 **CLOSE** valves 24 and 23. **RETURN** to Step 3.2.

10.2.4.2 When using Steam Supply Line, **PROCEED** as follows:

10.2.4.2.1 **OPEN** valve 14 to commence transfer and **MONITOR** CONTAINMENT VESSEL pressure throughout transfer.

10.2.4.2.2 **TURN OFF** supply tank heater, if applicable.

CALLOUT: Announce time supply tank heater turned OFF, if applicable.

10.2.4.2.3 When quantity specified in Table 3-1 has transferred to CONTAINMENT VESSEL, **CLOSE** valve 14.

10.2.4.2.4 **CLOSE** valves 24 and 23. **RETURN** to Step 3.2.

SPECIAL REQUIREMENTS:

1. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Vessel rotation/clamp control key	1 each
Primary tool kit	1 each
EDS operator log	1 each
Indelible ink pen	1 each
Reagent	as required
Drum pump	1 each
Hand truck pump	1 each
T-connector, flex hose	1 each

PROCEDURE 11 COLLECT NEUTRALENT SAMPLE

The purpose of this procedure is to obtain a neutralent liquid or vapor sample and when directed, to charge the EDS containment vessel with nitrogen prior to draining the neutralent.

PRECONDITIONS:

1. Laboratory has provided sampling equipment per Laboratory Quality Control Plan and was provided with the necessary tools for sample bottle assemblies.
2. Receipt of samples has been coordinated with laboratory and courier.
3. Waste containers are in place and waste hoses are in place.
4. Air monitoring must be operational.
5. Setup and daily startup checklists have been completed.
6. Decontaminant pail, water pail, and rags are positioned on EDS Trailer and at sample table.
7. Steam generator must be operating.

WARNINGS

DIRECT CONTACT WITH HEATED SURFACES CAN CAUSE INJURY.

VERIFY PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS HALTED.

FAILURE TO USE VACUUM ASPIRATION LINE WHEN COLLECTING A LIQUID SAMPLE MAY RESULT IN A CHEMICAL AGENT RELEASE.

FAILURE TO PERFORM SAMPLE LINE PURGE AFTER COLLECTING SAMPLE MAY RESULT IN A CHEMICAL AGENT RELEASE FROM SAMPLE LINES AND CONTAINMENT VESSEL.

PPE LEVELS WILL BE WORN ACCORDING TO THE TASK BEING PERFORMED AND IN CONJUNCTION WITH MONITORING RESULTS IAW ANNEX G, PPE LEVELS.

FAILURE TO DON HEARING PROTECTION MAY CAUSE HEARING LOSS WHILE PERFORMING THE FOLLOWING STEPS.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Notes

Two-Person Rule will be strictly enforced when having access to and/or conducting operations involving chemical surety material. At least two CPRP personnel (only one may be interim-certified) of which both must be equally qualified in the task(s) being performed, capable of recognizing an unsafe act, performing self- or buddy-aid in case of chemical agent exposure, and able to detect unauthorized acts on the part of the other are required when the Two-Person Rule is in effect.

Neutralent samples can be collected at any time during treatment process.

- 1.0 **COLLECT** neutralent sample by performing one of the following:
 - 1.1 When collecting sample from CONTAINMENT VESSEL door, **PROCEED** to Step 2.0.
 - 1.2 When collecting sample from waste containers, **PROCEED** to Procedure 12, Step 7.0.

- 2.0 **STOP** ROTARY AGITATION SUBSYSTEM in SAMPLE position.
 - 2.1 **PUSH** green Vessel Rotation Control SAMPLE button.
 - 2.2 When CONTAINMENT VESSEL is in SAMPLE position, **TURN** Vessel Rotation Control Key to OFF position. **REMOVE** Vessel Rotation Control Key.
 - 2.3 **RECORD** rotation stop time.

CALLOUT: Announce time containment vessel rotation halted.

- 3.0 **CLOSE** valve 13 to stop steam transfer.
- 4.0 **CHECK** CONTAINMENT VESSEL pressure.

CALLOUT: Announce containment vessel pressure.

Note

When processing a large amount of chemical fill, it may be necessary to decontaminate, rinse, and flush the liquid sample line before collecting a liquid sample.

- 5.0 **PREPARE** to collect a liquid sample.
 - 5.1 When only flushing liquid sample line with nitrogen, **PROCEED** to Step 5.2.3.
 - 5.2 When decontaminating, rinsing, and flushing liquid sample line, **PERFORM** the following:
 - 5.2.1 **DECONTAMINATE** liquid sample line.
 - 5.2.1.1 **DON** hearing protection, as needed.
 - 5.2.1.2 **VERIFY** Supply Hose is connected to Q8.
 - 5.2.1.3 **VERIFY** valve 28 is CLOSED.
 - 5.2.1.4 **OPEN** valve 27.

- 5.2.1.5 **START** REAGENT SUPPLY PUMP A by opening valves 21 and 22.
- 5.2.1.6 **OPEN** valve 8.
- 5.2.1.7 **OPEN** valve 10. **WAIT** 5 seconds. **CLOSE** valve 10.
- 5.2.1.8 **CLOSE** valves 22 and 21.
- 5.2.1.9 **VERIFY** valve 80 is OPEN to “WASTE 1” position (white arrow on valve handle points to WASTE 1).
- 5.2.1.10 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valve 31.
- 5.2.2 **RINSE** liquid sample line.
 - 5.2.2.1 **START** WATER SUPPLY PUMP A by opening valves 23 and 24.
 - 5.2.2.2 **OPEN** valve 10. **WAIT** 5 seconds (water). **CLOSE** valve 10.
 - 5.2.2.3 **CLOSE** valves 24 and 23.
 - 5.2.2.4 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valve 31.
- 5.2.3 **FLUSH** liquid sample line with nitrogen.
 - 5.2.3.1 **VERIFY** Supply Hose is connected to Q8.
 - 5.2.3.2 **VERIFY** valve 76 is OPEN.
 - 5.2.3.3 **OPEN** valves 28, 27, and 8.
 - 5.2.3.4 **OPEN** valve 10 one turn and when nitrogen is heard venting into CONTAINMENT VESSEL, immediately **CLOSE** valve 10.
 - 5.2.3.5 **CLOSE** valve 28.
 - 5.2.3.6 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valve 31.
 - 5.2.3.7 **CLOSE** valves 8 and 27.

- 5.2.4 **EVACUATE** liquid sample line.
 - 5.2.4.1 **DISCONNECT** Supply Hose from Q8 and **CONNECT** it to Hose Docking Station.
 - 5.2.4.2 **CONNECT** Vacuum Hose to Q8.
 - 5.2.4.3 **OPEN** valves 30 and 8.
 - 5.2.4.4 **PUSH** green VACUUM PUMP ON button on PROCESS CONTROL PANEL and **RUN** vacuum pump until at least -10 inches of mercury (Hg) are displayed on VACUUM GAUGE.
 - 5.2.4.5 **CLOSE** valves 8 and 30.
 - 5.2.4.6 **PUSH** red VACUUM PUMP OFF button.
 - 5.2.4.7 **OPEN** valve 29 and then **CLOSE** valve 29.
 - 5.2.4.8 **DISCONNECT** Vacuum Hose from Q8 and **CONNECT** it to Hose Docking Station.

7.0 **COLLECT** liquid sample in liquid sample bottle assembly (valve 9).

7.1 **RECORD** CONTAINMENT VESSEL pressure and temperature.

CALLOUT: Announce containment vessel pressure and temperature.

7.2 **CONNECT** Supply Hose to Q8 and **OPEN** valve 10.

7.3 **OPEN** valve 9 to collect liquid sample.

7.4 Tightly **CLOSE** valve 9.

Notes

During operations involving high containment vessel pressures, it may be necessary to adjust air line pressure so the air-driven pumps will pump reagent and/or water into containment vessel.

Hand Truck Pump can be used when the supply pumps are not operating, there is no air pressure, or when pumping liquids directly from a container to the containment vessel.

8.0 DECONTAMINATE, RINSE, and FLUSH liquid sample line.

8.1 DON hearing protection, as needed.

8.2 DECONTAMINATE liquid sample line.

8.2.1 OPEN valves 27, 21, and 22.

8.2.2 OPEN valve 8. **WAIT** 5 seconds. **CLOSE** valve 10.

8.2.3 CLOSE valves 22 and 21.

8.2.4 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valve 31.

8.3 RINSE liquid sample line.

8.3.1 OPEN valves 23 and 24.

8.3.2 OPEN valve 10. **WAIT** 5 seconds (water). **CLOSE** valve 10.

8.3.3 CLOSE valves 24 and 23.

8.3.4 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valve 31.

CALLOUT: Announce water supply tank volume.

8.4 FLUSH liquid sample line with nitrogen.

8.4.1 OPEN valve 28.

8.4.2 OPEN valve 10 one turn and when nitrogen is heard venting into CONTAINMENT VESSEL, immediately **CLOSE** valve 10.

8.4.3 CLOSE valve 28.

8.4.4 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valve 31.

8.4.5 **CLOSE** valves 8 and 27.

8.4.6 **DISCONNECT** Supply Hose from Q8 and **CONNECT** it to Hose Docking Station.

9.0 **REMOVE** liquid sample bottle assembly (valve 9).

9.1 **VERIFY** valve 10 is CLOSED and **NOTIFY** Monitoring personnel of potential release.

9.2 **SECURE** liquid sample bottle assembly body with a 3/4-inch open-end wrench and **LOOSEN** the fittings on both sides of liquid sample bottle assembly using a 5/8-inch open-end wrench.

9.3 **VERIFY** valve 10 is tightly CLOSED. **LOOSEN** handle securing valve 8 and **SLIDE** valve 8 to the left, away from liquid sample bottle assembly.

9.4 **REMOVE** liquid sample bottle assembly from sample line and **RECORD** time liquid sample bottle assembly is removed.

CALLOUT: Announce time liquid sample bottle assembly is removed from containment vessel door.

10.0 **PREPARE** liquid sample bottle assembly for transport.

10.1 **PLACE** pipe plug and laboratory adapter into valve openings of liquid sample bottle assembly.

10.2 **SECURE** liquid sample bottle assembly in a vise and **TIGHTEN** both fittings to 30 ft-lbs using the appropriate torque wrench.

10.3 **PLACE** liquid sample bottle assembly into pail of decontaminant.

10.4 **REMOVE** liquid sample bottle assembly from decontaminant pail and **PLACE** in pail of rinsewater.

10.5 **REMOVE** liquid sample bottle assembly from rinse pail and **DRY**.

10.6 **PACK** into a separate secondary container or sample bag.

Notes

Monitor sample bottle assembly IAW local monitoring program.

While liquid sample bottle assembly is being monitored, it is permissible to install new liquid sample bottle assembly.

10.7 **MONITOR** exterior of liquid sample bottle assembly. **RECORD** monitoring results.

CALLOUT: Announce liquid sample bottle assembly monitoring results.

10.8 **PERFORM** one of the following:

10.8.1 When monitoring results are below established limits, **PROCEED** to Step 10.9.

10.8.2 When monitoring results are not below established limits, **RETURN** to Step 10.3.

10.9 **PLACE** packaged liquid bottle assembly into overpack, **SEAL** overpack, and **CARRY** overpacked liquid sample bottle assembly to the PDS.

10.10 **COMPLETE** required chain-of-custody documents.

10.11 **ATTACH** chain-of-custody documents to packed sample and **TRANSFER** to courier.

CALLOUT: Announce time sample container(s) ready for transport.

11.0 **INSTALL** new liquid sample bottle assembly (valve 9).

11.1 **INSPECT** liquid sample bottle assembly for serviceability. **DISCARD**, **REPLACE**, and **RECORD** on sample log when assembly is damaged.

11.2 **VERIFY** liquid sample bottle assembly has correct sample label on it.

Note

Once per day, use thread lubricant on external threads of valve piping prior to installation of liquid sample bottle assembly.

11.3 **LOOSEN** handle securing valve 8 to bracket and **SLIDE** valve 8 to the left.

- 11.4 **TIGHTEN** both stop collars on sample piping finger-tight and **BACK OFF** 1/4 turn.
- 11.5 **SLIP** liquid sample bottle assembly onto the stem of valve 10.
- 11.6 **SLIDE** valve 8 toward liquid sample bottle assembly and **FINGER-TIGHTEN** both fittings on left and right of assembly.

WARNING

VERIFY BOTH FITTINGS ARE PROPERLY TORQUED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 11.7 **HOLD** liquid sample bottle assembly body with 3/4-inch open-end wrench and **TIGHTEN** both fittings to 30 ft-lbs using appropriate torque wrench.
- 11.8 **VERIFY** torque (30 ft-lbs) on all valve fittings between valves 6 and 8.
- 11.9 **TIGHTEN** handle securing valve 8.

CALLOUT: Announce liquid sample bottle assembly number. Verify Monitoring receives applicable sample number.

- 11.10 **VERIFY** valves 8, 9, and 10 are CLOSED.

12.0 **PROCEED** as follows:

12.1 When planning to collect additional neutralent liquid sample(s), **PROCEED** to Step 13.0.

12.2 When planning not to collect any more neutralent liquid sample(s), **PERFORM** the following:

12.2.1 **DECONTAMINATE** and **RINSE** liquid sample line.

12.2.1.1 **DON** hearing protection, as needed.

12.2.1.2 **DECONTAMINATE** liquid sample line.

12.2.1.2.1 **VERIFY** Supply Hose is connected to Q8.

12.2.1.2.2 **VERIFY** valve 28 is CLOSED.

12.2.1.2.3 **OPEN** valves 27, 21, and 22.

12.2.1.2.4 **OPEN** valve 8.

12.2.1.2.5 **OPEN** valve 10. **WAIT** 5 seconds. **CLOSE** valve 10.

12.2.1.2.6 **CLOSE** valves 22 and 21.

12.2.1.2.7 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valve 31.

12.2.1.3 **RINSE** liquid sample line.

12.2.1.3.1 **OPEN** valves 23 and 24.

12.2.1.3.2 **OPEN** valve 10. **WAIT** 5 seconds (water). **CLOSE** valve 10.

12.2.1.3.3 **CLOSE** valves 24 and 23.

12.2.1.3.4 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valve 31.

CALLOUT: Announce water supply tank volume.

12.2.1.4 **FLUSH** liquid sample line with nitrogen.

12.2.1.4.1 **OPEN** valve 28.

12.2.1.4.2 **OPEN** valve 10 one turn and when nitrogen is heard venting into CONTAINMENT VESSEL, immediately **CLOSE** valve 10.

12.2.1.4.3 **CLOSE** valve 28.

12.2.1.4.4 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valves 31 and 8.

12.2.1.4.5 **DISCONNECT** Supply Hose from Q8 and **CONNECT** it to Q1.

12.2.2 **DECONTAMINATE** and **RINSE** vapor sample line.

12.2.2.1 **DON** hearing protection, as needed.

12.2.2.2 **DECONTAMINATE** vapor sample line.

12.2.2.2.1 **OPEN** valves 21 and 22.

12.2.2.2.2 **OPEN** valves 1 and 3. **WAIT** 5 seconds. **CLOSE** valve 3.

12.2.2.2.3 **CLOSE** valves 22 and 21.

12.2.2.2.4 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valve 31.

12.2.2.3 **RINSE** vapor sample line.

12.2.2.3.1 **OPEN** valves 23 and 24.

12.2.2.3.2 **OPEN** valve 3. **WAIT** 5 seconds. **CLOSE** valve 3.

12.2.2.3.3 **CLOSE** valves 24 and 23.

12.2.2.3.4 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valve 31.

CALLOUT: Announce water supply tank volume.

12.2.2.4 **FLUSH** vapor sample line with nitrogen.

12.2.2.4.1 **OPEN** valve 28.

12.2.2.4.2 **OPEN** valve 3 one turn and when nitrogen is heard venting into CONTAINMENT VESSEL, immediately **CLOSE** valve 3.

12.2.2.4.3 **CLOSE** valve 28.

12.2.2.4.4 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valve 31.

12.2.2.4.5 **CLOSE** valves 1 and 27.

12.2.2.4.6 **DISCONNECT** Supply Hose from Q1 and **CONNECT** it to Hose Docking Station.

12.2.2.4.7 **PROCEED** to Step 15.0.

13.0 **PERFORM** one of the following:

13.1 When CONTAINMENT VESSEL is not rotating, **PROCEED** to Step 14.0.

13.2 When CONTAINMENT VESSEL is rotating, **PROCEED** to Step 16.0.

WARNING

BE AWARE OF BODY POSITION AND AVOID STEPPING OVER OR BEING IN PROXIMITY TO SUPPLY LINES UNDER PRESSURE. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

14.0 **START** steam transfer.

14.1 **VERIFY** valve 14 is OPEN.

14.2 Completely **OPEN** valve 13 and then **CLOSE** valve 13 one quarter turn.

14.3 **RECORD** time steam transfer started.

CALLOUT: Announce time steam transfer to containment vessel started.

Cautions

Loose tools or other hardware left on top of or underneath rotating containment vessel may be damaged.

Starting containment vessel rotation with hoses connected to containment vessel except for Steam Supply Line may cause possible damage.

15.0 START ROTARY AGITATION SUBSYSTEM.

15.1 **VERIFY** four PROCESS SHUTDOWN buttons are out and red STEAM LINE MOTION FAULT is not illuminated.

15.2 **VERIFY** green VESSEL ROTATION CONTROL ON button is illuminated on VESSEL CONTROL PANEL.

15.3 **VERIFY** five green INTERLOCK READY lights are illuminated on the Hose Docking Station.

15.4 **VERIFY** CLAMP INTERLOCK READY light is illuminated.

Notes

Use of vessel rotation control pendant may be required when auto rotation mode is not operating correctly. See Annex D for using vessel rotation control pendant.

Vessel rotation control key must be inserted and turned to AUTO or MANUAL position before containment vessel will rotate.

Containment vessel will not rotate unless all six interlock lights are illuminated and containment vessel door is closed. However, containment vessel will rotate in BYPASS mode.

Containment vessel will only stop during normal operations in HOME, SAMPLE, and FILL/DRAIN position after moving in a counterclockwise direction.

15.5 **INSERT** and **TURN** Vessel Rotation Control Key in AUTO/OFF/MAN switch to AUTO position.

15.6 **VERIFY** INTERLOCKS key switch is set to ON.

- 15.7 **VERIFY** status of green INTERLOCKS READY light and **PROCEED** as follows:
- 15.7.1 When green INTERLOCKS READY light is illuminated, **PROCEED** to Step 15.8.
 - 15.7.2 When green INTERLOCKS READY light is not illuminated, **PERFORM** the following:
 - 15.7.2.1 **VERIFY** all hoses in Hose Docking Station are secure.
 - 15.7.2.2 **VERIFY** HANGERS STOWED light is illuminated and **PROCEED** as follows:
 - 15.7.2.2.1 When green INTERLOCKS READY light is illuminated, **PROCEED** to Step 15.8.
 - 15.7.2.2.2 When green INTERLOCKS READY light is not illuminated, **REQUEST** permission to turn Interlocks Control Key to BYPASS position (BYPASS light illuminates).

Note

Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.

- 15.8 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation.
- 15.9 **PROCEED** as follows:
- 15.9.1 When CONTAINMENT VESSEL is rotating correctly, **PROCEED** to Step 15.10.
 - 15.9.2 When CONTAINMENT VESSEL is not rotating correctly, **PERFORM** one of the following.
 - 15.9.2.1 **PERFORM** troubleshooting procedures IAW O&M Manual for P2 Series, Table 3-1, Malfunction No. 4.
 - 15.9.2.2 **PROCEED** to Annex D to manually rotate CONTAINMENT VESSEL using VESSEL ROTATION CONTROL PENDANT.
 - 15.9.2.3 **PROCEED** as directed.

15.10 **RECORD** CONTAINMENT VESSEL rotation start time.

CALLOUT: Announce time containment vessel rotation began.

16.0 **CONTROL** access to EDS Trailer during CONTAINMENT VESSEL rotation.

17.0 **PROCEED** as follows:

17.1 When collecting a liquid sample, **RETURN** to Step 2.0. **PROCEED** as directed.

17.2 When not collecting a liquid sample, **PROCEED** as follows:

17.2.1 When CONTAINMENT VESSEL temperature is 65°C or less, **PROCEED** to Procedure 12.

WARNING

DO NOT DRAIN LIQUIDS FROM CONTAINMENT VESSEL TO WASTE CONTAINERS WHEN CONTAINMENT VESSEL TEMPERATURE EXCEEDS 65°C WITHOUT FIRST CONSULTING WITH THE COMMAND POST. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

17.2.2 When CONTAINMENT VESSEL temperature is more than 65°C, **COOL** CONTAINMENT VESSEL contents by performing the following:

17.2.2.1 **PUSH** green FILL/DRAIN button to stop CONTAINMENT VESSEL in FILL/DRAIN position.

17.2.2.2 **TURN OFF** and **REMOVE** Vessel Rotation Control Key.

CALLOUT: Announce time containment vessel rotation stopped.

17.2.2.3 **PERFORM** one of the following:

17.2.2.3.1 When steam transfer has been stopped, **PROCEED** to Step 17.2.2.4.

17.2.2.3.2 When steam transfer has not been stopped, **CLOSE** valve 13.

- 17.2.2.4 **CONNECT** Supply Hose to Q5.
- 17.2.2.5 **REQUEST** transfer weight. **DON** hearing protection, as needed.
- 17.2.2.6 **VERIFY** valve 45 is CLOSED.
- 17.2.2.7 **START WATER SUPPLY PUMP** by opening valves 23 and 24. **PROCEED** as follows:
 - 17.2.2.7.1 When manifold pressure is greater than 250 psig, WATER SUPPLY PUMP is primed, **PROCEED** to Step 17.2.2.8.
 - 17.2.2.7.2 When manifold pressure is less than 250 psig, WATER SUPPLY PUMP is not primed, **OPEN** valve 31 for 3 seconds and then **CLOSE** valve 31.
- 17.2.2.8 **OPEN** valve 5 to transfer water to CONTAINMENT VESSEL.
- 17.2.2.9 **STOP** water transfer to CONTAINMENT VESSEL by closing valve 5.
- 17.2.2.10 **STOP WATER SUPPLY PUMP** by closing valves 24 and 23.
- 17.2.2.11 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valve 31.
- 17.2.2.12 **DISCONNECT** Supply Hose from Q5 and **CONNECT** it to Hose Docking Station.

CALLOUT: Announce amount of water transferred.

- 17.2.2.13 **RETURN** to Step 15.0.

18.0 **PROCEED** to Procedure 12.

SPECIAL REQUIREMENTS:

1. Label sample containers IAW Sampling and Analysis Plan.
2. Air monitoring must be in place unless all sample containers are decontaminated.
3. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Decontaminant pail	1 each
Rinse pail	1 each
Sample bag or secondary container	as required
Chain-of-custody documents	as required
Liquid sample adapter assembly	as required
Liquid sample bottle assembly	as required
Labeled sample bottles	as required
Sample packaging	as required
Vessel rotation control key	1 each
Reagent	as required
Liquid waste drums	as required
Open-head drums	as required
Household bleach (5 percent)	as required
Rags	as required
Waste bags	as required
Primary tool kit	1 each
T-handle wrench, 5/8-inch	1 each
Torque wrench, 5/8-inch, 30 ft-lbs	1 each
Open-end wrench, 3/4-inch	1 each
Open-end wrench, 5/8-inch	1 each
EDS operator log	1 each
Indelible ink pen	1 each

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PROCEDURE 12
REMOVE NEUTRALENT FROM EDS CONTAINMENT VESSEL

The purpose of this procedure is to remove the neutralent from the EDS containment vessel.

PRECONDITIONS:

1. PPE must be worn IAW Annex G.
2. This procedure is contingent upon treatment being deemed complete (either as a result of meeting the treatment requirement or exceeding the maximum treatment time).
3. Laboratory has provided sampling equipment per Laboratory Quality Control Plan and was provided with the necessary tools for sample bottle assemblies.
4. Receipt of samples has been coordinated with laboratory and courier.
5. Air monitoring must be operational.
6. IBC is in place and drain hose is in place.
7. Setup and daily startup checklists have been completed.
8. Decontaminant and water pails must be positioned on EDS Trailer and sample table.
9. Steam generator must be operating.

WARNINGS

PPE LEVELS WILL BE WORN ACCORDING TO THE TASK BEING PERFORMED AND IN CONJUNCTION WITH MONITORING RESULTS IAW ANNEX G, PPE LEVELS.

DUE TO EXTREME TEMPERATURES, PERSONNEL SHOULD AVOID DIRECT SKIN CONTACT WITH HEATED SURFACES.

VERIFY PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED.

FAILURE TO DON HEARING PROTECTION MAY CAUSE HEARING LOSS WHILE PERFORMING THE FOLLOWING STEPS.

WEAR LEATHER GLOVES TO PREVENT PERSONAL INJURY DUE TO BURNS FROM HANDLING HOT LIQUID/EQUIPMENT.

FAILURE TO DON LEATHER GLOVES MAY CAUSE RUBBER GLOVES TO BE COMPROMISED WHEN COMING INTO CONTACT WITH SHARP EDGES.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

1.0 **PREPARE** to drain neutralent from CONTAINMENT VESSEL.

1.1 **RECORD** waste container weights as shown on waste drum scales.

CALLOUT: Announce waste container weights (lbs).

1.2 If necessary, **DON** leather gloves.

- 2.0 **POSITION** CONTAINMENT VESSEL in FILL/DRAIN position. **PROCEED** as follows:
- 2.1 When CONTAINMENT VESSEL is in the FILL/DRAIN position, **PROCEED** to Step 3.0.
 - 2.2 When CONTAINMENT VESSEL is rotating, **PROCEED** to Step 2.3.9.
 - 2.3 When CONTAINMENT VESSEL is not in the FILL/DRAIN position, **OPERATE** ROTARY AGITATION SYSTEM as follows:

Caution

Loose tools or other hardware left on top of or underneath rotating containment vessel may be damaged.

- 2.3.1 **VERIFY** four PROCESS SHUTDOWN buttons are out and red STEAM LINE MOTION FAULT button is not illuminated.
- 2.3.2 **VERIFY** green VESSEL ROTATION CONTROL ON button on VESSEL CONTROL PANEL is illuminated.
- 2.3.3 **VERIFY** five green INTERLOCKS READY lights are illuminated on the Hose Docking Station.
- 2.3.4 **VERIFY** HANGERS STOWED light on VESSEL ROTATION CONTROL panel is illuminated.

Notes

Use of vessel rotation control pendant may be required when auto rotation mode is not operating correctly. See Annex D for using vessel rotation control pendant.

Vessel rotation control key must be inserted and turned to AUTO or MANUAL position before containment vessel will rotate.

- 2.3.5 **INSERT** and **TURN** Vessel Rotation Control Key in AUTO/OFF/MAN switch to AUTO position.
- 2.3.6 **VERIFY** INTERLOCKS key switch is set to ON.

Note

Containment vessel will not rotate unless clamp interlock light is illuminated. However, containment vessel will rotate in BYPASS mode.

- 2.3.7 **VERIFY** status of green INTERLOCK READY light and **PROCEED** as follows:
 - 2.3.7.1 When green INTERLOCK READY light is illuminated, **PROCEED** to Step 2.3.8.
 - 2.3.7.2 When green INTERLOCK READY light is not illuminated, **VERIFY CLAMP** is CLOSED and proximity switch is in alignment. **PROCEED** as follows:
 - 2.3.7.2.1 When green INTERLOCK READY light is illuminated, **PROCEED** to Step 2.3.8.
 - 2.3.7.2.2 When green INTERLOCK READY light is not illuminated, **TURN** Interlocks Control Key to BYPASS position (BYPASS light illuminates).

Note

Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.

- 2.3.8 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation.
- 2.3.9 **PUSH** green FILL/DRAIN button to stop CONTAINMENT VESSEL in DRAIN position.
- 2.3.10 **TURN OFF** and **REMOVE** Vessel Rotation Control Key.
- 2.3.11 **RECORD** time CONTAINMENT VESSEL rotation stopped, CONTAINMENT VESSEL pressure, and CONTAINMENT VESSEL temperature.

CALLOUT: Announce time containment vessel rotation stopped and containment vessel pressure and temperature.

3.0 **STOP** steam transfer.

3.1 When steam transfer has been stopped, **PROCEED** to Step 3.3.

3.2 When steam transfer has not been stopped, **PROCEED** as follows:

3.2.1 **CLOSE** valve 13 and **PUSH** red OFF button on VESSEL STEAM CONTROL Panel.

CALLOUT: Announce time steam transfer to containment vessel shut off.

3.2.2 **RECORD** amount of water transferred to CONTAINMENT VESSEL during steam heating phase.

CALLOUT: Announce amount of water transferred to containment vessel.

3.2.3 **PUSH** RESET USAGE button on BCP screen of HMI to set display to 0.0 lbs.

3.3 **PERFORM** one of the following:

3.3.1 When not increasing CONTAINMENT VESSEL internal pressure prior to draining neutralent from CONTAINMENT VESSEL, **PROCEED** to Step 3.4.

Caution

Do not increase air line pressure above 120 psig to avoid damage to steam line actuators.

Note

Containment vessel internal pressure can be monitored by observing containment vessel pressure indicator on containment vessel control panel.

3.3.2 When increasing CONTAINMENT VESSEL internal pressure prior to draining neutralent from CONTAINMENT VESSEL, **PROCEED** as follows:

3.3.2.1 **CHECK** CONTAINMENT VESSEL pressure.

CALLOUT: Announce containment vessel internal pressure.

3.3.2.2 **INCREASE** CONTAINMENT VESSEL internal pressure to 30 psig as follows:

3.3.2.2.1 When using Supply Hose, **PROCEED** to Step 3.3.2.3.

3.3.2.2.2 When using Steam Supply Line, **PROCEED** to Step 3.3.2.4.

3.3.2.3 **USE** Supply Hose to increase CONTAINMENT VESSEL pressure as follows:

3.3.2.3.1 **CONNECT** Supply Hose to Q1.

3.3.2.3.2 **OPEN** valves 28, 27, and 1.

3.3.2.3.3 **OPEN** valve 3 and when CONTAINMENT VESSEL internal pressure is 30 psig, **CLOSE** valve 3.

3.3.2.3.4 **CLOSE** valve 28.

3.3.2.3.5 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valves 31, 27, and 1.

3.3.2.3.6 **DISCONNECT** Supply Hose from Q1 and **CONNECT** it to Hose Docking Station.

3.3.2.3.7 **PROCEED** to Step 3.3.2.5.

3.3.2.4 **USE** Steam Supply Line to increase CONTAINMENT VESSEL pressure as follows:

3.3.2.4.1 **OPEN** valves 28 and 26.

3.3.2.4.2 **OPEN** valve 13 and when CONTAINMENT VESSEL internal pressure is 30 psig, **CLOSE** valve 13.

3.3.2.4.3 **CLOSE** valves 28 and 26.

3.3.2.4.4 Slowly **OPEN** valve 31 to vent Supply Manifold. **CLOSE** valve 31.

3.3.2.5 **RECORD** CONTAINMENT VESSEL internal pressure.

CALLOUT: Announce containment vessel pressure and temperature.

- 3.4 **CONNECT** Vessel Effluent Hose to Q5.
- 3.5 **VERIFY** valve 91 is OPEN to “IBC” position (green IBC light is illuminated).
- 3.6 **VERIFY** valve 80 is in “WASTE 1” position (white arrow on valve handle points to WASTE 1).

WARNING

DO NOT DRAIN LIQUIDS FROM CONTAINMENT VESSEL TO WASTE CONTAINERS WHEN CONTAINMENT VESSEL TEMPERATURE EXCEEDS 65°C WITHOUT FIRST CONSULTING WITH THE COMMAND POST. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 4.0 **START** neutralent drain.
 - 4.1 Slowly **OPEN** valve 5 until CONTAINMENT VESSEL is heard to begin venting. **OPEN** valve 5 completely.

CALLOUT: Announce start time of containment vessel drain.

- 4.2 **VERIFY** CONTAINMENT VESSEL is draining by simultaneously observing readout on waste container 1 SCALE and CONTAINMENT VESSEL pressure indicator.

- 4.3 **MONITOR** transfer lines for blockage during neutralent drain and **PROCEED** as follows:
- 4.3.1 When no blockage is detected, **PROCEED** to Step 4.4 and **CONTINUE** neutralent drain.
 - 4.3.2 When possible blockage is detected by no change in drum weight and/or CONTAINMENT VESSEL pressure, **PERFORM** one of the following:
 - 4.3.2.1 **BACK FLUSH** Vessel Effluent Hose with nitrogen.

CALLOUT: Announce containment vessel pressure and temperature.

- 4.3.2.1.1 **CLOSE** valve 93.
- 4.3.2.1.2 **OPEN** valve 28.
- 4.3.2.1.3 **OPEN** valve 31. **WAIT** 5 seconds. **CLOSE** valve 28.
- 4.3.2.1.4 **OPEN** valve 93 to vent and **RESUME** drain.
- 4.3.2.1.5 **CLOSE** valve 31.
- 4.3.2.1.6 **RETURN** to Step 4.2.
- 4.3.2.2 **BACK FLUSH** Vessel Effluent Hose with water.
 - 4.3.2.2.1 **DON** hearing protection, as needed.
 - 4.3.2.2.2 **CLOSE** valve 93.
 - 4.3.2.2.3 **START WATER SUPPLY PUMP** by opening valves 23 and 24.
 - 4.3.2.2.4 **OPEN** valve 31 (forces water through valves 91, 5, and 6).
 - 4.3.2.2.5 **STOP WATER SUPPLY PUMP** by closing valves 24 and 23.
 - 4.3.2.2.6 **OPEN** valve 93 to vent and **RESUME** drain.
 - 4.3.2.2.7 **CLOSE** valve 31.
 - 4.3.2.2.8 **RETURN** to Step 4.2.

4.4 **PERFORM** one of the following:

4.4.1 When not increasing CONTAINMENT VESSEL internal pressure while draining neutralent from CONTAINMENT VESSEL, **PROCEED** to Step 4.5.

Caution

Do not increase air line pressure above 120 psig to avoid damage to steam line actuators.

Note

Containment vessel internal pressure can be monitored by observing containment vessel pressure indicator on containment vessel control panel.

4.4.2 When increasing CONTAINMENT VESSEL internal pressure while draining neutralent from CONTAINMENT VESSEL, **PROCEED** as follows:

4.4.2.1 **CLOSE** valve 5.

4.4.2.2 **CHECK** CONTAINMENT VESSEL pressure.

CALLOUT: Announce containment vessel internal pressure.

4.4.2.3 **INCREASE** CONTAINMENT VESSEL internal pressure to 30 psig as follows:

4.4.2.3.1 When using Supply Hose, **PROCEED** to Step 4.4.2.4.

4.4.2.3.2 When using Steam Supply Line, **PROCEED** to Step 4.4.2.5.

4.4.2.4 **USE** Supply Hose to increase CONTAINMENT VESSEL pressure as follows:

4.4.2.4.1 **CONNECT** Supply Hose to Q1.

4.4.2.4.2 **OPEN** valves 28, 27, and 1.

- 4.4.2.4.3 **OPEN** valve 3 and when CONTAINMENT VESSEL internal pressure is 30 psig, **CLOSE** valve 3.
- 4.4.2.4.4 **CLOSE** valve 28.
- 4.4.2.4.5 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valves 31, 27, and 1.
- 4.4.2.4.6 **DISCONNECT** Supply Hose from Q1 and **CONNECT** it to Hose Docking Station.
- 4.4.2.4.7 **PROCEED** to Step 4.4.2.6.
- 4.4.2.5 **USE** Steam Supply Line to increase CONTAINMENT VESSEL pressure as follows:
 - 4.4.2.5.1 **OPEN** valves 28 and 26.
 - 4.4.2.5.2 **OPEN** valve 13 and when CONTAINMENT VESSEL internal pressure is 30 psig, **CLOSE** valve 13.
 - 4.4.2.5.3 **CLOSE** valves 28 and 26.
 - 4.4.2.5.4 Slowly **OPEN** valve 31 to vent Supply Manifold. **CLOSE** valve 31.
- 4.4.2.6 **RECORD** CONTAINMENT VESSEL internal pressure.

CALLOUT: Announce containment vessel internal pressure.

- 4.4.2.7 **RETURN** to Step 4.1.
- 4.5 **MONITOR** waste container during neutralent drain and **PERFORM** one of the following:
 - 4.5.1 When waste container changeout is not required, **PROCEED** to Step 5.0.
 - 4.5.2 When waste container changeout is required or as directed, **CHANGE OUT** waste container as follows:
 - 4.5.2.1 If required, **DON** leather gloves. **CLOSE** valve 93. **RECORD** waste container identification number and weight.

CALLOUT: Announce waste container weight and waste container number.

- 4.5.2.2 **DISCONNECT** Waste Hose 1 from Q95A and Vent Waste Hose 1 from Q96A. **PLACE** Waste Hose 1 in secondary containment.
- 4.5.2.3 **REMOVE** quick-disconnect waste container lid from waste container 1 and **INSTALL** shipping lid on waste container 1.
- 4.5.2.4 **DISCONNECT** grounding wires from waste container 1 and **REMOVE** waste container 1 from secondary containment.
- 4.5.2.5 **INSTALL** new waste container 1 and **REMOVE** shipping lid.
- 4.5.2.6 **CONNECT** grounding wires to waste container 1.
- 4.5.2.7 **REMOVE** shipping lid and **INSTALL** quick-disconnect waste container lid on replacement waste container 1 as follows:
 - 4.5.2.7.1 **SCREW** quick-disconnect waste container lid onto waste container 1.
 - 4.5.2.7.2 **TIGHTEN** quick-disconnect waste container lid until hand-tight.
- 4.5.2.8 **VERIFY** waste container 1 drain valve is CLOSED.
- 4.5.2.9 **CONNECT** Waste Hose 1 to Q95A on replacement waste container 1.
- 4.5.2.10 **CONNECT** Vent Waste Hose 1 to Q96A on replacement waste container 1.
- 4.5.2.11 **VERIFY** waste container 1 scale is at 0 pounds.

Note

Allow waste containers to cool to ambient temperature before installing bung covers.

4.5.2.12 **RECORD** time old waste container 1 was disconnected, time new waste container 1 was connected, and number of new waste container 1.

CALLOUT: Announce container changeout time and new waste container number.

4.5.2.13 **RESUME** neutralent drain from CONTAINMENT VESSEL by opening valve 93.

4.5.2.14 **RETURN** to Step 4.2.

5.0 **STOP** neutralent drain.

5.1 **CLOSE** valve 5 when CONTAINMENT VESSEL has reached atmospheric pressure.

5.2 **DISCONNECT** Vessel Effluent Hose from Q5. **SECURE** Vessel Effluent Hose to Hose Docking Station.

5.3 **RECORD** final waste container weight and time CONTAINMENT VESSEL drain ended.

CALLOUT: Announce final waste container weight (lbs) and time containment vessel drain ended.

6.0 **PERFORM** one of the following:

6.1 When collecting a liquid sample from a liquid waste container, **PROCEED** to Step 7.0.

6.2 When not collecting a liquid sample from a liquid waste container, **PROCEED** to Procedure 13 to rinse CONTAINMENT VESSEL.

7.0 **COLLECT** liquid waste stream sample from liquid waste container.

7.1 **INSPECT** liquid sample container. **REPLACE**, if necessary, and **RECORD** liquid sample container label number.

7.2 **OPEN** liquid sample container and **PLACE** it on catch tray beside waste drum.

7.3 **REMOVE** liquid waste container bung plug and **PLACE** it on catch tray.

- 7.4 **INSERT** composite liquid waste sampler (coliwasa) tube into liquid waste drum and **LOWER** it all the way to the waste container bottom.
- 7.5 **SEAL** coliwasa tube, **REMOVE** it from liquid waste container, and **CHECK** for stratification in coliwasa tube liquid contents.
- 7.6 **PLACE** coliwasa tube into liquid sample container.
- 7.7 **CHECK** coliwasa tube contents and **PROCEED** as follows:
 - 7.7.1 When stratification is not present, **DRAIN** contents into liquid sample container. **PROCEED** to Step 7.8.
 - 7.7.2 When more than one phase is seen in coliwasa tube, **DRAIN** each phase of the stratification into a separate liquid sample container.
- 7.8 **PERFORM** one of the following:
 - 7.8.1 When liquid sample container contents are within required levels designated by the supporting laboratory, **PROCEED** to Step 7.9.
 - 7.8.2 When liquid sample container contents are not within required levels, **REPEAT** Steps 7.4 through 7.8.2 until liquid sample container contents are within required levels.
- 7.9 **CLOSE** liquid sample container(s).
- 7.10 **PROCESS** coliwasa tube.
 - 7.10.1 **DON** leather gloves.
 - 7.10.2 **DISPOSE** coliwasa tube as follows:
 - 7.10.2.1 **PLACE** coliwasa tube into sampled liquid waste container.
 - 7.10.2.2 **BREAK** coliwasa tube against waste container's inner side and **VERIFY** all coliwasa tube fragments are within liquid waste container.
 - 7.10.2.3 **INSTALL** container bung plug on liquid waste container.

- 8.0 **PROCESS** sample container(s).
- 8.1 **PLACE** liquid sample container into pail of decontaminant.
- 8.2 **REMOVE** liquid sample container from decontaminant pail and **PLACE** into pail of rinsewater.
- 8.3 **REMOVE** liquid sample container from rinse pail and **DRY**.
- 8.4 **PACK** liquid sample container into a separate secondary container or sample bag.

Note

Monitor item IAW local monitoring program.

- 8.5 **MONITOR** exterior of liquid sample container. **RECORD** monitoring results.

CALLOUT: Announce liquid sample container monitoring results.

- 8.6 **PERFORM** one of the following:
 - 8.6.1 When monitoring results are below established limits, **PROCEED** to Step 8.7.
 - 8.6.2 When monitoring results are not below established limits, **RETURN** to Step 8.1.
 - 8.7 **PLACE** packaged sample container into overpack containing absorbent material. **SEAL** and **CARRY** overpack to PDS.
 - 8.8 **COMPLETE** required chain-of-custody documents. **ATTACH** chain-of-custody documents to packed sample and **TRANSFER** to courier.
- 9.0 **PROCEED** as directed.

SPECIAL REQUIREMENTS:

1. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Spill containment pan	1 each
Liquid waste containers	as required
Household bleach (5 percent)	as required
Leather gloves	as required
Rags	as required
Composite liquid waste sampler	as required
Liquid sample container	as required
Sample bag or secondary container	as required
Chain-of-custody documents	as required
Sample packaging	as required
Vessel rotation control key	1 each
Primary tool kit	1 each
T-handle wrench, 1-5/16-inch	1 each
EDS operator log	1 each
Indelible ink pen	1 each

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PROCEDURE 13
RINSE AND DRAIN EDS CONTAINMENT VESSEL

The purpose of this procedure is to rinse and drain the EDS containment vessel after the neutralent has been removed.

PRECONDITIONS:

1. Monitoring of waste container level was conducted to avoid overfilling drum.
2. Air monitoring must be operational.
3. Setup and daily startup checklists have been completed.
4. Receipt of samples has been coordinated with laboratory and courier.
5. Laboratory has provided sampling equipment per Laboratory Quality Control Plan.
6. Decontaminant and water pails must be positioned on EDS Trailer and at sample table.
7. Steam generator must be operating.

WARNINGS

VERIFY PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED.

DUE TO EXTREME TEMPERATURES, PERSONNEL SHOULD AVOID DIRECT SKIN CONTACT WITH HEATED SURFACES.

WEAR LEATHER GLOVES TO PREVENT PERSONAL INJURY DUE TO BURNS FROM HANDLING HOT LIQUID/EQUIPMENT.

VERIFY RINSATE AMOUNT TO BE DRAINED AND LIQUID LEVEL IN IBC PRIOR TO COMMENCING RINSATE TRANSFER TO AVOID OVERFILLING IBC.

DO NOT DRAIN LIQUIDS TO TANK 3 WHEN CONTAINMENT VESSEL TEMPERATURE EXCEEDS 95°C AND DO NOT DRAIN LIQUIDS TO IBC WHEN CONTAINMENT VESSEL TEMPERATURE EXCEEDS 65°C.

FAILURE TO DON HEARING PROTECTION MAY CAUSE HEARING LOSS WHILE PERFORMING THE FOLLOWING STEPS.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Caution

Starting containment vessel rotation with hoses connected to containment vessel except for Steam Supply Line may cause possible damage to hoses.

- 1.0 **POSITION** CONTAINMENT VESSEL in FILL/DRAIN position.
 - 1.1 When CONTAINMENT VESSEL is rotating, **PROCEED** to Step 2.0.
 - 1.2 When CONTAINMENT VESSEL is in the FILL/DRAIN position, **PROCEED** to Step 2.3.
 - 1.3 When CONTAINMENT VESSEL has been stopped and is not in the FILL/DRAIN position, **PROCEED** to Step 3.0.

2.0 **STOP** ROTARY AGITATION SUBSYSTEM in FILL/DRAIN position.

2.1 **PUSH** green FILL/DRAIN button to stop CONTAINMENT VESSEL in the FILL/DRAIN position.

2.2 **TURN OFF** and **REMOVE** Vessel Rotation Control Key.

CALLOUT: Announce time containment vessel rotation stopped.

2.3 **STOP** steam transfer.

2.3.1 When steam transfer has been stopped, **PROCEED** to Step 4.0.

2.3.2 When steam transfer has not been stopped, **PROCEED** as follows:

2.3.2.1 **CLOSE** valve 13 and **PUSH** red OFF button on VESSEL STEAM CONTROL Panel.

CALLOUT: Announce time steam transfer to containment vessel shut off.

2.3.2.2 **RECORD** amount of water transferred to CONTAINMENT VESSEL during steam heating phase.

CALLOUT: Announce amount of water transferred to containment vessel.

2.3.2.3 **PUSH** RESET USAGE button on BCP screen of HMI to set display to 0.0 lbs.

2.3.2.4 **PROCEED** to Step 4.0.

3.0 **POSITION** CONTAINMENT VESSEL in FILL/DRAIN position.

3.1 **VERIFY** four PROCESS SHUTDOWN buttons are out and red STEAM LINE MOTION FAULT button is not illuminated.

3.2 **VERIFY** green VESSEL ROTATION CONTROL ON button on VESSEL CONTROL PANEL is illuminated.

Note

Use of vessel rotation control pendant may be required when auto rotation mode is not operating correctly. See Annex D for using vessel rotation control pendant.

3.3 **INSERT** and **TURN** Vessel Rotation Control Key to AUTO position.

3.4 **VERIFY** INTERLOCKS key switch is set to ON.

Note

Containment vessel will not rotate unless clamp interlock light is illuminated. However, containment vessel will rotate if placed in BYPASS mode.

3.5 **VERIFY** status of green INTERLOCK READY light and **PROCEED** as follows:

3.5.1 When green INTERLOCK READY light is illuminated, **PROCEED** to Step 3.6.

3.5.2 When green INTERLOCK READY light is not illuminated, **VERIFY** CLAMP is CLOSED and proximity switch is in alignment. **PROCEED** as follows:

3.5.2.1 When green INTERLOCK READY light is illuminated, **PROCEED** to Step 3.6.

3.5.2.2 When green INTERLOCK READY light is not illuminated, **TURN** Interlocks Control Key to BYPASS position (BYPASS light illuminates).

Note

Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.

3.6 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation.

3.7 **PUSH** green FILL/DRAIN button to rotate CONTAINMENT VESSEL to FILL/DRAIN position.

3.8 **TURN OFF** and **REMOVE** Vessel Rotation Control Key.

3.9 **STOP** steam transfer.

3.9.1 When steam transfer has been stopped, **PROCEED** to Step 4.0.

3.9.2 When steam transfer has not been stopped, **PROCEED** as follows:

3.9.2.1 **CLOSE** valve 13 and **PUSH** red OFF button on VESSEL STEAM CONTROL Panel.

CALLOUT: Announce time steam transfer to containment vessel shut off.

3.9.2.2 **RECORD** amount of water transferred to CONTAINMENT VESSEL during steam heating phase.

CALLOUT: Announce amount of water transferred to containment vessel.

3.9.2.3 **PUSH** RESET USAGE button on BCP screen of HMI to set display to 0.0 lbs.

Caution

Do not transfer any fluids through Steam Supply Line for at least 15 minutes after last steam transfer. Transferring fluids through the line without having waited the minimum time may damage the line's fittings.

4.0 **TRANSFER** water into CONTAINMENT VESSEL.

4.1 **REQUEST** transfer weight. **DON** hearing protection, as needed.

CALLOUT: Announce Tank 1 volume and temperature.

4.2 **PERFORM** one of the following:

4.2.1 When using Supply Hose, **PROCEED** as follows:

4.2.1.1 **CONNECT** Supply Hose to Q5.

4.2.1.2 **DON** hearing protection. **OPEN** valve 27.

4.2.1.3 **START WATER SUPPLY PUMP A** by opening valves 23 and 24.

4.2.1.4 **OPEN** valve 5 to transfer water to CONTAINMENT VESSEL.

4.2.1.5 When quantity in Table 3-1 or directed quantity has transferred to CONTAINMENT VESSEL, **CLOSE** valve 5.

4.2.1.6 **CLOSE** valves 24 and 23.

4.2.1.7 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valves 31 and 27.

4.2.1.8 **DISCONNECT** Supply Hose from Q5 and **CONNECT** it to Hose Docking Station. **PROCEED** to Step 5.0.

4.2.2 When using Steam Supply Line, **PROCEED** as follows:

4.2.2.1 **OPEN** valve 26.

4.2.2.2 **START WATER SUPPLY PUMP A** by opening valves 23 and 24.

4.2.2.3 **OPEN** valve 13 to transfer water to CONTAINMENT VESSEL.

4.2.2.4 When quantity in Table 3-1 or directed quantity has transferred to CONTAINMENT VESSEL, **CLOSE** valve 13.

4.2.2.5 **CLOSE** valves 24 and 23.

4.2.2.6 Slowly **OPEN** valve 31 to vent Supply Manifold. **CLOSE** valves 31 and 26.

5.0 **RECORD** Tank 1 volume.

CALLOUT: Announce Tank 1 volume.

5.1 **CHECK** CONTAINMENT VESSEL pressure and temperature.

CALLOUT: Announce containment vessel pressure and temperature.

5.2 **PERFORM** one of the following:

5.2.1 When supply Tank 1 contents require chilling to a lower temperature, **SET** supply Tank 1 Temperature Controller to 3°C. **PROCEED** to Step 5.3.

5.2.2 When supply Tank 1 contents do not require chilling, **VERIFY** supply Tank 1 Temperature Controller is set to 15°C.

5.3 **PROCEED** as follows:

5.3.1 When heating CONTAINMENT VESSEL contents, **PROCEED** to Step 6.0.

5.3.2 When not heating CONTAINMENT VESSEL contents, **PROCEED** to Step 8.0.

6.0 **PREPARE** to operate Steam Supply Subsystem.

6.1 **VERIFY** valves 13, 16, and 50 are CLOSED.

6.2 **VERIFY** amber STEAM HEAT selector switch (valve 48) is turned to AUTO.

6.3 **VERIFY** setpoint temperature on VESSEL TEMPERATURE Controller on VESSEL STEAM CONTROL Panel is set IAW Table 3-1.

6.4 **PUSH** green ON button on VESSEL STEAM CONTROL Panel.

6.5 **VERIFY** SUPPLY pressure is between 140 to 150 psig on STEAM PRESSURES Controller on VESSEL STEAM CONTROL Panel.

6.6 **VERIFY** red STEAM LINE MOTION FAULT button is not illuminated. If illuminated, **PUSH** red STEAM LINE MOTION FAULT button to reset.

6.7 **VERIFY** amber INTERLOCK selector switch (valve 49) is turned to AUTO.

7.0 **STEAM HEAT CONTAINMENT VESSEL** contents.

7.1 **VERIFY** Steam Usage shows 0.0 lbs on BCP screen of HMI. If necessary, **PUSH** RESET USAGE button to set display to 0.0 lbs.

7.2 **CHECK** Steam Shut-off indicator on HMI. **PROCEED** as follows:

7.2.1 When Steam Shut-off indicator on HMI is illuminated (valve 49 is OPEN), **PROCEED** to Step 7.3.

7.2.2 When Steam Shut-off indicator is not illuminated (valve 49 is not OPEN), **PERFORM** the following:

7.2.2.1 **VERIFY** STEAM ISOLATION selector switch (valve 49) is turned to AUTO.

7.2.2.2 **VERIFY** PROCESS SHUTDOWN buttons are out.

7.2.2.3 **VERIFY** valve 103 is OPEN.

7.2.2.4 **CHECK** red STEAM LINE MOTION FAULT button on VESSEL STEAM CONTROL Panel and **PROCEED** as follows:

7.2.2.4.1 When red STEAM LINE MOTION FAULT button is not illuminated, **PROCEED** to Step 7.2.2.5.

7.2.2.4.2 When red STEAM LINE MOTION FAULT button is illuminated, **VERIFY** Steam Supply Line is properly seated beneath CONTAINMENT VESSEL and then **PUSH** red STEAM LINE MOTION FAULT button.

7.2.2.5 **PROCEED** as follows:

7.2.2.5.1 When SUPPLY pressure exceeds INJECTION pressure by a minimum of 10 psig, **TURN** amber INTERLOCK selector switch to OPEN and **PROCEED** to Step 7.3.

7.2.2.5.2 When SUPPLY pressure does not exceed INJECTION pressure by a minimum of 10 psig, **PERFORM** the following:

7.2.2.5.2.1 **VERIFY** valves 6 and 14 are OPEN.

7.2.2.5.2.2 **CHECK** CONTAINMENT VESSEL pressure. **PROCEED** as follows:

7.2.2.5.2.2.1 When CONTAINMENT VESSEL pressure is less than 140 psig, **PROCEED** to Step 7.2.2.5.2.3.

7.2.2.5.2.2.2 When CONTAINMENT VESSEL pressure is greater than 140 psig, **PROCEED** as directed.

7.2.2.5.2.3 **CHECK** SUPPLY pressure on STEAM PRESSURES Controller. **PROCEED** as follows:

7.2.2.5.2.3.1 When SUPPLY pressure is 150 ± 2 psig, **TURN** amber INTERLOCK selector switch to OPEN. **PROCEED** to Step 7.3.

7.2.2.5.2.3.2 When SUPPLY pressure is not 150 ± 2 psig, **PROCEED** as directed.

7.2.2.5.2.4 **COMPARE** CONTAINMENT VESSEL pressure against INJECTION pressure. **PROCEED** as follows:

7.2.2.5.2.4.1 When CONTAINMENT VESSEL pressure is within ± 5 psig of INJECTION pressure, **PROCEED** to Step 7.3.

7.2.2.5.2.4.2 When CONTAINMENT VESSEL pressure is not within ± 5 psig of INJECTION pressure, **PROCEED** as directed.

7.3 Completely **OPEN** valve 13 and then **CLOSE** valve 13 one quarter turn to commence steam transfer to CONTAINMENT VESSEL.

7.4 **RECORD** time steam transfer begins.

CALLOUT: Announce time steam transfer to containment vessel started.

Cautions

Loose tools or other hardware left on top of or underneath rotating containment vessel may be damaged.

Starting containment vessel rotation with hoses connected to containment vessel, except for Steam Supply Line, may cause possible damage.

8.0 **START** ROTARY AGITATION SYSTEM.

8.1 **OPERATE** ROTARY AGITATION SUBSYSTEM.

8.1.1 **VERIFY** four PROCESS SHUTDOWN buttons are out and red STEAM LINE MOTION FAULT button is not illuminated.

8.1.2 **VERIFY** green VESSEL ROTATION CONTROL ON button on VESSEL CONTROL PANEL is illuminated.

Note

Use of vessel rotation control pendant may be required when auto rotation mode is not operating correctly. See Annex D for using vessel rotation control pendant.

8.1.3 **INSERT** and **TURN** Vessel Rotation Control Key to AUTO position.

8.1.4 **VERIFY** INTERLOCKS key switch is set to ON.

Note

Containment vessel will not rotate unless clamp interlock light is illuminated. However, containment vessel will rotate in BYPASS mode.

- 8.1.5 **VERIFY** status of green INTERLOCK READY light and **PROCEED** as follows:
 - 8.1.5.1 When green INTERLOCK READY light is illuminated, **PROCEED** to Step 8.1.6.
 - 8.1.5.2 When green INTERLOCKS READY light is not illuminated, **VERIFY CLAMP** is CLOSED and proximity switch is in alignment. **PROCEED** as follows:
 - 8.1.5.2.1 When green INTERLOCK READY light is illuminated, **PROCEED** to Step 8.1.6.
 - 8.1.5.2.2 When green INTERLOCK READY light is not illuminated, **TURN** Interlocks Control Key to BYPASS position (BYPASS light illuminates).
- 8.1.6 **PUSH** green ROTATE button.
- 8.1.7 **RECORD** rotation start time.

CALLOUT: Announce time containment vessel rotation began.

Note

Supply tanks may be refilled as needed due to operational needs.

- 8.1.8 When necessary, **FILL** Tank 1 and **SET** supply Tank 1 Temperature Controller for the temperature requirements of the next rinse.
- 9.0 **CONTROL** access to EDS Trailer during CONTAINMENT VESSEL rotation.

10.0 **STOP** ROTARY AGITATION SUBSYSTEM in FILL/DRAIN Position.

10.1 **PUSH** green FILL/DRAIN button to stop CONTAINMENT VESSEL in FILL/DRAIN position.

10.2 **TURN OFF** and **REMOVE** Vessel Rotation Control Key.

CALLOUT: Announce time containment vessel rotation stopped.

10.3 **RECORD** waste container weights as shown on waste container scales.

CALLOUT: Announce waste container weights (lbs).

10.4 **RECORD** amount of water transferred to CONTAINMENT VESSEL during steam heating phase.

CALLOUT: Announce amount of water transferred to containment vessel.

11.0 **PROCEED** as follows:

11.1 When steam transfer has been stopped, **PROCEED** to Step 12.0.

11.2 When steam transfer has not been stopped, **PROCEED** as follows:

11.2.1 **CLOSE** valve 13 and **PUSH** red OFF button on VESSEL STEAM CONTROL Panel.

CALLOUT: Announce time steam transfer to containment vessel shut off.

11.2.2 **PUSH** RESET USAGE button on BCP screen of HMI to set display to 0.0 lbs.

12.0 **DRAIN** CONTAINMENT VESSEL.

12.1 If necessary, **DON** leather gloves.

Note

Containment vessel internal pressure can be monitored by observing containment vessel pressure indicator on containment vessel control panel.

12.2 **PERFORM** one of the following:

12.2.1 When not increasing CONTAINMENT VESSEL internal pressure prior to draining rinsate from CONTAINMENT VESSEL, **PROCEED** to Step 12.3.

Caution

Do not increase air line pressure to 120 psig to avoid damage to steam line actuators.

12.2.2 When increasing CONTAINMENT VESSEL internal pressure prior to draining rinsate from CONTAINMENT VESSEL, **PROCEED** as follows:

12.2.2.1 **CHECK** CONTAINMENT VESSEL pressure.

CALLOUT: Announce containment vessel internal pressure.

12.2.2.2 **INCREASE** CONTAINMENT VESSEL internal pressure to 30 psig as follows:

12.2.2.2.1 When using Supply Hose, **PROCEED** to Step 12.2.2.3.

12.2.2.2.2 When using Steam Supply Line, **PROCEED** to Step 12.2.2.4.

12.2.2.3 **USE** Supply Hose to increase CONTAINMENT VESSEL pressure as follows:

12.2.2.3.1 **CONNECT** Supply Hose to Q1.

12.2.2.3.2 **OPEN** valves 28, 27, and 1.

12.2.2.3.3 **OPEN** valve 3 and when CONTAINMENT VESSEL internal pressure is 30 psig, **CLOSE** valve 3.

12.2.2.3.4 **CLOSE** valve 28.

12.2.2.3.5 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valves 31, 27, and 1.

12.2.2.3.6 **DISCONNECT** Supply Hose from Q1 and **CONNECT** it to Hose Docking Station.

12.2.2.3.7 **PROCEED** to Step 12.2.2.5.

12.2.2.4 **USE** Steam Supply Line to increase CONTAINMENT VESSEL pressure as follows:

12.2.2.4.1 **OPEN** valves 28 and 26.

12.2.2.4.2 **OPEN** valve 13 and when CONTAINMENT VESSEL internal pressure is 30 psig, **CLOSE** valve 13.

12.2.2.4.3 **CLOSE** valves 28 and 26.

12.2.2.4.4 Slowly **OPEN** valve 31 to vent Supply Manifold. **CLOSE** valve 31.

12.3 **RECORD** CONTAINMENT VESSEL internal pressure.

CALLOUT: Announce containment vessel internal pressure.

12.4 **PERFORM** one of the following:

12.4.1 When draining rinsate to Tank 3, **PROCEED** as follows:

12.4.1.1 **MONITOR** CONTAINMENT VESSEL temperature and **PROCEED** as follows:

12.4.1.1.1 When CONTAINMENT VESSEL temperature is 95°C or less, **PROCEED** to Step 12.4.1.2.

12.4.1.1.2 When CONTAINMENT VESSEL temperature is more than 95°C, **RETURN** to Step 4.0.

12.4.1.2 **CONNECT** Vessel Effluent Hose to Q5.

12.4.1.3 **VERIFY** valves 86, 87, and 90 are CLOSED.

12.4.1.4 **VERIFY** amber selector switch is in the "TANK 3" (Tank 3 green light is illuminated).

12.4.1.5 **VERIFY** valve 92 is OPEN (green light is illuminated).

CALLOUT: Announce Tank 3 volume.

12.4.1.6 **PROCEED** to Step 13.0.

12.4.2 When draining rinsate to waste container 2, **PROCEED** as follows:

12.4.2.1 **VERIFY** CONTAINMENT VESSEL temperature is 65°C or less. **PROCEED** as follows:

12.4.2.1.1 When CONTAINMENT VESSEL temperature is 65°C or less, **PROCEED** to Step 12.4.2.2.

12.4.2.1.2 When CONTAINMENT VESSEL temperature is greater than 65°C, **RETURN** to Step 12.4.1.

12.4.2.2 **VERIFY** amber selector switch is turned to "IBC" position (IBC green light is illuminated).

12.4.2.3 **VERIFY** valve 80 is in "WASTE 2" position (white arrow on valve handle points to WASTE 2).

13.0 **START** rinsate drain.

13.1 Slowly **OPEN** valve 5 until CONTAINMENT VESSEL is heard to begin venting. **OPEN** valve 5 completely.

CALLOUT: Announce start time of containment vessel drain and containment vessel temperature.

13.2 **PROCEED** as follows:

13.2.1 When draining rinsate to Tank 3, **PROCEED** to Step 14.0.

13.2.2 When draining rinsate to waste container 2, **PROCEED** to Step 15.4.

14.0 **DRAIN** rinsate to Tank 3.

14.1 **MONITOR** transfer lines for blockage during rinsate transfer and **PROCEED** as follows:

14.1.1 **DETECT** no blockage. **PROCEED** to Step 14.2 and **CONTINUE** rinsate transfer operations.

14.1.2 **DETECT** possible blockage when Tank 3 level gauge and/or CONTAINMENT VESSEL pressure shows no change. **PERFORM** one of the following:

14.1.2.1 When back flushing Vessel Effluent Hose with nitrogen, **PROCEED** to Step 14.1.3.

14.1.2.2 When back flushing Vessel Effluent Hose with water, **PROCEED** to Step 14.1.4.

14.1.3 **BACK FLUSH** Vessel Effluent Hose with nitrogen.

CALLOUT: Announce containment vessel pressure and temperature.

14.1.3.1 **CLOSE** valve 93.

14.1.3.2 **TURN** amber selector switch to "IBC" position (IBC green light is illuminated).

14.1.3.3 **OPEN** valve 28.

14.1.3.4 **OPEN** valve 31. **WAIT** 5 seconds. **CLOSE** valve 28.

- 14.1.3.5 **TURN** amber selector switch to “TANK 3” position (Tank 3 green light is illuminated).
- 14.1.3.6 **OPEN** valve 93 to vent and **RESUME** drain.
- 14.1.3.7 **CLOSE** valve 31.
- 14.1.3.8 **RETURN** to Step 14.1.
- 14.1.4 **BACK FLUSH** Vessel Effluent Hose with water.
 - 14.1.4.1 **CLOSE** valve 93.
 - 14.1.4.2 **TURN** amber selector switch to “IBC” position (IBC green light is illuminated).
 - 14.1.4.3 **DON** hearing protection, as needed.
 - 14.1.4.4 **START** WATER SUPPLY PUMP A by opening valves 23 and 24.
 - 14.1.4.5 **OPEN** valve 31 (forces water through valves 91, 5, and 6).
 - 14.1.4.6 **STOP** WATER SUPPLY PUMP A by closing valves 24 and 23.
 - 14.1.4.7 **TURN** amber selector switch to “TANK 3” position (Tank 3 green light is illuminated).
 - 14.1.4.8 **OPEN** valve 93 to vent and **RESUME** drain.
 - 14.1.4.9 **CLOSE** valve 31.
 - 14.1.4.10 **RETURN** to Step 14.1.

Note

Containment vessel internal pressure can be monitored by observing containment vessel pressure indicator on containment vessel control panel.

14.2 **PERFORM** one of the following:

14.2.1 When not increasing CONTAINMENT VESSEL internal pressure while draining rinsate from CONTAINMENT VESSEL, **PROCEED** to Step 16.0.

Caution

Do not increase air line pressure to 120 psig to avoid damage to steam line actuators.

14.2.2 When increasing CONTAINMENT VESSEL internal pressure while draining rinsate from CONTAINMENT VESSEL, **PROCEED** as follows:

14.2.2.1 **CLOSE** valve 5.

14.2.2.2 **CHECK** CONTAINMENT VESSEL pressure.

CALLOUT: Announce containment vessel internal pressure.

14.2.2.3 **INCREASE** CONTAINMENT VESSEL internal pressure to 30 psig as follows:

14.2.2.3.1 When using Supply Hose, **PROCEED** to Step 14.2.2.4.

14.2.2.3.2 When using Steam Supply Line, **PROCEED** to Step 14.2.2.5.

14.2.2.4 **USE** Supply Hose to increase CONTAINMENT VESSEL pressure as follows:

14.2.2.4.1 **CONNECT** Supply Hose to Q1.

14.2.2.4.2 **OPEN** valves 28, 27, and 1.

14.2.2.4.3 **OPEN** valve 3 and when CONTAINMENT VESSEL internal pressure is 30 psig, **CLOSE** valve 3.

14.2.2.4.4 **CLOSE** valve 28.

14.2.2.4.5 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valves 31, 27, and 1.

14.2.2.4.6 **DISCONNECT** Supply Hose from Q1 and **CONNECT** it to Hose Docking Station.

14.2.2.4.7 **PROCEED** to Step 14.2.2.6.

14.2.2.5 **USE** Steam Supply Line to increase CONTAINMENT VESSEL pressure as follows:

14.2.2.5.1 **OPEN** valves 28 and 26.

14.2.2.5.2 **OPEN** valve 13 and when CONTAINMENT VESSEL internal pressure is 30 psig, **CLOSE** valve 13.

14.2.2.5.3 **CLOSE** valves 28 and 26.

14.2.2.5.4 Slowly **OPEN** valve 31 to vent Supply Manifold. **CLOSE** valve 31.

14.2.2.6 **RECORD** CONTAINMENT VESSEL internal pressure.

CALLOUT: Announce containment vessel internal pressure.

14.2.2.7 Slowly **OPEN** valve 5 until CONTAINMENT VESSEL is heard to begin venting. **OPEN** valve 5 completely.

14.2.2.8 **RETURN** to Step 14.1.

15.0 **DRAIN** rinsate to waste container 2.

15.1 **VERIFY** CONTAINMENT VESSEL is draining by simultaneously observing readout on waste container 2 scales and CONTAINMENT VESSEL pressure indicator.

15.2 **MONITOR** transfer lines for blockage during rinsate transfer and **PROCEED** as follows:

15.2.1 **DETECT** no blockage. **PROCEED** to Step 15.3 and **CONTINUE** rinsate transfer operations.

15.2.2 **DETECT** possible blockage when waste container weight and/or CONTAINMENT VESSEL pressure shows no change.
PERFORM one of the following:

15.2.2.1 **BACK FLUSH** Vessel Effluent Hose with nitrogen.

CALLOUT: Announce containment vessel pressure and temperature.

15.2.2.1.1 **CLOSE** valve 93.

15.2.2.1.2 **OPEN** valve 28.

15.2.2.1.3 **OPEN** valve 31. **WAIT** 5 seconds. **CLOSE** valve 28.

15.2.2.1.4 **OPEN** valve 93 to vent and **COMMENCE** drain.

15.2.2.1.5 **CLOSE** valve 31.

15.2.2.1.6 **RETURN** to Step 15.1.

15.2.2.2 **BACK FLUSH** Vessel Effluent Hose with water.

15.2.2.2.1 **CLOSE** valve 93.

15.2.2.2.2 **DON** hearing protection, as needed.

15.2.2.2.3 **START WATER SUPPLY PUMP** by opening valves 23 and 24.

15.2.2.2.4 **OPEN** valve 31 (forces water through valves 91, 5, and 6).

15.2.2.2.5 **STOP WATER SUPPLY PUMP** by closing valves 24 and 23.

15.2.2.2.6 **OPEN** valve 93 to vent and **COMMENCE** drain.

15.2.2.2.7 **CLOSE** valve 31.

15.2.2.2.8 **RETURN** to Step 15.1.

Note

Containment vessel internal pressure can be monitored by observing containment vessel pressure indicator on containment vessel control panel.

15.3 **PERFORM** one of the following:

15.3.1 When not increasing CONTAINMENT VESSEL internal pressure while draining rinsate from CONTAINMENT VESSEL, **PROCEED** to Step 15.4.

Caution

Do not increase air line pressure to 120 psig to avoid damage to steam line actuators.

15.3.2 When increasing CONTAINMENT VESSEL internal pressure while draining rinsate from CONTAINMENT VESSEL, **PROCEED** as follows:

15.3.2.1 **CLOSE** valve 5.

15.3.2.2 **CHECK** CONTAINMENT VESSEL pressure.

CALLOUT: Announce containment vessel internal pressure.

15.3.2.3 **INCREASE** CONTAINMENT VESSEL internal pressure to 30 psig as follows:

15.3.2.3.1 When using Supply Hose, **PROCEED** to Step 15.3.2.4.

15.3.2.3.2 When using Steam Supply Line, **PROCEED** to Step 15.3.2.5.

- 15.3.2.4 **USE** Supply Hose to increase CONTAINMENT VESSEL pressure as follows:
 - 15.3.2.4.1 **CONNECT** Supply Hose to Q1.
 - 15.3.2.4.2 **OPEN** valves 28, 27, and 1.
 - 15.3.2.4.3 **OPEN** valve 3 and when CONTAINMENT VESSEL internal pressure is 30 psig, **CLOSE** valve 3.
 - 15.3.2.4.4 **CLOSE** valve 28.
 - 15.3.2.4.5 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valves 31, 27, and 1.
 - 15.3.2.4.6 **DISCONNECT** Supply Hose from Q1 and **CONNECT** it to Hose Docking Station.
 - 15.3.2.4.7 **PROCEED** to Step 15.3.2.6.
 - 15.3.2.5 **USE** Steam Supply Line to increase CONTAINMENT VESSEL pressure as follows:
 - 15.3.2.5.1 **OPEN** valves 28 and 26.
 - 15.3.2.5.2 **OPEN** valve 13 and when CONTAINMENT VESSEL internal pressure is 30 psig, **CLOSE** valve 13.
 - 15.3.2.5.3 **CLOSE** valves 28 and 26.
 - 15.3.2.5.4 Slowly **OPEN** valve 31 to vent Supply Manifold. **CLOSE** valve 31.
 - 15.3.2.6 **RECORD** CONTAINMENT VESSEL internal pressure.
- CALLOUT: Announce containment vessel internal pressure.**
- 15.3.2.7 Slowly **OPEN** valve 5 until CONTAINMENT VESSEL is heard to begin venting. **OPEN** valve 5 completely.
 - 15.3.2.8 **RETURN** to Step 15.1.

15.4 **MONITOR** waste container during rinsate drain and **PERFORM** one of the following:

15.4.1 When waste container changeout is not required, **PROCEED** to Step 16.0.

15.4.2 When waste container changeout is required or as directed, **CHANGE OUT** waste container as follows:

15.4.2.1 If required, **DON** leather gloves. **CLOSE** valve 93. **RECORD** waste container identification number and weight.

CALLOUT: Announce waste container weight and waste container number.

15.4.2.2 **DISCONNECT** Waste Hose 2 from Q95B and Vent Waste Hose 2 from Q96B. **PLACE** Waste Hose 2 in secondary containment.

15.4.2.3 **REMOVE** quick-disconnect waste container cap from waste container 2 and **INSTALL** shipping cap on waste container 2.

15.4.2.4 **DISCONNECT** grounding wires from waste container 2 and **REMOVE** waste container 2 from secondary containment.

15.4.2.5 **INSTALL** new waste container 2 and **REMOVE** shipping cap.

15.4.2.6 **CONNECT** grounding wires to waste container 2.

15.4.2.7 **REMOVE** shipping cap and **INSTALL** quick-disconnect waste container cap on replacement waste container 2 as follows:

15.4.2.7.1 **SCREW** quick-disconnect waste container cap onto waste container 2.

15.4.2.7.2 **TIGHTEN** quick-disconnect waste container cap until hand-tight.

15.4.2.8 **VERIFY** waste container 2 drain valve is CLOSED.

15.4.2.9 **CONNECT** Waste Hose 2 to Q95B on replacement waste container 2.

15.4.2.10 **CONNECT** Vent Waste Hose 2 to Q96B on replacement waste container 2.

15.4.2.11 **VERIFY** waste container 2 scale is at 0 pounds.

15.4.2.12 **RECORD** time old waste container 2 was disconnected, time new waste container 2 was connected, and number of new waste container 2.

CALLOUT: Announce container changeout time and new waste container number.

15.4.2.13 **RESUME** rinsate drain from CONTAINMENT VESSEL by opening valve 93.

15.4.2.14 **RETURN** to Step 15.1.

16.0 **STOP** rinsate drain.

16.1 When CONTAINMENT VESSEL has reached atmospheric pressure, **CLOSE** valve 5.

16.2 **DISCONNECT** Vessel Effluent Hose from Q5 and **CONNECT** it to Hose Docking Station.

16.3 **RECORD** amount of rinsate in Tank 3 or waste container 2, time CONTAINMENT VESSEL drain ended, and CONTAINMENT VESSEL temperature.

CALLOUT: Announce amount of rinsate in Tank 3 or rinsate weight (lbs) in waste container 2, time containment vessel drain ended, and containment vessel temperature.

16.4 **PROCEED** as follows:

16.4.1 When additional rinses are required, **RETURN** to Step 4.0.

16.4.2 When no additional rinses are required, **PROCEED** to Step 17.0.

Note

Steam Supply Subsystem and Chiller Unit can be shut down and the Steam Supply Subsystem can be drained at any time when steam is no longer required.

- 17.0 **STOP** Steam Supply Subsystem.
 - 17.1 **VERIFY** valve 13 is CLOSED.
 - 17.2 **CLOSE** valve 14.
 - 17.3 **VERIFY** red OFF button on Vessel Steam Control Panel has been pushed.
 - 17.4 **TURN** amber INTERLOCK selector switch to CLOSED.
 - 17.5 **CLOSE** valve 103 located in BCC.
 - 17.6 **CLOSE** valve 47.
 - 17.7 Slowly **OPEN** valve 16 to vent Steam Supply Line. **CLOSE** valve 16.
 - 17.8 Slowly **OPEN** valve 50 to vent Steam Supply Line. **CLOSE** valve 50.
- 18.0 **STOP** Chiller Unit.
 - 18.1 **PUSH** red OFF button on TANK 1 WATER COOLER CONTROLS Panel.
 - 18.2 **PRESS** ON/OFF key on front panel display to stop Chiller Unit located in BCC.
 - 18.3 **TURN** Chiller Unit red ON switch to the OFF position located in BCC.
- 19.0 **PERFORM** one of the following:
 - 19.1 When not collecting a liquid sample from a waste container after rinsate drain is complete, **PROCEED** to Step 20.0.
 - 19.2 When collecting a liquid sample from a waste container after rinsate drain is complete, **RETURN** to Procedure 12 and **PERFORM** Steps 7.0 through 8.8 and then **PROCEED** to Step 20.0.

20.0 **PERFORM** one of the following procedures as directed:

- 20.1 When directed to perform a CONTAINMENT VESSEL headspace purge and/or collect a vapor sample, **PROCEED** to Procedure 14.
- 20.2 When no CONTAINMENT VESSEL headspace purge and/or vapor sample is required, **PROCEED** to Procedure 15.

SPECIAL REQUIREMENTS:

- 1. Air monitoring must be in place unless all sample containers are decontaminated.
- 2. PPE must be worn IAW Annex G.
- 3. Label sample containers IAW Sampling and Analysis Plan.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Spill containment pan	1 each
Sample bag or secondary container	as required
Chain-of-custody documents	as required
Sample containers	as required
Sample packaging	as required
Liquid waste containers	as required
Vessel rotation control key	1 each
Household bleach (5 percent)	as required
Primary tool kit	1 each
T-handle wrench, 1-5/16-inch	1 each
EDS operator log	1 each
Indelible ink pen	1 each

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PROCEDURE 14 COLLECT VAPOR SAMPLE

The purpose of this operation is to perform a headspace vapor purge and/or collect a headspace vapor sample.

PRECONDITIONS:

1. Waste containers and drain hoses are in place.
2. Decontaminant and water pails are positioned on EDS Trailer and at sample table.

WARNING

COLLECTING A VAPOR SAMPLE WHEN CONTAINMENT VESSEL PRESSURE EXCEEDS 50 PSIG MAY RESULT IN COMPROMISING THE STRUCTURAL INTEGRITY OF THE VAPOR SAMPLE BAG. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 1.0 **PREPARE** to purge CONTAINMENT VESSEL with nitrogen.
 - 1.1 **RECORD** nitrogen cylinder pressure (psig) shown on nitrogen cylinder regulator gauge.

CALLOUT: Announce nitrogen bottle pressure reading.

- 1.2 **VERIFY** all valves on CONTAINMENT VESSEL door are CLOSED, except valve 6.
- 1.3 **VERIFY** Vessel Effluent Hose is connected to Q5.
- 1.4 **VERIFY** valve 80 is open to "WASTE 1" position and valve 91 is OPEN to the IBC position.
- 1.5 **CONNECT** Supply Hose to Q1.

- 1.6 **CHECK** CONTAINMENT VESSEL pressure. **PERFORM** one of the following:
 - 1.6.1 When Nitrogen Regulator psig exceeds CONTAINMENT VESSEL psig, **OPEN** valve 28. **PROCEED** to Step 1.7.
 - 1.6.2 When CONTAINMENT VESSEL pressure exceeds Nitrogen Regulator psig, **PERFORM** the following:
 - 1.6.2.1 **ADJUST** Nitrogen Regulator until it exceeds CONTAINMENT VESSEL psig by 115 psig.
 - 1.6.2.2 **OPEN** valve 28.
- 1.7 **OPEN** valves 27, 1, and 3.
- 1.8 **VERIFY** valve 6 is OPEN.
- 1.9 **START** 500 psig differential purge.
 - 1.9.1 Slowly **OPEN** valve 5 until CONTAINMENT VESSEL is heard to begin venting.
 - 1.9.2 **MONITOR** transfer lines for blockage and **PROCEED** as follows:
 - 1.9.2.1 **DETECT** no blockage. **PROCEED** to Step 1.10.
 - 1.9.2.2 **DETECT** possible blockage by EDS CONTAINMENT VESSEL pressure showing no change or slight change. **PROCEED** as follows:
 - 1.9.2.2.1 **BACK FLUSH** Vessel Effluent Hose using nitrogen. **CLOSE** valves 3 and 93.
 - 1.9.2.2.2 **OPEN** valve 31 (forces nitrogen through valves 91, 5, and 6). **CLOSE** valve 31.
 - 1.9.2.2.3 **OPEN** valve 3.
 - 1.9.2.2.4 **OPEN** valve 93 to vent.
 - 1.9.2.2.5 **RETURN** to Step 1.9.1.

- 1.10 **CEASE** 500 psig purge of CONTAINMENT VESSEL by closing valve 3.
- 1.11 **VENT** CONTAINMENT VESSEL by performing one of the following:
 - 1.11.1 When collecting a vapor sample and CONTAINMENT VESSEL pressure is between 3 and 5 psig, **CLOSE** valve 5. **PROCEED** to Step 1.12.
 - 1.11.2 When not collecting a vapor sample, **VENT** CONTAINMENT VESSEL until CONTAINMENT VESSEL pressure is 0 psig. **CLOSE** valve 5.
- 1.12 **CLOSE** valve 28.
- 1.13 Slowly **OPEN** valve 31 to vent Supply Hose. **CLOSE** valves 1, 27, and 31.
- 1.14 **RECORD** nitrogen cylinder pressure (psig) shown on nitrogen cylinder regulator gauge.

CALLOUT: Announce nitrogen cylinder pressure reading.

- 1.15 **PROCEED** as follows:
 - 1.15.1 When collecting a vapor sample, **PROCEED** to Step 2.0.
 - 1.15.2 When not collecting a vapor sample, **PROCEED** to Procedure 15.
- 2.0 **PREPARE** to collect headspace vapor sample in a vapor sample bag.
 - 2.1 **VERIFY** vapor bag sample valve assembly is installed.
 - 2.2 **VERIFY** all valves on CONTAINMENT VESSEL are CLOSED except valve 6.

- 2.3 **NOTE** CONTAINMENT VESSEL pressure. **PERFORM** one of the following:
- 2.3.1 When CONTAINMENT VESSEL pressure is between 3 and 5 psig, **PROCEED** to Step 2.4.
 - 2.3.2 When CONTAINMENT VESSEL pressure is less than 3 psig, **PERFORM** the following:
 - 2.3.2.1 **VERIFY** Supply Hose is connected to Q1.
 - 2.3.2.2 **OPEN** valves 28, 27, and 1.
 - 2.3.2.3 **OPEN** valve 3 and when CONTAINMENT VESSEL pressure is between 3 to 5 psig, **CLOSE** valve 3.
 - 2.3.2.4 **CLOSE** valve 28.
 - 2.3.2.5 **OPEN** valve 31 to vent Supply Line and then **CLOSE** valves 31, 27, and 1.
 - 2.3.2.6 **PROCEED** to Step 2.4.
 - 2.3.3 When CONTAINMENT VESSEL pressure exceeds 5 psig, **PERFORM** the following:
 - 2.3.3.1 **VERIFY** Vessel Effluent Hose is connected to Q5.
 - 2.3.3.2 **VERIFY** valve 80 is open to "WASTE 1" position and valve 91 is OPEN to the IBC position.
 - 2.3.3.3 Slowly **OPEN** valve 5 and when CONTAINMENT VESSEL pressure is between 3 and 5 psig, **CLOSE** valve 5.
- 2.4 **VERIFY** vapor sample bag has correct sample label on it. **ATTACH** vapor sample bag to vapor sample bag adapter.

CALLOUT: Announce containment vessel pressure and temperature.

- 2.5 **COLLECT** headspace vapor sample.
 - 2.5.1 **OPEN** valve 3 and vapor sample bag valve in sequential order.
 - 2.5.2 Slowly **OPEN** valve 2 until vapor sample bag inflates with approximately a 10-liter vapor sample. Immediately **CLOSE** valve 2.
 - 2.5.3 **CLOSE** valve 3 and vapor sample bag valve in sequential order.
 - 2.5.4 **REMOVE** vapor sample bag and **TRANSFER** vapor sample bag to sample table.

CALLOUT: Announce time vapor sample bag is removed from containment vessel door.

- 2.5.5 **PERFORM** one of the following:
 - 2.5.5.1 When further vapor samples in vapor sample bags are required, **PERFORM** Steps 2.3 through 2.5.4 and then **PROCEED** to Step 2.5.5.2.
 - 2.5.5.2 When no more vapor samples are required, **PERFORM** the following:
 - 2.5.5.2.1 Slowly **OPEN** valve 31 to vent Supply Hose and then **CLOSE** valve 31.
 - 2.5.5.2.2 **DISCONNECT** Supply Hose from Q1 and **CONNECT** it to Hose Docking Station.

- 3.0 **PROCEED** to Procedure 15.

SPECIAL REQUIREMENTS:

1. Label sample containers IAW the Sampling and Analysis Plan.
2. Air monitoring must be in place unless all sample containers are decontaminated.
3. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Secondary container	as required
Decontaminant pail	1 each
Rinse pail	1 each
Chain-of-custody documents	as required
Sample packaging	as required
Liquid waste drums	as required
Household bleach (5 percent)	as required
Rags	as required
Vessel rotation control key	1 each
Primary tool kit	1 each
Flex hoses	as required
EDS operator log	1 each
Indelible ink pen	1 each
Nitrogen gas cylinder	1 each
Nitrogen pressure regulator	1 each
Vapor sample bag	as required
Vapor sample bag adapter	1 each
Wrench, 3/4-inch open-end	1 each
Wrench, 5/8-inch open-end	1 each

PROCEDURE 15
OPEN EDS CONTAINMENT VESSEL DOOR

The purpose of this procedure is to open the EDS containment vessel door after removal of liquid waste.

PRECONDITIONS:

1. Setup and daily startup checklists have been complete.
2. Air monitoring must be operational.
3. PPE during drum transfer is to be worn IAW Annex G.
4. EDS Crew Supervisor must consult with onsite RCMD representative to ensure appropriate parameters are met before the EDS containment vessel door is opened.

WARNINGS

VERIFY PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED.

NEVER OPEN CONTAINMENT VESSEL DOOR WHEN CONTAINMENT VESSEL IS PRESSURIZED TO ANY LEVEL ABOVE ATMOSPHERIC PRESSURE. INTERNAL PRESSURE MAY FORCE CONTAINMENT VESSEL DOOR TO OPEN PREMATURELY AS CLAMPS ARE LOOSEMED.

REMOVE CLAMP CONTROL KEY BEFORE ATTEMPTING TO PRY APART THE CLAMP HANGER ASSEMBLIES OR BEFORE USING THE SCREW DRIVE WHEEL.

NEVER STAND OR PLACE ANY PARTS OF BODY IN LINE WITH THREADED RODS WHEN HYDRAULIC NUTS ARE UNDER PRESSURE.

FAILURE TO DON LEATHER GLOVES MAY CAUSE RUBBER GLOVES TO BE COMPROMISED WHEN COMING INTO CONTACT WITH SHARP EDGES.

USE TWO OPERATORS WHEN CLOSING CONTAINMENT VESSEL DOOR.

DUE TO EXTREME TEMPERATURES, PERSONNEL SHOULD AVOID DIRECT SKIN CONTACT WITH CONTAINMENT VESSEL.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

CALLOUT: EDS Crew Supervisor will consult with onsite RCMD representative to verify parameters are met before the containment vessel door is opened.

1.0 **PROCEED** as follows:

1.1 When CONTAINMENT VESSEL pressure is at atmospheric pressure, **PROCEED** to Step 1.2.5.

1.2 When CONTAINMENT VESSEL pressure is not at atmospheric pressure, **PERFORM** the following:

1.2.1 **VERIFY** valve 80 is OPEN to "WASTE 1" position.

- 1.2.2 **VERIFY** valve 91 is OPEN to IBC.
- 1.2.3 **VERIFY** Vessel Effluent Hose is connected to Q5.
- 1.2.4 Slowly **OPEN** valve 5 and when CONTAINMENT VESSEL pressure is at atmospheric pressure, **CLOSE** valve 5.
- 1.2.5 **VERIFY** Supply Hose is connected to Hose Docking Station.
- 1.2.6 **DISCONNECT** Vessel Effluent Hose from Q5 and **CONNECT** it to Hose Docking Station.

Caution

Loose tools or other hardware left on top of or underneath rotating containment vessel may be damaged.

Note

Containment vessel will only stop during normal operations in the HOME, SAMPLE, FILL/DRAIN, or FILL position after rotating in a counterclockwise direction.

- 2.0 **POSITION** CONTAINMENT VESSEL in the HOME position.
 - 2.1 **VERIFY** four PROCESS SHUTDOWN buttons are out, red STEAM LINE MOTION FAULT is not illuminated, and green VESSEL ROTATION CONTROL ON light is illuminated on VESSEL CONTROL PANEL.
 - 2.2 **VERIFY** five green INTERLOCKS READY lights are illuminated on the Docking Station.
 - 2.3 **VERIFY** HANGERS STOWED light is illuminated (clamp hangers are in STOWED position).

Notes

Vessel rotation control key must be inserted and turned to AUTO or MANUAL position before containment vessel will rotate.

Containment vessel will not start rotating unless all six interlock lights are illuminated and containment vessel door is closed. However, containment vessel will rotate in BYPASS mode.

- 2.4 **INSERT** and **TURN** Vessel Rotation Control Key in AUTO/OFF/MAN switch to AUTO position (green AUTO READY light, green FILL button, and red HALT light illuminate).
- 2.5 **VERIFY INTERLOCKS** key switch is set to ON (green INTERLOCKS READY light is illuminated).

Note

Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.

- 2.6 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation (green ROTATE button illuminates and red HALT button goes off).
- 2.7 **PUSH** green HOME button to stop CONTAINMENT VESSEL in HOME position (green HOME button illuminates and green ROTATE button goes off).
- 2.8 **TURN OFF** and **REMOVE** Vessel Rotation Control Key.

WARNING

WHEN CONTAINMENT VESSEL TEMPERATURE EXCEEDS 65°C, DO NOT OPEN CONTAINMENT VESSEL DOOR WITHOUT FIRST CONSULTING WITH COMMAND POST. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

3.0 **PREPARE** to open CONTAINMENT VESSEL door.

3.1 **LIFT UP** DOOR OPEN INTERLOCK and **RAISE** CONTAINMENT VESSEL support jack to upright position.

Cautions

Do not turn support jack wheel crank more than 15 revolutions after Door Open Interlock makes contact with bottom of door hinge. Doing so may result in damage to the containment vessel door clamps, clamp hangers, and drive gearbox.

Verify bottom edge of door open interlock is above top edge of the lower portion of vessel door hinge before attempting to open vessel door to avoid possibly damaging door open interlock.

3.2 **TURN** support jack wheel crank clockwise until DOOR OPEN INTERLOCK makes contact with bottom of door hinge.

3.3 **TURN** jack wheel clockwise until CONTAINMENT VESSEL door hinge is level.

3.4 **POSITION** debris pan under CONTAINMENT VESSEL door, open-head solids waste drum and cleaning materials.

Notes

Clamp control key is the same key used in the vessel rotation control panel.

Use of clamp hanger control pendant may be required when local control mode is not operating correctly. See Annex D.

- 4.0 **ATTACH** CLAMP HANGER ASSEMBLIES to CONTAINMENT VESSEL door clamps.
 - 4.1 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.
 - 4.2 **TURN** amber speed selector switch on CLAMP HANGER DRIVE CONTROL Panel to FAST.
 - 4.3 **PUSH** and **HOLD** green IN button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel.
 - 4.4 When CLAMP HANGER ASSEMBLIES are approximately 6 inches from outer edge of clamp slide locks on top of door clamps, **RELEASE IN** button.
 - 4.5 **TURN** amber speed selector switch on CLAMP HANGER DRIVE CONTROL Panel to SLOW.

Caution

When leading edge of right CLAMP HANGER is driven beyond the interior edge of the CLAMP SLIDE LOCK, binding will occur, resulting in possible equipment damage.

- 4.6 **PUSH** and **HOLD** green IN button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel and when leading edge of the right CLAMP HANGER is flush with interior edge of CLAMP SLIDE LOCK, **RELEASE** IN button and **PERFORM** one of the following:
- 4.6.1 When CLAMP HANGER ASSEMBLIES are free and not bound, **PUSH** both CLAMP HANGER ASSEMBLIES inward until clamp slide locks are fully enclosed in CLAMP HANGERS and pins are centered in CLAMP PIN DRIVE ASSEMBLY cutouts. **PROCEED** to Step 4.7.
 - 4.6.2 When binding has occurred and the CLAMP HANGERS cannot move to center, **PERFORM** the following:
 - 4.6.2.1 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and **REMOVE**.
 - 4.6.2.2 **SWITCH** main disconnect switch to OFF position.
 - 4.6.2.3 **REMOVE** power connector for the screw drive motor from the junction box.
 - 4.6.2.4 **TURN** hand wheel counterclockwise to free the binding of the CLAMP HANGER LEAD SCREW.
 - 4.6.2.5 **CONNECT** power connector for the screw drive motor in the junction box.
 - 4.6.2.6 **SWITCH** main disconnect switch to ON position.
 - 4.6.2.7 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.
 - 4.6.2.8 **PUSH** green OUT button to move CLAMP PIN DRIVE ASSEMBLIES until pins are centered in CLAMP HANGER ASSEMBLIES cutouts.

- 4.7 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and **REMOVE**.
- 4.8 Simultaneously **ROTATE** the clamp hanger adjustment wheels to the left (Raise) until door clamps are fully raised.

Note

Hydraulic Nut Subsystem will not operate unless green Hangers Closed light is illuminated.

- 5.0 **START** HYDRAULIC NUT SUBSYSTEM.
 - 5.1 **CONNECT** Hydraulic Pump Hose to hydraulic manifold.
 - 5.2 **TURN** red PRESSURE switch on VESSEL CONTROL PANEL to HIGH.
 - 5.3 **PUSH** green ON button on HYDRAULIC NUT PUMP Panel to start hydraulic pump.

Note

To monitor hydraulic nuts, pump operator should be positioned in front of containment vessel.

- 6.0 **RELEASE** hydraulic nuts.
 - 6.1 **VERIFY** all personnel are clear of hydraulic nuts and hydraulic hoses.
 - 6.2 **PUSH** and **HOLD** ADVANCE button on HYDRAULIC NUT PUMP Panel to tighten hydraulic nuts and **MONITOR** all four hydraulic nuts.

Note

Pump is set to automatically turn off when pressure reaches 7,000 psig.

- 6.3 When hydraulic pump shuts off, **CHECK** pump pressure gauge for reading between 5,900 to 7,000 psig.
- 6.4 **DON** leather gloves.

- 6.5 **TURN** locking rings counterclockwise simultaneously to loosen top and bottom until all four are flush with piston end and then **BACK OFF** 1/4 turn.
- 6.6 **PUSH** and **HOLD** RETRACT button on HYDRAULIC NUT PUMP Panel to release hydraulic pressure.
- 6.7 **VERIFY** pressure gauge reads approximately 0 psig. **RELEASE** RETRACT button when hydraulic nuts are fully seated against locking rings.
- 6.8 **PUSH** and **HOLD** RETRACT button to release any residual pressure. **RELEASE** RETRACT button.
- 7.0 **STOP** HYDRAULIC NUT SUBSYSTEM.
 - 7.1 **PRESS** red OFF button on HYDRAULIC NUT PUMP Panel.
 - 7.2 **DISCONNECT** Hydraulic Pump Hose from hydraulic manifold and **CONNECT** it to Hose Docking Station.

CALLOUT: Obtain permission to open containment vessel door.

WARNING

FAILURE TO DON HEARING PROTECTION MAY CAUSE HEARING LOSS WHILE OPERATING NUT RUNNER DRIVERS. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 8.0 **OPEN** CONTAINMENT VESSEL door.
 - 8.1 **VERIFY** leather gloves are worn.
 - 8.2 **PLACE** drive switch on large low speed high torque nut runner driver to clockwise position.
 - 8.3 **ATTACH** nut runner driver to lower nut runner using 1-3/8-inch socket to nut runner HIGH TORQUE nut.

- 8.4 **DEPRESS** trigger and **LOOSEN** lower nut runner. **RELEASE** trigger.
- 8.5 **REMOVE** nut runner driver from lower nut runner and **ATTACH** nut runner driver to upper nut runner HIGH TORQUE nut.
- 8.6 **DEPRESS** trigger and **LOOSEN** upper nut runner. **RELEASE** trigger.
- 8.7 **REMOVE** nut runner driver from upper nut runner and **PLACE** it in storage location.
- 8.8 **PLACE** drive switch on small high speed low torque nut runner driver to clockwise position.
- 8.9 **ATTACH** nut runner driver to upper nut runner HIGH SPEED nut.
- 8.10 **DEPRESS** trigger. **RUN** nut runner to within 1/2 inch of outer end of rods and **RELEASE** trigger.
- 8.11 **REMOVE** nut runner driver from upper nut runner and **ATTACH** it to lower nut runner HIGH SPEED nut. **DEPRESS** trigger. **RUN** nut runner to within 1/2 inch of outer end of rods and **RELEASE** trigger.
- 8.12 **REMOVE** nut runner driver from lower nut runner and **PLACE** it in storage location.
- 8.13 Simultaneously **ROTATE** the clamp hanger adjustment wheels to the left (Raise) 1/2 turn.

Notes

Clamp control key is the same key used in the vessel rotation control panel.

Use of clamp hanger control pendant may be required when local control mode is not operating correctly. See Annex D.

- 8.14 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.
- 8.15 **VERIFY** amber speed selector switch on CLAMP HANGER DRIVE CONTROL Panel is turned to SLOW.

Caution

Prying door clamp hanger assemblies apart may damage metal surfaces over time.

Note

In the following step it may be necessary to pry the clamp hanger assemblies apart so the clamp hanger motor will be able to move the assemblies.

8.16 **OPEN** door clamps.

8.16.1 **PUSH** and **HOLD** green OUT button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel to open door clamps. **PROCEED** as follows:

8.16.1.1 When door clamps move apart, **PROCEED** to Step 8.16.2.

8.16.1.2 When door clamps do not move apart, **PERFORM** the following:

8.16.1.2.1 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and **REMOVE**.

8.16.1.2.2 **ROTATE** LEAD SCREW DRIVE WHEEL to free door clamp hanger assemblies. **RETURN** to Step 8.9.

8.16.2 **RELEASE** button when door clamps are clear of CONTAINMENT VESSEL door and 1/4 to 1/2 inch away from DOOR OPEN INTERLOCK.

8.17 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and **REMOVE**.

Note

Monitor containment vessel door opening IAW Local Monitoring Plan.

8.18 **COORDINATE** with Monitoring, if required. **OPEN CONTAINMENT VESSEL** door just enough to cut detonator lead wires. **PROCEED** as follows:

8.18.1 When detonator lead wires were able to be cut, **ALLOW** CONTAINMENT VESSEL door to drip/drain while positioned over debris pan. **PROCEED** as follows:

8.18.1.1 When CONTAINMENT VESSEL door is not obstructed, **PROCEED** to Step 8.19.

8.18.1.2 When CONTAINMENT VESSEL door is obstructed, **NOTIFY** command post and **REQUEST** permission to proceed to Step 10.0.

8.18.2 When detonator lead wires were not able to be cut, **PERFORM** the following:

8.18.2.1 **ATTEMPT** to free CONTAINMENT VESSEL door of obstruction and **PROCEED** as follows:

8.18.2.1.1 When CONTAINMENT VESSEL door is free of obstruction, **PERFORM** the following:

8.18.2.1.1.1 **CUT** detonator lead wires.

8.18.2.1.1.2 **ALLOW** CONTAINMENT VESSEL door to drip/drain while positioned over debris pan.

8.18.2.1.1.3 **PROCEED** to Step 8.19.

8.18.2.1.2 When CONTAINMENT VESSEL door is obstructed, **NOTIFY** command post and **REQUEST** permission to proceed to Step 10.0.

- 8.19 **OPEN** CONTAINMENT VESSEL door fully and **USE** a catch tray for any material that may drip from CONTAINMENT VESSEL door inner surface.

CALLOUT: Announce time when containment vessel door is opened.

- 9.0 **PROCEED** to Procedure 16.

UNUSUAL PROCEDURE:

- 10.0 **CLOSE** and **SEAL** obstructed CONTAINMENT VESSEL door.

- 10.1 **RINSE** CONTAINMENT VESSEL interior to remove any material that could possibly migrate and/or is present between Grayloc seal and sealing surfaces.

WARNINGS

CONTAINMENT VESSEL DOOR PRESENTS CRUSHING AND PINCHING HAZARDS. BE AWARE OF BODY POSITION WHEN PERFORMING THE FOLLOWING STEPS.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 10.2 **VERIFY** nothing hinders closure of CONTAINMENT VESSEL door and **CLOSE** CONTAINMENT VESSEL door.
- 11.0 **SECURE** CONTAINMENT VESSEL door clamps.
- 11.1 **VERIFY** four PROCESS SHUTDOWN buttons are out.
- 11.2 **VERIFY** hydraulic nuts are fully retracted.

Notes

Clamp control key is the same key used in the vessel rotation control panel.

Use of clamp hanger control pendant may be required when local control mode is not operating correctly. See Annex D.

When closing containment vessel door, it may be necessary for an operator to maintain pressure on the door until door clamps are closed.

- 11.3 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.
- 11.4 **TURN** amber speed selector switch on CLAMP HANGER DRIVE CONTROL Panel to SLOW.
- 11.5 **PUSH** and **HOLD** green IN button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel and **RELEASE** IN button when CLAMP HANGER LEAD SCREW stops rotating.
- 11.6 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and remove.
- 12.0 **TIGHTEN** hydraulic nuts on CONTAINMENT VESSEL door clamp.
 - 12.1 **DON** leather gloves.
 - 12.2 **PLACE** drive switch on small high speed low torque nut runner driver to counterclockwise position.
 - 12.3 **ATTACH** nut runner driver using 1-3/8-inch socket to upper nut runner HIGH SPEED nut.
 - 12.4 **DEPRESS** trigger and when nut runner driver stalls, **RELEASE** trigger.
 - 12.5 **REMOVE** nut runner driver from upper nut runner and **ATTACH** it to lower nut runner HIGH SPEED nut.
 - 12.6 **DEPRESS** trigger and when nut runner driver stalls, **RELEASE** trigger.
 - 12.7 **REMOVE** nut runner driver from upper nut runner and **PLACE** it in storage location.

Caution

Top and bottom gaps of clamp faces must be within 1/4-inch difference and closed to 2-1/2 inches or less. Inconsistent gaps may damage hydraulic nuts and result in seal leakage. Do not use screw drive wheel to close the gaps.

- 13.0 **COMPLETE** initial tightening of hydraulic nuts on CONTAINMENT VESSEL door clamp.
- 13.1 **PLACE** drive switch on large low speed high torque nut runner driver to counterclockwise position.
- 13.2 **ATTACH** nut runner driver to HIGH TORQUE nut and **ALTERNATE** tightening upper and lower nut runners 1/2 inch at a time until top and bottom gaps between clamp faces are 2-1/2 inches or less (green HANGERS CLOSED light illuminates).
- 13.3 **REMOVE** nut runner driver from nut runner and **PLACE** it in storage location.
- 13.4 **RECORD** upper and lower gap space measurement.

CALLOUT: Announce upper and lower gap measurements.

- 13.5 Simultaneously **ROTATE** clamp hanger adjustment wheels to the right (Lower) until the clamps rest on CONTAINMENT VESSEL door.

WARNING

NEVER ATTEMPT TO GRASP LEAKING HOSE UNDER PRESSURE WITH HANDS. THE FORCE OF ESCAPING HYDRAULIC FLUID COULD CAUSE SERIOUS INJURY. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Note

Hydraulic Nut Subsystem will not operate unless green Hangers Closed light is illuminated.

14.0 START HYDRAULIC NUT SUBSYSTEM.

- 14.1 **CONNECT** Hydraulic Pump Hose to hydraulic manifold.
- 14.2 **VERIFY** all three hydraulic nut hoses and Hydraulic Pump Hose are securely connected to hydraulic manifold, are not leaking, and red Hydraulic Nut Pump OFF button is illuminated.
- 14.3 **TURN** red PRESSURE switch on VESSEL CONTROL PANEL to LOW.
- 14.4 **PRESS** green ON button on HYDRAULIC NUT PUMP Panel to start hydraulic pump.
- 14.5 **VERIFY** all personnel are clear of hydraulic nuts and hydraulic hoses.
- 14.6 **PUSH** ADVANCE button on HYDRAULIC NUT PUMP Panel to advance hydraulic nuts by 1/4 to 1/2 inch and then **RELEASE** ADVANCE button.
- 14.7 **TURN** locking ring clockwise on each hydraulic nut until hand-tight.
- 14.8 **PUSH** and **HOLD** RETRACT button on HYDRAULIC NUT PUMP Panel to release hydraulic pressure.
- 14.9 **VERIFY** that pump pressure gauge reads approximately 0 psig and then **RELEASE** RETRACT button.
- 14.10 **PUSH** and **HOLD** RETRACT button to release any residual pressure. **RELEASE** RETRACT button.

15.0 **STOP** HYDRAULIC NUT SUBSYSTEM.

- 15.1 **PRESS** red OFF button on HYDRAULIC NUT PUMP Panel to stop hydraulic pump.
- 15.2 **DISCONNECT** Hydraulic Pump Hose from hydraulic manifold and **CONNECT** it to Hose Docking Station.
- 15.3 **RECORD** upper and lower gap space measurement.

CALLOUT: Announce upper and lower gap measurements.

16.0 **RELEASE** and **STOW** CLAMP HANGER ASSEMBLIES.

- 16.1 **VERIFY** clamp hanger adjustment wheels have been rotated to the right (Lower) so that clamp hanger rails are fully clear of clamp slide locks.

Notes

Clamp control key is the same key used in the vessel rotation control panel.

Use of clamp hanger control pendant may be required when local control mode is not operating correctly. See Annex D.

- 16.2 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.
- 16.3 **TURN** amber speed selector switch on CLAMP HANGER DRIVE CONTROL Panel to FAST.
- 16.4 **PUSH** and **HOLD** green OUT button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel, and **RELEASE** OUT button when CLAMP HANGER ASSEMBLIES are approximately 6 inches from each end of the linear bearing rod.
- 16.5 **TURN** amber speed selector switch on CLAMP HANGER DRIVE CONTROL Panel to SLOW.
- 16.6 **PUSH** and **HOLD** green OUT button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel, and **RELEASE** OUT button when green HANGERS STOWED POSITION light illuminates.

- 16.7 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and **REMOVE** it.
- 16.8 **RECORD** time CONTAINMENT VESSEL door closed and secured.

CALLOUT: Announce time containment vessel door is closed and secured.

Caution

Loose tools or other hardware left on top of or underneath rotating containment vessel may be damaged.

- 17.0 **OPERATE** ROTARY AGITATION SUBSYSTEM.
 - 17.1 **VERIFY** Jack Support has been lowered. **VERIFY** four PROCESS SHUTDOWN buttons are out and red STEAM LINE MOTION FAULT is not illuminated.
 - 17.2 **VERIFY** green VESSEL ROTATION CONTROL ON button on VESSEL CONTROL PANEL is illuminated.
 - 17.3 **VERIFY** five green INTERLOCK READY lights are illuminated on the Hose Docking Station.
 - 17.4 **VERIFY** CLAMP INTERLOCK READY light is illuminated.

Notes

Use of vessel rotation control pendant may be required when auto rotation mode is not operating correctly. See Annex D for using vessel rotation control pendant.

Vessel rotation control key must be inserted and turned to AUTO or MANUAL position before containment vessel will rotate.

Containment vessel will only stop during normal operations in HOME, SAMPLE, or FILL/DRAIN position after moving in a counterclockwise direction.

- 17.5 **INSERT** and **TURN** Vessel Rotation Control Key in AUTO/OFF/MAN switch to AUTO position.
- 17.6 **VERIFY** INTERLOCKS key switch is set to ON.
- 17.7 **VERIFY** status of green INTERLOCKS READY light and **PROCEED** as follows:
 - 17.7.1 When green INTERLOCKS READY light is illuminated, **PROCEED** to Step 17.8.
 - 17.7.2 When green INTERLOCKS READY light is not illuminated, **PERFORM** the following:
 - 17.7.2.1 **VERIFY** all hoses in Hose Docking Station are secure.
 - 17.7.2.2 **VERIFY** HANGERS STOWED light is illuminated and **PROCEED** as follows:
 - 17.7.2.2.1 When green INTERLOCKS READY light is illuminated, **PROCEED** to Step 17.8.
 - 17.7.2.2.2 When green INTERLOCKS READY light is not illuminated, **REQUEST** permission to turn Interlocks Control Key to BYPASS position (BYPASS light illuminates).

Notes

Rotation may be stopped at any time by pushing HALT button on vessel rotation control panel.

Containment vessel will not rotate unless all six interlock lights are illuminated and containment vessel door is closed. However, containment vessel will rotate if placed in BYPASS mode.

17.8 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation (green ROTATE button illuminates and red HALT button goes off).

17.9 **PROCEED** as follows:

17.9.1 When CONTAINMENT VESSEL is rotating correctly, **PROCEED** to Step 17.10.

17.9.2 When CONTAINMENT VESSEL is not rotating correctly, **PERFORM** one of the following.

17.9.2.1 **PERFORM** troubleshooting procedures IAW O&M Manual for P2 Series, Table 3-1, Malfunction No. 4.

17.9.2.2 **PROCEED** to Annex D to manually rotate CONTAINMENT VESSEL using VESSEL ROTATION CONTROL PENDANT.

17.9.2.3 **PROCEED** as directed.

17.10 **RECORD** rotation start time.

CALLOUT: Announce time containment vessel rotation began.

18.0 **STOP** CONTAINMENT VESSEL in the HOME position.

18.1 **PUSH** green HOME button to stop CONTAINMENT VESSEL in HOME position.

18.2 **TURN OFF** and **REMOVE** Vessel Rotation Control Key.

19.0 **RETURN** to Step 3.0.

SPECIAL REQUIREMENTS:

1. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Spill containment tray	1 each
Catch tray	1 each
Liquid waste drum	as required
Solids waste drum	as required
Household bleach (5 percent)	as required
Rags	as required
Primary tool kit	1 each
Strap wrench	1 each
Spanner bar, 30-1/4-inch	1 each
Leather gloves	as required
Spanner wrench	1 each
EDS operator log	1 each
Indelible ink pen	1 each

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PROCEDURE 16
REMOVE SOLID WASTE FROM EDS CONTAINMENT VESSEL

The purpose of this procedure is to remove the remaining solid materials from the EDS containment vessel and to collect a representative sample of the solid wastes, when directed.

PRECONDITIONS:

1. Laboratory has provided sampling equipment per Laboratory Quality Control Plan.
2. Receipt of samples has been coordinated with laboratory and courier.
3. Solid waste containers are available.
4. Setup and daily startup checklists have been completed.
5. Decontaminant and water pails must be positioned on EDS Trailer and at sample table.
6. Initial survey of EDS containment vessel contents must be made by an Explosive Operator.

WARNINGS

EXERCISE CARE WHEN HANDLING FRAGMENTS.

FAILURE TO DON LEATHER GLOVES MAY CAUSE RUBBER GLOVES TO BE COMPROMISED WHEN COMING INTO CONTACT WITH SHARP EDGES.

PPE LEVELS WILL BE WORN ACCORDING TO THE TASK BEING PERFORMED AND IN CONJUNCTION WITH MONITORING RESULTS IAW ANNEX G, PPE LEVELS.

NEVER STAND OR PLACE ANY PARTS OF THE BODY IN LINE WITH CABLE, GRAPPLER BAR, OR CAM-LOCK LIFTING CLAMP WHEN EDS FSS RETRIEVAL TOOL IS BEING USED.

EXERCISE EXTREME CAUTION WHEN VISUALLY INSPECTING CONTAINMENT VESSEL CONTENTS FOR EXPLOSIVE COMPONENTS, PROPELLANTS, AND/OR SOLIDIFIED RESIDUAL AGENT.

FAILURE TO PLACE AFSS COMPONENTS IN A SAFE LOCATION (CATCH TRAY) MAY CAUSE A SLIP, TRIP, OR FALL HAZARD.

SERVICEABLE AFSS COMPONENTS WILL BE DECONTAMINATED IN THE SAME MANNER AS OTHER CONTAINMENT VESSEL PARTS.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

1.0 **ASSESS** CONTAINMENT VESSEL interior contents.

1.1 **SURVEY** CONTAINMENT VESSEL contents for hazardous materiel. **PROCEED** as follows:

1.1.1 When no hazardous components or solidified residual agent are seen, **PROCEED** to Step 1.2.

1.1.2 When explosive components/propellants/intact munition(s) and/or a solidified residual agent are seen, **PROCEED** to Step 5.0.

1.2 **DON** leather gloves.

Caution

Do not scratch or otherwise damage containment vessel sealing surfaces when removing debris from containment vessel.

- 1.2.1 **REMOVE** large metal fragment pieces from CONTAINMENT VESSEL by performing one of the following:
 - 1.2.1.1 When manually removing large metal fragment pieces from CONTAINMENT VESSEL, **REMOVE** and **PLACE** them in solids waste drum. **PROCEED** to Step 1.2.2.
 - 1.2.1.2 When using EDS FSS Retrieval Tool, **PROCEED** as follows:

Caution

Correctly secure EDS FSS Retrieval Tool under skid sump cross member to prevent damage to deck grating.

- 1.2.1.2.1 **VERIFY** EDS FSS Retrieval Tool is correctly attached under sump cross member.
- 1.2.1.2.2 **ATTACH** grappler bar or cam-lock lifting clamp to large metal piece(s), as needed.
- 1.2.1.2.3 **TURN** hand crank and **PULL** large metal piece(s) onto LOADING TABLE while using angled pry bar to control piece(s).
- 1.2.1.2.4 **VERIFY** large metal piece(s) is stable on LOADING TABLE.
- 1.2.1.2.5 **REMOVE** grappler bar or cam-lock lifting clamp from large metal piece(s).
- 1.2.1.2.6 **PLACE** large metal piece(s) in solids waste drum.

1.2.1.2.7 **PERFORM** one of the following:

1.2.1.2.7.1 When EDS FSS Retrieval Tool is no longer needed, **PROCEED** to Step 1.2.1.2.8.

1.2.1.2.7.2 When EDS FSS Retrieval Tool is still needed, **RETURN** to Step 1.2.1.2.2.

1.2.1.2.8 **DETACH** EDS FSS Retrieval Tool from sump cross member.

1.2.1.2.9 **STORE** EDS FSS Retrieval Tool in appropriate location.

1.2.2 **RECORD** contents of CONTAINMENT VESSEL. **PROCEED** as follows:

CALLOUT: Describe contents of residue remaining in containment vessel (that is, burster components, fuze functioned, mustard heels, sludge, detonation results, and liquid residue). Is the fuze intact? Obtain photographs.

1.2.2.1 When no explosive components, propellants, or solidified residual agent are seen, **PROCEED** to Step 1.3.

1.2.2.2 When explosive components/intact munition(s) and/or solidified residual agent are seen, **PROCEED** to Step 5.0.

1.3 **PERFORM** one of the following:

1.3.1 When no representative sample of the solid materials in CONTAINMENT VESSEL is required, **PROCEED** to Step 2.0.

1.3.2 When a representative sample of solid materials in CONTAINMENT VESSEL is required, **PROCEED** as follows:

1.3.2.1 **DON** leather gloves. **COLLECT** and **PLACE** material in a sample container.

1.3.2.2 **CLOSE** sample container.

- 1.3.2.3 **RECORD** time sample was taken and solid sample container number.

CALLOUT: Announce solid sample container number and time sample taken. Verify Monitoring is aware of sample number.

- 1.3.2.4 **WIPE** exterior of solid sample container with bleach-saturated rag to decontaminate it.
- 1.3.2.5 **WIPE** exterior of solid sample container with water-saturated rag to rinse it.
- 1.3.2.6 **PLACE** used rags in waste bag, **PLACE** waste bag into open-head drum, and **ANNOTATE** open-head drum inventory.
- 1.3.2.7 **PACK** sample in secondary container/bag.

Note

Monitor item IAW local monitoring program.

- 1.3.2.8 **MONITOR** exterior of solid sample container. **RECORD** monitoring results.

CALLOUT: Announce sample container monitoring results.

- 1.3.2.9 **PERFORM** one of the following:
- 1.3.2.9.1 When monitoring results are below established limits, **PROCEED** to Step 1.3.2.10.
 - 1.3.2.9.2 When monitoring results are not below established limits, **RETURN** to Step 1.3.2.4.
- 1.3.2.10 **PLACE** packaged solid sample container into overpack, **SEAL** overpack, and **CARRY** to the PDS.
- 1.3.2.11 **COMPLETE** chain-of-custody documents, **ATTACH** chain-of-custody documents to packed sample, and **TRANSFER** to courier.

CALLOUT: Announce time sample container is ready for transport.

Note

When using AFSS, it is permissible to leave some debris in containment vessel when debris does not hamper further operations.

2.0 **REMOVE** solid waste from CONTAINMENT VESSEL.

2.1 **REMOVE** debris from CONTAINMENT VESSEL and **PLACE** debris into debris pan.

2.2 **INSPECT** remaining AFSS rods in AFSS MAIN UNIT IAW EDS P2 Series O&M Manual, Procedure CNV 21, Steps 2, 3, 7, and 8.

2.3 **REMOVE** unserviceable AFSS rods and **PLACE** in solids waste drum.

2.4 **RECORD** time solid waste removal from CONTAINMENT VESSEL is complete.

CALLOUT: Announce time solid waste removal from containment vessel is complete.

2.5 **PLACE** rags in waste bag, **PLACE** waste bag in open-head drum, and **ANNOTATE** open-head drum inventory.

3.0 **PROCEED** to Procedure 17.

ALTERNATE PROCEDURE:

WARNING

WHEN MUNITION(S)/EXPLOSIVE COMPONENTS DID NOT DETONATE DURING EXPLOSIVE BREACHING OF MUNITION, THESE ITEMS MAY STILL CONTAIN EXPLOSIVES. EXERCISE EXTREME CAUTION WHEN INSPECTING CONTAINMENT VESSEL CONTENTS FOR EXPLOSIVE COMPONENTS/INTACT MUNITION(S) AND/OR SOLIDIFIED RESIDUAL AGENT. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 4.0 When explosive components/intact munition(s) and/or solidified residual agent are encountered upon opening of CONTAINMENT VESSEL door after munition detonation, **PERFORM** one of the following:
 - 4.1 When explosive materiel and/or intact munition(s) are encountered upon opening CONTAINMENT VESSEL door, **PROCEED** to Step 5.0.
 - 4.2 When explosive materiel/components and/or intact munition(s) and solidified residual agent are encountered upon opening CONTAINMENT VESSEL door, **PROCEED** to Step 5.0.
 - 4.3 When only solidified residual agent is encountered upon opening CONTAINMENT VESSEL door, **PROCEED** to Step 6.0.

- 5.0 When explosive hazardous materiel/components and/or intact munition(s) are encountered, **PERFORM** one of the following:
 - 5.1 When explosive materiel/components found, **PERFORM** the following:
 - 5.1.1 **IDENTIFY** explosive components.
 - 5.1.2 **SEGREGATE** explosive components from other fragments in CONTAINMENT VESSEL.
 - 5.1.3 **PLACE** explosive components into separate wooden container containing cushioning material.

Note

Monitor item IAW local monitoring program.

- 5.1.4 **MONITOR** exterior of container. **APPLY** appropriate labels and **PROCESS** for transfer to a local authorized recipient for storage or final disposition.
- 5.1.5 **PROCEED** as follows:
 - 5.1.5.1 When intact munition(s) found, **PROCEED** to Step 5.2.
 - 5.1.5.2 When no intact munition(s) found; however, solidified residual agent is found, **PROCEED** to Step 6.0.
 - 5.1.5.3 When no intact munition(s) and no solidified residual agent are found, **RETURN** to Step 1.2.
- 5.2 When intact munition(s) found, **PERFORM** one of the following:
 - 5.2.1 When munition(s) not fuzed, **PROCEED** as follows:
 - 5.2.1.1 **PLACE** munition(s) into overpack.

Note

Monitor item IAW local monitoring program.

- 5.2.1.2 **MONITOR** munition(s). **RECORD** monitoring results.
- 5.2.1.3 **MONITOR** exterior surfaces of overpack. **RECORD** monitoring results.
- 5.2.1.4 **PROCEED** as directed.
- 5.2.2 When munition(s) is fuzed or partially fuzed, **PROCEED** as follows:
 - 5.2.2.1 **REQUEST** EOD support.

5.2.2.2 **CLOSE** CONTAINMENT VESSEL door.

5.2.2.2.1 **VERIFY** clamps are positioned so as not to interfere with movement of CONTAINMENT VESSEL door.

5.2.2.2.2 **DON** leather gloves.

WARNINGS

CONTAINMENT VESSEL DOOR PRESENTS CRUSHING AND PINCHING HAZARDS. BE AWARE OF BODY POSITION WHEN PERFORMING THE FOLLOWING STEPS.

TO PREVENT POSSIBLE INJURY, USE TWO OPERATORS WHEN CLOSING CONTAINMENT VESSEL DOOR.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

5.2.2.2.3 **CLOSE** Containment Vessel door.

5.2.2.3 **SECURE** CONTAINMENT VESSEL door clamps.

5.2.2.3.1 **VERIFY** four PROCESS SHUTDOWN buttons are out and red STEAM LINE MOTION FAULT light is not illuminated.

5.2.2.3.2 **VERIFY** hydraulic nuts are fully retracted.

WARNING

REMOVE CLAMP CONTROL KEY BEFORE ATTEMPTING TO PRY APART CLAMP HANGER ASSEMBLIES OR BEFORE USING SCREW DRIVE WHEEL. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Notes

Clamp control key is same key used in vessel rotation control panel.

Use of clamp hanger control pendant may be required when local control mode is not operating correctly. See Annex D.

When closing containment vessel door, it may be necessary for an operator to maintain pressure on door until door clamps are closed.

- 5.2.2.3.3 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.
- 5.2.2.3.4 **TURN** amber speed switch on CLAMP HANGER DRIVE CONTROL Panel to SLOW.
- 5.2.2.3.5 **PUSH** and **HOLD** green IN button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel and **RELEASE IN** button when CLAMP HANGER LEAD SCREW stops rotating.
- 5.2.2.3.6 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and remove.
- 5.2.2.4 **TIGHTEN** hydraulic nuts on CONTAINMENT VESSEL door clamp.
 - 5.2.2.4.1 **PLACE** drive switch on small high speed low torque nut runner driver to counterclockwise position.

- 5.2.2.4.2 **ATTACH** nut runner driver using 1-3/8-inch socket to upper nut runner HIGH SPEED nut.
- 5.2.2.4.3 **DEPRESS** trigger and when nut runner stalls, **RELEASE** trigger.
- 5.2.2.4.4 **REMOVE** nut runner driver from upper nut runner and **ATTACH** it to lower nut runner HIGH SPEED nut.
- 5.2.2.4.5 **DEPRESS** trigger and when nut runner stalls, **RELEASE** trigger.

Caution

Top and bottom gaps of clamp faces must be within 1/4-inch difference and closed to 2-1/2 inches or less. Inconsistent gaps may damage hydraulic nuts and result in seal leakage. Do not use screw drive wheel to close the gaps.

- 5.2.2.4.6 **PLACE** drive switch on large low speed high torque nut runner driver to counterclockwise position.
- 5.2.2.4.7 **ATTACH** nut runner driver to HIGH TORQUE nut and **ALTERNATE** tightening upper and lower nut runners 1/2 inch at a time until top and bottom gaps between clamp faces are 2-1/2 inches or less (green HANGERS CLOSED light illuminates).
- 5.2.2.4.8 **REMOVE** nut runner driver from nut runner and **PLACE** it in storage location.
- 5.2.2.4.9 **RECORD** upper and lower gap space measurement.

CALLOUT: Announce upper and lower gap measurements.

- 5.2.2.4.10 Simultaneously **ROTATE** clamp hanger adjustment wheels to the right (Lower) until the clamps rest on the CONTAINMENT VESSEL door.

WARNING

NEVER ATTEMPT TO GRASP LEAKING HOSE UNDER PRESSURE WITH HANDS. FORCE OF ESCAPING HYDRAULIC FLUID COULD CAUSE SERIOUS INJURY. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Note

Hydraulic Nut Subsystem will not operate unless green Hangers Closed light is illuminated.

5.2.2.5 START HYDRAULIC NUT SUBSYSTEM.

5.2.2.5.1 CONNECT Hydraulic Pump Hose to hydraulic manifold.

5.2.2.5.2 VERIFY all three hydraulic nut hoses and Hydraulic Pump Hose are securely connected to hydraulic manifold.

5.2.2.5.3 TURN red PRESSURE switch on VESSEL CONTROL panel to LOW.

5.2.2.5.4 PRESS green ON button on HYDRAULIC NUT PUMP Panel to start hydraulic pump.

WARNING

NEVER STAND OR PLACE ANY PARTS OF THE BODY IN LINE WITH THREADED RODS WHEN TENSIONER IS UNDER PRESSURE. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

5.2.2.5.5 VERIFY all personnel are clear of hydraulic nuts and hydraulic hoses.

- 5.2.2.5.6 **PUSH** and **HOLD** ADVANCE button on HYDRAULIC NUT PUMP Panel and **MONITOR** all four hydraulic nuts.
- 5.2.2.5.7 When hydraulic pump shuts off, **CHECK** hydraulic pump pressure gauge for reading between 5,000 and 5,300 psig.
- 5.2.2.5.8 **TURN** locking ring clockwise on each hydraulic nut until hand-tight.
- 5.2.2.5.9 **PUSH** and **HOLD** RETRACT button on HYDRAULIC NUT PUMP Panel to release hydraulic pressure.
- 5.2.2.5.10 **VERIFY** that pump pressure gauge reads approximately 0 psig and then **RELEASE** RETRACT button.
- 5.2.2.5.11 **PUSH** and **HOLD** RETRACT button to release any residual pressure. **RELEASE** RETRACT button.
- 5.2.2.6 **STOP** HYDRAULIC NUT SUBSYSTEM.
 - 5.2.2.6.1 **PRESS** red OFF button on HYDRAULIC NUT PUMP Panel to stop hydraulic pump.
 - 5.2.2.6.2 **DISCONNECT** Hydraulic Pump Hose from hydraulic manifold and **CONNECT** it to Hose Docking Station.
 - 5.2.2.6.3 **RECORD** upper and lower gap space measurement.

CALLOUT: Announce upper and lower gap measurements.

- 5.2.2.7 **RELEASE** and **STOW** CLAMP HANGER ASSEMBLIES.
 - 5.2.2.7.1 **VERIFY** clamp hanger adjustment wheels have been rotated to the right (Lower) so that clamp hanger rails are fully clear of clamp slide locks.

Notes

Clamp control key is same key used in vessel rotation control panel.

Use of clamp hanger control pendant may be required when local control mode is not operating correctly. See Annex D.

5.2.2.7.2 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.

5.2.2.7.3 **TURN** amber speed switch on CLAMP HANGER DRIVE CONTROL Panel to FAST.

5.2.2.7.4 **PUSH** and **HOLD** green OUT button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel and **RELEASE** OUT button when CLAMP HANGER ASSEMBLIES are approximately 6 inches from each end of the linear bearing rod.

5.2.2.7.5 **TURN** amber speed switch on CLAMP HANGER DRIVE CONTROL Panel to SLOW.

5.2.2.7.6 **PUSH** and **HOLD** green OUT button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel and **RELEASE** OUT button when green HANGERS STOWED POSITION light illuminates.

5.2.2.7.7 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and **REMOVE** it.

5.2.2.7.8 **RECORD** time CONTAINMENT VESSEL door closed and secured.

CALLOUT: Announce time containment vessel door closed and secured.

5.2.2.7.9 When explosive ordnance disposal (EOD) support arrives, **OPEN** CONTAINMENT VESSEL door IAW Procedure 15, Steps 4.0 through 8.17.

5.2.2.7.10 **PROCEED** as directed.

6.0 When solidified residual agent is encountered upon opening CONTAINMENT VESSEL door after munition detonation, **PERFORM** the following steps:

6.1 **DON** leather gloves.

Caution

Do not scratch or otherwise damage containment vessel sealing surfaces when removing debris from containment vessel.

6.2 **REMOVE** large metal fragment pieces from CONTAINMENT VESSEL by performing one of the following:

6.2.1 When manually removing large metal fragment pieces from CONTAINMENT VESSEL, **REMOVE** and **PLACE** them in solids waste drum. **PROCEED** to Step 6.3.

6.2.2 When using EDS FSS Retrieval Tool, **POSITION** EDS FSS Retrieval Tool on line with center of CONTAINMENT VESSEL.

Caution

Correctly secure EDS FSS Retrieval Tool under skid sump cross member to prevent damage to deck grating.

6.2.2.1 **VERIFY** EDS FSS Retrieval Tool is correctly attached under sump cross member.

6.2.2.2 **ATTACH** grapppler bar or cam-lock lifting clamp to large metal piece(s), as needed.

WARNING

NEVER STAND OR PLACE ANY PARTS OF THE BODY IN LINE WITH CABLE, GRAPPLER BAR, OR CAM-LOCK LIFTING CLAMP WHEN EDS FSS RETRIEVAL TOOL IS BEING USED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 6.2.2.3 **TURN** hand crank and **PULL** large metal piece(s) onto LOADING TABLE while using angled pry bar to control piece(s).
- 6.2.2.4 **VERIFY** large metal piece(s) is stable on LOADING TABLE.
- 6.2.2.5 **REMOVE** grappler bar or cam-lock lifting clamp from large metal piece(s).
- 6.2.2.6 **PLACE** large metal piece(s) in solids waste drum.
- 6.2.2.7 **PERFORM** one of the following:
 - 6.2.2.7.1 When EDS FSS Retrieval Tool is no longer needed, **PROCEED** to Step 6.2.2.8.
 - 6.2.2.7.2 When EDS FSS Retrieval Tool is still needed, **RETURN** to Step 6.2.2.2.
- 6.2.2.8 **DETACH** EDS FSS Retrieval Tool from sump cross member.
- 6.2.2.9 **STORE** EDS FSS Retrieval Tool in appropriate location.
- 6.3 **IDENTIFY** solidified residual agent (mustard heel has a crystallized tar-like appearance) not consumed during explosive breach of munition.
- 6.4 **SEGREGATE** solidified residual agent from remaining fragments in CONTAINMENT VESSEL with metal tongs and **PLACE** it into appropriate shipping container.

Note

Monitor item IAW local monitoring program.

- 6.5 **MONITOR** exterior of shipping container, **APPLY** appropriate labels, and **PROCESS** for transfer to a permitted disposal facility.

CALLOUT: Announce shipping container monitoring results.

- 6.6 **RETURN** to Step 1.3 and **RESUME** normal operations.

SPECIAL REQUIREMENTS:

1. Label sample containers IAW the Sampling and Analysis Plan.
2. Air monitoring must be in place unless all sample containers are decontaminated.
3. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Catch tray	1 each
Spill containment pan	1 each
Debris pan	1 each
Household bleach (5 percent)	as required
Rags	as required
Sample container or secondary container	as required
Chain-of-custody documents	as required
Sample packaging	as required
Lined wooden container	as required
Open-head drums	as required
Liquid waste drum	as required
Solids waste drum	as required
Tongs	1 each
Hoe	1 each
Waste bag	as required
Leather gloves	as required
EDS FSS Retrieval Tool	1 each
Primary tool kit	1 each
Portable Hydraulic Ram Kit	1 each
EDS operator log	1 each
Indelible ink pen	1 each
AFSS	1 each as required
- AFSS Main Unit	1 each
- AFSS rod	92 each
- Top support plate	1 each
- Bottom support plate	1 each

**PROCEDURE 17
CLEAN AND PREPARE EQUIPMENT**

The purpose of this procedure is to service, clean, and prepare the EDS equipment for the next munition(s) or for final servicing prior to departing the operations area.

PRECONDITIONS:

1. PPE must be worn IAW Annex G.
2. Air monitoring must be operational.
3. Laboratory has provided sampling equipment per Laboratory Quality Control Plan.

WARNINGS

PPE LEVELS WILL BE WORN ACCORDING TO THE TASK BEING PERFORMED AND IN CONJUNCTION WITH MONITORING RESULTS IAW ANNEX G, PPE LEVELS.

FAILURE TO DON LEATHER GLOVES MAY CAUSE RUBBER GLOVES TO BE COMPROMISED WHEN COMING INTO CONTACT WITH SHARP EDGES.

USE PROPER MATERIALS HANDLING TECHNIQUES AND/OR MATERIAL HANDLING EQUIPMENT WHEN MOVING HEAVY ITEMS.

REAGENT AND SOLVENT CHEMICALS ARE HAZARDOUS. WEAR APPROPRIATE PPE WHEN HANDLING REAGENTS AND SOLVENTS.

DO NOT DRAIN TO IBC WHEN LIQUID TEMPERATURE EXCEEDS 65°C.

FAILURE TO DON HEARING PROTECTION MAY CAUSE HEARING LOSS PERFORMING THE FOLLOWING STEPS.

USE TIE-DOWN STRAPS TO PROPERLY SECURE IBC.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

1.0 **SERVICE** CONTAINMENT VESSEL and CONTAINMENT VESSEL door.

1.1 **VERIFY** CONTAINMENT VESSEL is level with support jack in place.

Note

Rags and towels used during this procedure are considered operational waste and should be placed into the same plastic bag used in Step 15.1 for disposal.

1.2 **OBTAIN** and **PRE-POSITION** the following items next to opening side of CONTAINMENT VESSEL:

- Primary tool kit
- Open-head drum with lid and lid band removed
- Decontaminant pail with household bleach (5 percent)
- Rinse pail with water
- General-purpose detergent
- Designated cleaning fluid
- Spray bottle
- Soft-bristle test tube brush
- Rags or absorbent paper towels
- Debris pan
- Nonmetallic scouring pad
- Scrub brush
- Large plastic bags
- Sealable bags
- Duct tape.

1.3 **PRE-POSITION** debris pan under CONTAINMENT VESSEL door.

1.4 **PERFORM** gross decontamination of CONTAINMENT VESSEL and CONTAINMENT VESSEL door by spraying with household bleach, general-purpose detergent, or other designated cleaning fluid.

2.0 **REMOVE** O-ring from CONTAINMENT VESSEL door.

2.1 **DON** leather gloves.

2.2 **PRESS** a sharp metal awl into seal ring and pry out.

2.3 **CUT** O-ring in half, **DECONTAMINATE**, and **PLACE** into open-head drum.

- 2.4 **SPRAY** O-ring groove with household bleach, general-purpose detergent, or other designated cleaning fluid.

Note

Monitor item IAW local monitoring program.

- 3.0 **REMOVE** Grayloc seal from CONTAINMENT VESSEL and **RINSE** with water in debris pan. **PLACE** seal in large plastic bag and monitor.
- 4.0 **SCRUB** CONTAINMENT VESSEL interior and **RINSE** with water. **REPEAT** until clean.
- 5.0 **RINSE** CONTAINMENT VESSEL door with water.
- 6.0 When directed, **REMOVE** CONTAINMENT VESSEL door BLAST PLATE, BLAST COVER, and BLAST SHIELDS.
- 6.1 **REMOVE** BLAST COVER and **REMOVE** EXTERIOR DETONATOR SHORTING JACK from HIGH VOLTAGE FLANGE.
- 6.2 **REMOVE** BLAST PLATE.
- 6.3 Using 5/16-inch hex key or equivalent, **REMOVE** hex-head bolts holding BLAST COVER BASE and BLAST SHIELDS.
- 6.4 **CLEAN** with household bleach, general-purpose detergent, or other designated cleaning fluid and **RINSE** with water.
- 6.5 **DRY** component with paper towels.
- 6.6 **INSPECT** parts for serviceability.
- 6.7 **PLACE** unserviceable parts into sealable bag.
- 7.0 When directed, **REMOVE** spray nozzle from bottom of inside CONTAINMENT VESSEL door.
- 7.1 Using 3/4-inch deep well or equivalent socket, **REMOVE** spray nozzle from inside of EDS CONTAINMENT VESSEL door.
- 7.2 **CLEAN** spray nozzle with household bleach, general-purpose detergent, or other designated cleaning fluid and **RINSE** with water.

- 7.3 **DRY** spray nozzle with paper towels.
- 7.4 **INSPECT** spray nozzle for serviceability.
- 7.5 **PLACE** unserviceable nozzle into sealable bag.
- 8.0 When directed, **REMOVE** dip tubes and 1/2-inch male connectors from top and left side of inner CONTAINMENT VESSEL door.
 - 8.1 Using 7/8-inch crow's-foot with extension or equivalent wrench, **REMOVE** both dip tubes from inner CONTAINMENT VESSEL door. **REMOVE** 1/2-inch male connectors.
 - 8.2 **CLEAN** dip tubes with household bleach, general-purpose detergent, or other designated cleaning fluid and **RINSE** with water.
 - 8.3 **DRY** components with paper towels.
 - 8.4 **INSPECT** dip tubes and 1/2-inch male connectors for serviceability.
 - 8.5 **PLACE** unserviceable dip tubes and 1/2-inch male connectors into sealable bag.
- 9.0 **REMOVE** INTERIOR DETONATOR JACK ASSEMBLY.
 - 9.1 **PULL** INTERIOR DETONATOR JACK ASSEMBLY off interior feedthrough assembly banana plugs.
 - 9.2 **CLEAN** INTERIOR DETONATOR JACK ASSEMBLY with household bleach, general-purpose detergent, or other designated cleaning fluid and **RINSE** with water.
 - 9.3 **PLACE** INTERIOR DETONATOR JACK ASSEMBLY into open-head drum and **ANNOTATE** open-head drum inventory.
- 10.0 **CLEAN** exposed high voltage feedthroughs.
 - 10.1 **WIPE** soot or debris from each Teflon sleeve, banana plug, and ground rod surface with paper towels, cotton-tipped swabs, or equivalent. **CLEAN** feedthroughs with alcohol, if necessary.
 - 10.2 **CLEAN** hardware with household bleach, general-purpose detergent, or other designated cleaning fluid and **RINSE** with water.
 - 10.3 **DRY** components with paper towels.

- 10.4 **INSPECT** hardware for serviceability.
- 10.5 **PLACE** unserviceable hardware into sealable bag.

Note

If replacement of high voltage flange metal seal and O-ring is required, refer to O&M Manual for EDS P2R, Procedure CNV-18.

- 11.0 When directed, **REMOVE** high voltage feedthroughs from HIGH VOLTAGE FEEDTHROUGH FLANGE.
 - 11.1 Using 7/16-inch deep well or equivalent socket, **REMOVE** INTERIOR GROUND ROD/SPIDER assembly from inner EDS CONTAINMENT VESSEL door.
 - 11.2 Using 3/4-inch deep well or equivalent socket, **REMOVE** feedthrough nuts from HIGH VOLTAGE FEEDTHROUGH FLANGE.

Note

Two crew members may be required to remove the feedthroughs from the high voltage feedthrough flange.

- 11.3 Using a plastic hammer or equivalent, gently **TAP** inside end of banana plug toward outside of door. Simultaneously, **PULL/TWIST** from the outside using pliers on the banana hex plug.
- 11.4 Using 3/8-inch crow's foot or equivalent wrench, **REMOVE** exterior ground rod base from the HIGH VOLTAGE FEEDTHROUGH FLANGE.
- 11.5 **CLEAN** hardware with household bleach, general-purpose detergent, or other designated cleaning fluid with particular attention to the flared feedthrough seal area. **RINSE** with water.
- 11.6 **DRY** components with paper towels.
- 11.7 **INSPECT** hardware for serviceability.
- 11.8 **PLACE** unserviceable hardware into sealable bag.

Note

Monitor item(s) IAW local monitoring program.

- 12.0 **PLACE** reusable CONTAINMENT VESSEL door parts into sealable bag and monitor.
- 13.0 **PLACE** bag containing expendable/unserviceable CONTAINMENT VESSEL door parts into open-head drum.
- 14.0 **DECONTAMINATE** CONTAINMENT VESSEL door.
 - 14.1 **SPRAY** portholes, threaded holes, and drain and spray nozzle adapters with household bleach, general-purpose detergent, or other designated cleaning fluid.
 - 14.2 **SCRUB** remaining inside surface of CONTAINMENT VESSEL door with nonmetallic scouring pad to remove deposits that may have accumulated.
 - 14.3 **SCRUB** portholes, threaded holes, and drain and spray nozzle adapters using soft-bristle test tube brush. **PAY** particular attention to crevices.
 - 14.4 **CLEAN** residue from O-ring groove using a dry cotton-tipped swab, as needed.
 - 14.5 **CLEAN** CONTAINMENT VESSEL and CONTAINMENT VESSEL door sealing surfaces. **VERIFY** old N-7000 anti-seize coating is removed.
 - 14.6 **RINSE** CONTAINMENT VESSEL and CONTAINMENT VESSEL door with water.
- 15.0 **CLEAR** sample and drain lines with nitrogen.
 - 15.1 **PLACE** large plastic bag containing bleach-soaked paper towels around circumference of inner CONTAINMENT VESSEL door and **SEAL** with tape.
 - 15.2 **CONNECT** Supply Hose QS to Q1. **OPEN** valves 28 and 1.
 - 15.3 Slowly **OPEN** valve 3.
 - 15.4 When all liquids have been removed from vapor sample line, **CLOSE** valves 3 and 28.

- 15.5 Slowly **OPEN** valve 31 to release pressure.
- 15.6 **CLOSE** valves 1 and 31.
- 15.7 **REMOVE** Supply Hose from Q1 and **CONNECT** to Q8. **OPEN** valves 28 and 8.
- 15.8 Slowly **OPEN** valve 10.
- 15.9 When all liquid has been removed from liquid sample line, **CLOSE** valves 10 and 28.
- 15.10 Slowly **OPEN** valve 31 to relieve pressure.
- 15.11 **CLOSE** valves 10 and 31.
- 15.12 **REMOVE** Supply Hose from Q8 and **CONNECT** it to Q5. **VERIFY** valve 6 is open.
- 15.13 **OPEN** valve 28. Slowly **OPEN** valve 6.
- 15.14 When all liquid has been removed from drain line, **CLOSE** valves 6 and 35.
- 15.15 Slowly **OPEN** valve 31 to relieve pressure.
- 15.16 **CLOSE** valves 5 and 31.
- 15.17 **REMOVE** Supply Hose from Q33 and Q4.
- 15.18 **REMOVE** plastic bag from CONTAINMENT VESSEL door and **PLACE** into open-head drum.
- 16.0 **CLEAR** vacuum port on CONTAINMENT VESSEL door with compressed air.
 - 16.1 **CLOSE** valve 65 and **DISCONNECT** nut runner driver Air Hose from QA.
 - 16.2 **CONNECT** air hose with nozzle to QA and **OPEN** valve 65.
 - 16.3 **REMOVE** dust cap from V-F fitting on CONTAINMENT VESSEL door.
 - 16.4 **CLEAR** vacuum port with compressed air.

- 16.5 **INSTALL** dust cap on V-F fitting.
- 16.6 **CLOSE** valve 65.
- 16.7 **RELIEVE** pressure in air hose and **DISCONNECT** air hose from QA.
- 16.8 **DISCONNECT** nut runner driver Air Hose to QA.
- 17.0 **ALLOW** CONTAINMENT VESSEL and CONTAINMENT VESSEL door to dry.

WARNING

DO NOT DRAIN LIQUIDS FROM TANK 3 TO IBC WHEN TANK 3 TEMPERATURE EXCEEDS 65°C. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 18.0 **AGITATE** and **DRAIN** Tank 3.
 - 18.1 **VERIFY** valve 83 is CLOSED.
 - 18.2 **VERIFY** valve 80 is in "WASTE 2" position (white arrow on valve handle points to WASTE 2).
 - 18.3 **OPEN** valve 84.
 - 18.4 **OPEN** valves 82 and 86. **WAIT** 30 seconds. **OPEN** valve 83.
 - 18.5 **CLOSE** valve 84.
 - 18.6 **OBSERVE** tank 3 level gauge and when tank 3 is empty, **CLOSE** valves 86 and 82.
 - 18.7 **CLOSE** valve 83.

Caution

Pieces of metal and debris big enough to pick up and handle should be removed from debris pan and placed in open-head drum designated for solid waste. Debris larger than grit or shavings should not be run through the pan pump because of possible damage to strainer hose.

19.0 **CLEAN** debris pan.

19.1 **REMOVE** any solid debris from debris pan.

19.2 **PERFORM** one of the following:

19.2.1 When no liquids or insignificant amounts of liquid remain in debris pan, **PROCEED** to Step 20.0.

19.2.2 When significant amounts of liquid remain in debris pan, **PERFORM** the following:

19.2.2.1 **CONNECT** Strainer Hose to Q89 and **PLACE** strainer hose into debris pan.

19.2.2.2 **VERIFY** Tank Skid Pan Waste Hose is connected to Q81 and Q95B.

19.2.2.3 **START** pan pump by opening valves 88 and 81.

19.2.2.4 When liquid has been removed from debris pan, **STOP** pan pump by closing valves 81 and 88.

19.2.2.5 **REMOVE** Strainer Hose from debris pan.

19.2.2.6 **DISCONNECT** Strainer Hose from Q89 and **PLACE** in secondary containment.

20.0 **RINSE** CONTAINMENT VESSEL and debris pan.

20.1 **RINSE** CONTAINMENT VESSEL and debris pan with water.

20.2 **DRAIN** and **RINSE** until debris pan is clean.

- 20.3 **REMOVE** remaining liquid from debris pan.
 - 20.3.1 **CONNECT** Strainer Hose to Q89 and **PLACE** strainer hose into debris pan.
 - 20.3.2 **START** pan pump by opening valves 88 and 81.
 - 20.3.3 When liquid has been removed from debris pan, **STOP** pan pump by closing valves 81 and 88.
 - 20.3.4 **REMOVE** Strainer Hose from debris pan.
 - 20.3.5 **DISCONNECT** Strainer Hose from Q89 and **PLACE** in secondary containment.
- 20.4 **VERIFY** debris pan is clean.
- 20.5 **ALLOW** debris pan to dry.
- 20.6 **PLACE** rags in waste bag, **PLACE** waste bag in open-head drum, and **ANNOTATE** open-head drum inventory.
- 21.0 **PROCEED** as follows:
 - 21.1 When having to clean the EDS unit secondary containment pans, **PROCEED** to Step 22.0.
 - 21.2 When not having to clean the EDS unit secondary containment pans, **PROCEED** to Step 24.0.
- 22.0 **CLEAN** EDS Trailer secondary containment pan, as needed.
 - 22.1 **REMOVE** any debris from EDS Trailer secondary containment pan.
 - 22.2 **PLACE** debris in open-head drum.
 - 22.3 **PROCEED** as follows:
 - 22.3.1 When not having to flush EDS Trailer secondary containment pan with water, **PROCEED** to Step 23.0.
 - 22.3.2 When having to flush EDS Trailer secondary containment pan with water, **PERFORM** the following:
 - 22.3.2.1 **VERIFY** valve 57 is CLOSED.

- 22.3.2.2 **FLUSH** EDS Trailer secondary containment pan with water.
 - 22.3.2.3 **CONNECT** Trailer Pan Waste Hose to Q57 and Q89. **OPEN** valve 57.
 - 22.3.2.4 **START** pan pump by opening valves 88 and 81.
 - 22.3.2.5 When liquid has been removed from EDS Trailer secondary containment pan, **STOP** pan pump by closing valves 81 and 88.
 - 22.3.2.6 **CLOSE** valve 57.
 - 22.3.2.7 **DISCONNECT** Trailer Pan Waste Hose from Q57 and Q89. **PLACE** in secondary containment.
 - 22.3.2.8 **PLACE** rags in waste bag, **PLACE** waste bag in open-head drum, and **ANNOTATE** open-head drum inventory.
- 23.0 **CLEAN** Reagent Platform secondary containment pan, as needed.
- 23.1 **REMOVE** any debris from Reagent Platform secondary containment pan.
- 23.2 **PLACE** debris in open-head drum.
- 23.3 **PROCEED** as follows:
- 23.3.1 When not having to flush Reagent Platform secondary containment pan with water, **PROCEED** to Step 24.0.
 - 23.3.2 When having to flush Reagent Platform secondary containment pan with water, **PERFORM** the following:
 - 23.3.2.1 **VERIFY** valve 58 is CLOSED.
 - 23.3.2.2 **FLUSH** Reagent Platform secondary containment pan with water.
 - 23.3.2.3 **CONNECT** Reagent Platform Waste Hose to Q58 and Q89. **OPEN** valve 58.
 - 23.3.2.4 **START** pan pump by opening valves 88 and 81.

23.3.2.5 When liquid has been removed from Reagent Platform secondary containment pan, **STOP** pan pump by closing valves 81 and 88.

23.3.2.6 **CLOSE** valve 58.

23.3.2.7 **DISCONNECT** Reagent Platform Waste Hose from Q58 and Q89. **PLACE** in secondary containment.

23.3.2.8 **PLACE** rags in waste bag, **PLACE** waste bag in open-head drum, and **ANNOTATE** open-head drum inventory.

24.0 **PROCEED** as follows:

24.1 **REMOVE** any debris from Tank Skid secondary containment pan.

24.2 **PLACE** debris in open-head drum.

24.3 **PROCEED** as follows:

24.3.1 When not having to flush Tank 3 Skid secondary containment pan with water, **PROCEED** to Step 25.0.

24.3.2 When having to flush Tank 3 Skid secondary containment pan with water, **PERFORM** the following:

24.3.2.1 **FLUSH** Tank 3 Skid secondary containment pan with water.

24.3.2.2 **CONNECT** Strainer Hose to Q89 and **PLACE** Strainer Hose into Tank 3 Skid secondary containment pan.

24.3.2.3 **START** pan pump by opening valves 88 and 81.

24.3.2.4 When liquid has been removed from Tank 3 Skid secondary containment pan, **STOP** pan pump by closing valves 81 and 88.

24.3.2.5 **DISCONNECT** Strainer Hose from Q89 and **PLACE** in secondary containment.

24.3.2.6 **PLACE** rags in waste bag, **PLACE** waste bag in open-head drum, and **ANNOTATE** open-head drum inventory.

25.0 **PROCEED** as follows:

25.1 **REMOVE** any debris from Waste Skid secondary containment pan and/or Reagent Skid secondary containment pan.

25.2 **PLACE** debris in open-head drum.

25.3 **PROCEED** as follows:

25.3.1 When not having to flush Waste Skid secondary containment pan and/or Reagent Skid secondary containment pan with water, **PROCEED** to Step 26.0.

25.3.2 When having to flush Waste Skid secondary containment pan and/or Reagent Skid secondary containment pan with water, **PERFORM** the following:

25.3.2.1 **FLUSH** Waste Skid secondary containment pan and/or Reagent Skid secondary containment pan with water.

25.3.2.2 **CONNECT** Strainer Hose to Q89.

25.3.2.3 **PLACE** Strainer Hose into secondary containment pan.

25.3.2.4 **START** pan pump by opening valves 88 and 81.

25.3.2.5 When liquid has been removed from secondary containment pan, **STOP** pan pump by closing valves 81 and 88.

25.3.2.6 If necessary, **REPEAT** Steps 25.3.2.4 through 25.3.2.6 for the other secondary containment pan.

25.3.2.7 **DISCONNECT** Strainer Hose from Q89 and **PLACE** in secondary containment.

25.3.2.8 **PLACE** rags in waste bag, **PLACE** waste bag in open-head drum, and **ANNOTATE** open-head drum inventory.

26.0 **CLEAN** EDS Trailer contact surfaces.

26.1 **WIPE** all electrical panels (paying close attention to buttons and switches) with bleach-saturated rags.

- 26.2 **WIPE DOWN** debris pan and spill containment trays.
- 26.3 **WIPE DOWN** railings and any other operator-contacted surfaces.
- 26.4 **PLACE** rags in waste bag, **PLACE** waste bag in open-head drum, and **ANNOTATE** open-head drum inventory.
- 27.0 **PERFORM** vinegar rinse of reagent/water lines periodically or when directed IAW O&M Manual for EDS P2R, Procedure RSS-5.
- 28.0 If necessary, **PROCESS** liquid waste container(s).
 - 28.1 **DISCONNECT** Waste Hose(s) and Vent Waste Hose(s) from quick-disconnect waste container cap(s) and **PLACE** Waste Hose(s) in secondary containment.
 - 28.2 **REMOVE** quick-disconnect waste container cap(s) from waste container(s) and **SECURE** shipping cap(s) on waste container(s).
 - 28.3 **DISCONNECT** grounding wires from waste container(s). **RECORD** final weight of waste container(s).

CALLOUT: Announce final waste container(s) weight.

- 28.4 **REMOVE** waste container(s) from secondary containment. **RECORD** time waste container(s) is removed.

CALLOUT: Announce time drum removed.

- 28.5 **REPLACE** with empty waste container(s). **RECORD** new waste container(s) label number(s).
- 28.6 **REMOVE** shipping cap(s) and **INSTALL** quick-disconnect waste container lid(s) on replacement waste container(s) as follows:
 - 28.6.1 **SCREW** quick-disconnect waste container cap(s) onto waste container(s).
 - 28.6.2 **TIGHTEN** quick-disconnect waste container cap(s) until hand-tight.
- 28.7 **VERIFY** waste container(s) drain valve(s) is CLOSED.
- 28.8 **CONNECT** Waste Hose(s) to quick-connect fitting(s) on replacement waste container(s).

- 28.9 **CONNECT** Vent Waste Hose(s) to quick-connect fitting(s) on replacement waste container(s).
- 28.10 **CONNECT** grounding wires to waste container(s).
- 28.11 **ZERO** scale(s).
- 28.12 **RECORD** time old waste container(s) was disconnected, time new waste container(s) was connected, and number(s) of new waste container(s).

CALLOUT: Announce container changeout time and new waste container number.

- 29.0 **VERIFY** EDS CONTAINMENT VESSEL door is prepared for re-assembly.
 - 29.1 **VERIFY** training/shipping metal seal is installed to protect EDS CONTAINMENT VESSEL sealing surfaces.
 - 29.2 **POSITION** replacement parts and tools next to EDS CONTAINMENT VESSEL door.
- 30.0 If necessary, **INSTALL** dip tubes and 1/2-inch male connectors on top and left side of inner EDS CONTAINMENT VESSEL door.
 - 30.1 Using appropriate crow's-foot or equivalent wrench, **SCREW** 1/2-inch male connectors into threaded fitting at top and left side of inner EDS CONTAINMENT VESSEL door.
 - 30.2 **INSTALL** dip tubes and **TIGHTEN** until secure.
- 31.0 If necessary, **INSTALL** spray nozzle at bottom of inside EDS CONTAINMENT VESSEL.
 - 31.1 Using 3/4-inch deep well or equivalent socket, **SCREW** spray nozzle assembly into hole near bottom of inside EDS CONTAINMENT VESSEL door.
 - 31.2 **TIGHTEN** until secure.
- 32.0 If necessary, **INSTALL** high voltage feedthroughs.
 - 32.1 **BRUSH** Conax[®] lube onto feedthrough nut threads and area between feedthrough nut and follower.
 - 32.2 **INSERT** high voltage feedthrough into feedthrough ports in HIGH VOLTAGE FEEDTHROUGH FLANGE.

32.3 Using 3/4-inch deep well or equivalent socket, **SCREW** feedthrough nut until secure.

32.4 **TORQUE** each feedthrough nut to 25 to 30 ft-lbs.

Note

Do not brush lubricant onto ground rod flat area. Electrical ground path may be degraded.

32.5 **BRUSH** N-7000 lube onto EXTERIOR GROUND ROD base threads and **INSTALL** the rod into HIGH VOLTAGE FEEDTHROUGH FLANGE.

32.6 Using 3/8-inch crow's foot or equivalent wrench, **TORQUE** EXTERIOR GROUND ROD base to 50 inch-pounds.

32.7 **BRUSH** N-7000 lube onto INTERIOR GROUND ROD/SPIDER assembly threads.

32.8 **SLIDE** INTERIOR GROUND ROD/SPIDER assembly into feedthrough well from inside EDS CONTAINMENT VESSEL door.

32.9 Using 7/16-inch deep well or equivalent socket, **SCREW** INTERIOR GROUND ROD/SPIDER assembly until secure.

32.10 **TORQUE** to 100 inch-pounds.

33.0 **INSTALL** EXTERIOR DETONATOR SHORTING JACK onto HIGH VOLTAGE FEEDTHROUGH FLANGE.

34.0 If necessary, **INSTALL** BLAST PLATE, BLAST SHIELDS and BLAST COVER BASE.

34.1 **HOLD** BLAST SHIELD against CONTAINMENT VESSEL door interior and **ALIGN** over four bolt holes.

34.2 Using 5/16-inch hex key or equivalent wrench, **SECURE** BLAST SHIELD with four hex screws.

34.3 **REPEAT** Steps 34.1 and 34.2 for the remaining two BLAST SHIELDS and then **PROCEED** to Step 34.4.

- 34.4 Using 5/16-inch hex key or equivalent wrench, **SECURE** BLAST COVER BASE with four hex screws.
- 34.5 **PLACE** BLAST COVER in designated area until needed.
- 35.0 **RECORD** name of CONTAINMENT VESSEL door components that were disassembled, decontaminated, and re-assembled.
- CALLOUT:** Announce name of containment vessel door components disassembled, decontaminated, and re-assembled.
- 36.0 **RECORD** names of components that were replaced due to unserviceability.
- 37.0 If necessary, **CLEAN** DRUM PUMP.
- 37.1 **VERIFY** DRUM PUMP is turned off.
- 37.2 **DISCONNECT** Reagent Hose from Q67.
- 37.3 **DISCONNECT** Waste Hose 2 from Q95B and **PLACE** in secondary containment.
- 37.4 **CONNECT** Reagent Hose to Q95B.
- 37.5 **REMOVE** DRUM PUMP from chemical reagent/solvent container and **WIPE DOWN** DRUM PUMP with a damp cloth.
- 37.6 **INSTALL** and **TIGHTEN** by hand the shipping cap on chemical reagent/solvent container.

Note

Add additional water to 5-gallon container, as needed.

- 37.7 **PLACE** DRUM PUMP into 5-gallon container with 4 gallons of water.
- 37.8 **START** DRUM PUMP.
- 37.9 **OBSERVE** flow into waste container 2 and when water flow is clear, **TURN OFF** DRUM PUMP.
- 37.10 **DISCONNECT** Reagent Hose from Q95B and **CONNECT** it to Q67.
- 37.11 **CONNECT** Waste Hose 2 to Q95B.

37.12 **REMOVE** DRUM PUMP from water container.

37.13 **PROCEED** as directed.

Note

Allow waste containers to cool to ambient temperature before installing bung covers.

38.0 If necessary, **DISCONNECT** waste container waste hoses. **INSTALL** caps on waste container hoses and **POSITION** capped ends of waste container waste hoses in secondary containment.

39.0 **DRAIN** Water Boiler.

39.1 **PROCEED** as follows:

39.1.1 When Water Boiler has not been drained, **DON** leather gloves and **PROCEED** to Step 39.2.

39.1.2 When Water Boiler has been drained, **PROCEED** to Step 40.0.

Note

Push Process Shutdown Button to turn off Low/High Water alarm.

39.2 **PUSH** green ON-OFF button on Boiler Control Panel to turn Boiler Assembly OFF.

39.3 **VERIFY** valves 103 and 107 are CLOSED.

39.4 **OPEN** valves 47, 50, and 16.

39.5 **CLOSE** valves 100 and 102.

39.6 **CHECK** Blow Down Tank and **PROCEED** as follows:

39.6.1 When Blow Down Tank is empty, **PROCEED** to Step 39.7.

39.6.2 When Blow Down Tank is not empty, **PERFORM** the following:

39.6.2.1 **VERIFY** Blow Down Tank water is below 60°C (140°F).

- 39.6.2.2 **OPEN** valves 108 and 109 to drain Blow Down Tank.
- 39.6.2.3 **CLOSE** valves 109 and 108.
- 39.6.2.4 **OPEN** valve 110. **WAIT** 5 seconds. **CLOSE** valve 110.
- 39.7 **OPEN** valve 105.
- 39.8 Slowly **OPEN** valve 106 to vent steam from water boiler into Blow Down Tank.
- 39.9 **OBSERVE** water boiler pressure gauge for decrease and water sight glass for water to drop.
- 39.10 **CLOSE** valves 105 and 106.
- 39.11 **PROCEED** as follows:
 - 39.11.1 When water in Blow Down Tank is not below 60°C (140°F), **ALLOW** water in Blow Down Tank to cool to 60°C (140°F) and then **PROCEED** to Step 39.11.2.1.
 - 39.11.2 When water in Blow Down Tank is 60°C (140°F) or below, **PERFORM** the following:
 - 39.11.2.1 **OPEN** valves 108 and 109 to drain Blow Down Tank.
 - 39.11.2.2 **OBSERVE** Blow Down water transfer pressure gauge and **RECORD** highest psig reading into log book.
 - 39.11.2.3 **CLOSE** valves 109 and 108.
 - 39.11.2.4 **OPEN** valve 110. **WAIT** 5 seconds. **CLOSE** valve 110.
- 39.12 **RECORD** cumulative boiler feed water flow measurement into log book.
- 40.0 **PROCEED** to Procedure 2 (Checklists for EDS Setup Procedures) and **PERFORM** one of the following:
 - 40.1 When processing another munition, **COMPLETE** Checklist for EDS Pre-operations and Pre-operations Checklist for Equipment, Tools, and Supplies.
 - 40.2 When not processing another munition, **COMPLETE** Checklist for Post-operations.

SPECIAL REQUIREMENTS:

1. PPE must be worn IAW Annex G.
2. Label sample containers IAW the Sampling and Analysis Plan.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Primary tool kit	1 each
Socket, 3/4-inch deep well or equivalent	1 each
Socket, 7/16-inch deep well or equivalent	1 each
Wrench, 3/8-inch crow's foot or equivalent	1 each
Wrench, 5/16-inch hex key or equivalent	1 each
Wrench, 7/8-inch crow's-foot with extension or equivalent	1 each
Plastic hammer	1 each
Pliers	1 each
Conax lube	as required
Loctite N-7000 lube	as required
Scrub brush	1 each
Soft-bristle test tube brush	as required
Spray bottle	2 each
General-purpose detergent	as required
Rags or absorbent paper towels	as required
Chain-of-custody documents	as required
Sample container	as required
Sample packaging	as required
Household bleach (5 percent)	as required
Bung wrench	1 each
Open-head drums	as required
Nonmetallic scouring pad	as required
Tape, Teflon roll	as required
Tape, duct	as required
Bag, plastic, large	as required
Bag, sealable	as required
Debris pan	1 each
Decontaminant pail	1 each
Rinse pail	as required
EDS operator log	1 each
Indelible ink pen	1 each
Digital camera	1 each
Swab, cotton tipped	as required
Air hose with nozzle	1 each
Training/shipping metal seal	1 each

PROCEDURE 18 DRAIN EDS TANKS

The purpose of this procedure is to drain the EDS tanks as needed. Also, this procedure is used when it is necessary to prepare the EDS for shipment.

PRECONDITIONS:

1. PPE must be worn IAW Annex G.
2. Air monitoring must be operational.
3. Laboratory has provided sampling equipment per Laboratory Quality Control Plan.

WARNINGS

**USE PROPER MATERIAL HANDLING TECHNIQUES AND/OR
MATERIAL HANDLING EQUIPMENT WHEN MOVING HEAVY ITEMS.**

WEAR APPROPRIATE PPE FOR TRANSFER OF REAGENT.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 1.0 **DRAIN** and **RINSE** supply tank(s), if needed.
 - 1.1 **DRAIN** reagent from Supply Tank 2 into original reagent supply container.
 - 1.1.1 **VERIFY** reagent supply tank heaters are OFF.
 - 1.1.2 **VERIFY** all valves on CONTAINMENT VESSEL door and CONTAINMENT VESSEL door valve panel are CLOSED.
 - 1.1.3 **VERIFY** reagent supply container has appropriate QC installed.
 - 1.1.4 **CONNECT** Supply Hose to quick-connect on reagent supply container.
 - 1.1.5 **TRANSFER** chemical reagent from Supply Tank 2 into reagent supply container by opening valves 21 and 22.

- 1.1.6 When transfer is complete or to avoid overfilling reagent supply container, **CLOSE** valves 22 and 21.
- 1.1.7 **DISCONNECT** Supply Hose from quick-connect on reagent supply container and **REMOVE** QC from reagent supply container.
- 1.1.8 **INSTALL** bung cap on reagent supply container bung and **REMOVE** reagent supply container from secondary containment, if necessary.
- 1.2 **RINSE** Supply Tank 2 with water.
 - 1.2.1 **OPEN** valve 66.
 - 1.2.2 **PROCEED** as follows:
 - 1.2.2.1 When sufficient pressure is supplied by water supply source, **PROCEED** to Step 1.2.3.
 - 1.2.2.2 When insufficient pressure is supplied by water supply source, **PERFORM** the following:
 - 1.2.2.2.1 **TURN ON** AIR COMPRESSOR SYSTEM.
 - 1.2.2.2.2 **OPEN** valve 43.
 - 1.2.3 **RINSE** Supply Tank 2 with water by performing the following:
 - 1.2.3.1 **RINSE** Supply Tank 2 by opening valve 41.
 - 1.2.3.2 **OBSERVE** TANK LEVEL GAUGE and when approximately 20 liters of water have been transferred, **CLOSE** valve 41 for Supply Tank 2.
 - 1.2.4 **PROCEED** as follows:
 - 1.2.4.1 When not having used the WATER SOURCE PUMP, **PROCEED** to Step 1.2.5.
 - 1.2.4.2 When having used the WATER SOURCE PUMP, **CLOSE** valve 43.
 - 1.2.5 **DRAIN** rinsate water from Supply Tank 2 to Tank 3.
 - 1.2.5.1 **DISCONNECT** Supply Hose from Q27 on Reagent Supply Panel.

- 1.2.5.2 **CONNECT** Vessel Effluent Hose to Q27.
- 1.2.5.3 **VERIFY** valves 83, 84, and 86 are CLOSED.
- 1.2.5.4 **VERIFY** valve 91 green TANK 3 button is illuminated.
- 1.2.5.5 **OPEN** valve 27.
- 1.2.5.6 **OPEN** valves 21 and 22.
- 1.2.5.7 **OBSERVE** Supply Tank 2 level gauge and when Supply Tank 2 is empty, **CLOSE** valves 22 and 21.
- 1.2.5.8 **REPEAT** Steps 1.2.2 through 1.2.5.7 two additional times to thoroughly rinse Supply Tank 2.
- 1.2.5.9 **RECORD** amount of water rinsate in liters in Tank 3.

CALLOUT: Announce amount of water rinsate in liters in Tank 3.

1.3 **DRAIN** Supply Tank 1.

1.3.1 **PERFORM** one of the following:

1.3.1.1 When draining Supply Tank 1 to Tank 3, **PERFORM** the following:

1.3.1.1.1 **OPEN** valves 23 and 24.

1.3.1.1.2 **OBSERVE** Supply Tank 1 level gauge and when Supply Tank 1 is empty, **CLOSE** valves 24 and 23.

1.3.1.1.3 **CLOSE** valve 27.

1.3.1.1.4 **DISCONNECT** Vessel Effluent Hose from Q27 and **CONNECT** it to Hose Docking Station.

1.3.1.1.5 **PROCEED** to Step 2.0.

1.3.1.2 When draining Supply Tank 1 to waste container 2, **PERFORM** the following:

1.3.1.2.1 **VERIFY** valve 80 is in "WASTE 2" position (white arrow on valve handle points to WASTE 2).

- 1.3.1.2.2 **VERIFY** waste hose 2 is connected to Q80B and Q95B.
- 1.3.1.2.3 **OPEN** valve 31.
- 1.3.1.2.4 **OPEN** valves 23 and 24.
- 1.3.1.2.5 **OBSERVE** Supply Tank 1 level gauge and when Supply Tank 1 is empty, **CLOSE** valves 24 and 23.
- 1.3.1.2.6 **CLOSE** valve 31.

WARNING

DO NOT DRAIN LIQUIDS FROM CONTAINMENT VESSEL TO WASTE CONTAINERS WHEN CONTAINMENT VESSEL TEMPERATURE EXCEEDS 65°C. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

2.0 **AGITATE** and **DRAIN** Tank 3.

- 2.1 **VERIFY** valve 83 is CLOSED.
- 2.2 **VERIFY** valve 80 is in "WASTE 2" position (white arrow on valve handle points to WASTE 2).
- 2.3 **OPEN** valve 84.
- 2.4 **OPEN** valves 82 and 86. **WAIT** 30 seconds. **OPEN** valve 83.
- 2.5 **CLOSE** valve 84.
- 2.6 **OBSERVE** Tank 3 level gauge and when Tank 3 is empty, **OPEN** valve 90 for 5 seconds, and then **CLOSE** valve 90.
- 2.7 **CLOSE** valves 86 and 82.
- 2.8 **CLOSE** valve 83.

3.0 **PROCESS** waste container 2.

- 3.1 **DISCONNECT** waste hose 2 from waste container 2.

3.2 **DISCONNECT** waste container Vent Hose 2 from waste container 2.

3.3 **DISCONNECT** grounding wires from waste container 2.

3.4 **RECORD** weight of waste container 2.

CALLOUT: Announce waste container 2 final weight.

3.5 **REMOVE** waste container 2 from secondary containment. **RECORD** time drum is removed.

CALLOUT: Announce time waste container 2 removed.

3.6 **PROCEED** as follows:

3.6.1 When not having to replace waste container 2, **PROCEED** to Step 4.0.

3.6.2 When having to replace waste container 2, **PERFORM** the following:

3.6.2.1 If required, **DON** leather gloves. **RECORD** waste container identification number and weight.

CALLOUT: Announce waste container weight and waste container number.

3.6.2.2 **DISCONNECT** Waste Hose 2 and Vent Waste Hose 2 from quick-disconnect waste container cap and **PLACE** Waste Hose 2 in secondary containment.

3.6.2.3 **REMOVE** quick-disconnect waste container cap from waste container 2 and **SECURE** shipping cap on waste container 2.

3.6.2.4 **DISCONNECT** grounding wires from waste container 2 and **REMOVE** waste container 2 from secondary containment.

3.6.2.5 **INSTALL** new waste container 2 and **REMOVE** shipping cap.

3.6.2.6 **CONNECT** grounding wires to waste container 2.

3.6.2.7 **INSTALL** quick-disconnect waste container lid.

3.6.2.8 **CONNECT** Waste Hose 2 and Vent Waste Hose 2 to quick-disconnect waste container cap.

3.6.2.9 **VERIFY** waste container 2 scale is at 0 pounds.

3.6.2.10 **RECORD** time old waste container 2 was disconnected, time new waste container 2 was connected, and number of new waste container 2.

CALLOUT: Announce container changeout time and new waste container number.

4.0 **PROCEED** to Procedure 2 and **COMPLETE** Checklist for Post-Operations.

SPECIAL REQUIREMENTS:

1. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Primary tool kit	1 each
Household bleach (5 percent)	as required
Rags or chemical swipes	as required
Absorbent paper towels	as required
Rinse pail	as required
Decontaminant pail	as required
Spray bottle	as required
General-purpose detergent	as required
Liquid waste drum	as required
Bung wrench	1 each
Open-head drum	as required
EDS operator log	1 each
Indelible ink pen	1 each

PROCEDURE 19
MONITOR AND DECONTAMINATE THE EDS

The purpose of this procedure is to provide operating procedures for monitoring and decontaminating the EDS to acceptable levels for EDS closeout.

PRECONDITIONS:

1. PPE must be worn IAW Annex G.
2. Air monitoring must be operational.

WARNINGS

PPE LEVELS WILL BE WORN ACCORDING TO THE TASK BEING PERFORMED AND IN CONJUNCTION WITH MONITORING RESULTS IAW THE PPE ANNEX OF THIS SOP.

VERIFY PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED.

CLOSING CONTAINMENT VESSEL DOOR PRESENTS CRUSHING AND PINCHING HAZARDS. BE AWARE OF BODY POSITION WHILE PERFORMING THE FOLLOWING STEPS.

REMOVE CLAMP CONTROL KEY BEFORE ATTEMPTING TO PRY APART THE CLAMP HANGER ASSEMBLIES OR BEFORE USING THE SCREW DRIVE WHEEL.

FAILURE TO DON LEATHER GLOVES MAY CAUSE RUBBER GLOVES TO BE COMPROMISED WHEN COMING INTO CONTACT WITH SHARP EDGES.

WEAR LEATHER GLOVES WHENEVER HANDLING HEAVY OBJECTS OR OBJECTS WITH SHARP EDGES.

TO PREVENT POSSIBLE INJURY, USE TWO OPERATORS WHEN CLOSING CONTAINMENT VESSEL DOOR.

NEVER ATTEMPT TO GRASP LEAKING HYDRAULIC HOSE UNDER PRESSURE WITH HANDS. THE FORCE OF ESCAPING HYDRAULIC FLUID COULD CAUSE SERIOUS INJURY.

BECAUSE STRESS MAY DAMAGE HOSE AND CAUSE INJURY, NEVER USE A HOSE TO MOVE EQUIPMENT.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 1.0 **VERIFY** EDS equipment has been disassembled, serviced, and re-assembled IAW Procedures 17 and 18.

CALLOUT: Announce name of components disassembled, decontaminated, and replaced due to serviceability.

- 2.0 **MONITOR** CONTAINMENT VESSEL and CONTAINMENT VESSEL door for chemical agent contamination.
- 2.1 **PLACE** plastic sheeting or large bags over CONTAINMENT VESSEL opening and CONTAINMENT VESSEL door.
- 2.2 **SEAL** the plastic sheeting or bags with duct tape or equivalent.
- 2.3 **BAG** and **MONITOR** individual items that may have become contaminated during the process of treating a chemical munition in the EDS. These items include:
- CONTAINMENT VESSEL door parts
 - Operational solids waste
 - Tools
 - CONTAINMENT VESSEL hoe
 - PPE
 - Drum fittings
 - Debris and rinse pans
 - Munition loading table.
- 2.4 **ALLOW** the sealed items to remain undisturbed for 4 hours at a minimum of 21°C (70°F) in a sealed and unventilated condition.
- 2.5 **PERFORM** monitoring inside the plastic sheeting or bags to determine if further decontamination is necessary.
- 3.0 **DECONTAMINATE** any items with positive results.
- 3.1 **WIPE** contaminated item with 5 percent bleach solution. When item is sensitive to 5 percent bleach solution, **USE** general-purpose detergent.
- 3.2 **RINSE** item with water and **ALLOW** item to air dry.
- 3.3 **PLACE** decontamination waste into open-head drum or liquid waste drum, as required.
- 3.4 **CLOSE** open-head drum.

Note

Monitor item IAW local monitoring program.

- 3.5 **MONITOR** decontaminated item for chemical agent contamination.
- 3.5.1 **BAG** item and **SEAL** bag.

- 3.5.2 **ALLOW** bagged item to remain sealed and undisturbed for 4 hours at a minimum of 21°C (70°F) in an unventilated condition.
- 3.5.3 **MONITOR** inside bag and **PROCEED** as follows:
 - 3.5.3.1 When monitoring results show chemical agent is not present, **PROCEED** to Step 4.0.
 - 3.5.3.2 When monitoring results show chemical agent is present, **RETURN** to Step 3.1.

CALLOUT: Describe which items were individually bagged, if any, for agent monitoring.

- 4.0 **CLOSE** and **SECURE** CONTAINMENT VESSEL door for transport.
 - 4.1 **VERIFY** all valves on valve panel, reagent supply panel, and CONTAINMENT VESSEL door are CLOSED.
 - 4.2 **PREPARE** sealing surfaces IAW O&M Manual for EDS P2R, Table 4-2, Pre-Op PMCS No. 3.
 - 4.3 **VERIFY** training/shipping metal seal is properly installed.
 - 4.4 **VERIFY** clamps are positioned around CONTAINMENT VESSEL so they do not interfere with door movement.
 - 4.5 **DON** leather gloves and **CLOSE** CONTAINMENT VESSEL door.
 - 4.6 **SECURE** CONTAINMENT VESSEL door clamp.
 - 4.6.1 **VERIFY** four PROCESS SHUTDOWN buttons are out and red STEAM LINE MOTION FAULT button is not illuminated,
 - 4.6.2 **VERIFY** hydraulic nuts are fully retracted.
 - 4.6.3 Simultaneously **ROTATE** the clamp hanger adjustment wheels to the left (Raise) until door clamps are fully raised.

Notes

Clamp control key is the same key used in the vessel rotation control panel.

Use of clamp hanger control pendant may be required when local control mode is not operating correctly. See Annex D.

When closing containment vessel door, it may be necessary for an operator to maintain pressure on the door until the door clamps are closed.

- 4.6.4 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.
- 4.6.5 **TURN** amber speed switch on CLAMP HANGER DRIVE CONTROL Panel to SLOW.
- 4.6.6 **PUSH** and **HOLD** green IN button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel. **RELEASE** button when CLAMP HANGER LEAD SCREW stops rotating.
- 4.6.7 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and remove.

WARNING

FAILURE TO DON HEARING PROTECTION MAY CAUSE HEARING LOSS WHILE OPERATING NUT RUNNER DRIVERS. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 5.0 **TIGHTEN** hydraulic nuts on CONTAINMENT VESSEL door clamp.
 - 5.1 **DON** leather gloves.
 - 5.2 **PLACE** drive switch on small high speed low torque nut runner driver to counterclockwise position.
 - 5.3 **ATTACH** nut runner driver using 1-3/8-inch socket to upper nut runner HIGH SPEED nut.
 - 5.4 **DEPRESS** trigger and when nut runner driver stalls, **RELEASE** trigger.

- 5.5 **REMOVE** nut runner driver from upper nut runner and **ATTACH** it to lower nut runner HIGH SPEED nut.
- 5.6 **DEPRESS** trigger and when nut runner driver stalls, **RELEASE** trigger.
- 5.7 **REMOVE** nut runner driver from lower nut runner and **PLACE** it in storage location.

Caution

Top and bottom gaps of clamp faces must be within 1/4-inch difference and closed to 2-1/2 inches or less. Inconsistent gaps may damage hydraulic nuts and result in seal leakage.

- 5.8 **PLACE** drive switch on large low speed high torque nut runner driver to counterclockwise position.
- 5.9 **ATTACH** nut runner driver to HIGH TORQUE nut and **ALTERNATE** tightening upper and lower nut runners 1/2 inch at a time until top and bottom gaps between clamp faces are 2-1/2 inches or less (green HANGERS CLOSED light illuminates).
- 5.10 **REMOVE** nut runner driver from nut runner and **PLACE** it in storage location.
- 5.11 Simultaneously **ROTATE** clamp hanger adjustment bolts to the right (Lower) until the clamps rest on CONTAINMENT VESSEL door.

Note

Hydraulic Nut Subsystem will not operate unless green Hangers Closed light is illuminated.

- 6.0 **START HYDRAULIC NUT SUBSYSTEM.**
- 6.1 **VERIFY** Hydraulic Pump Hose is connected to hydraulic manifold.
- 6.2 **VERIFY** all three hydraulic nut hoses and Hydraulic Pump Hose are securely connected to hydraulic nut quick-connects and are not leaking and red Hydraulic Nut Pump OFF button is illuminated.
- 6.3 **TURN** red PRESSURE switch on VESSEL CONTROL PANEL to LOW.

WARNING

DUE TO POTENTIAL FOR PERSONAL INJURY FROM A RUPTURED HOSE UNDER HYDRAULIC PRESSURE, EXERCISE EXTREME CAUTION WHEN WORKING WITH HYDRAULIC NUTS AND HOSES UNDER HYDRAULIC TENSION. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 6.4 **PRESS** green ON button on HYDRAULIC NUT PUMP Panel to start hydraulic pump and **MONITOR** all four hydraulic nuts.

WARNING

NEVER STAND OR PLACE ANY PARTS OF THE BODY IN LINE WITH THREADED RODS WHEN TENSIONER IS UNDER PRESSURE. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 6.5 **VERIFY** all personnel are clear of hydraulic nut and hydraulic hoses.

Caution

Do not exceed 3,200 psig hydraulic pump pressure to avoid possible damage to sealing surfaces during movement.

- 6.6 **MONITOR** all four hydraulic nuts. **PUSH** and **HOLD** ADVANCE button on HYDRAULIC NUT PUMP Panel until pressure reaches 3,000 psig and then **RELEASE** ADVANCE button.
- 6.7 **TURN** locking ring clockwise on each hydraulic nut until hand-tight.
- 6.8 **PUSH** and **HOLD** RETRACT button on HYDRAULIC NUT PUMP Panel to release hydraulic pressure.
- 6.9 **VERIFY** that pump pressure gauge reads approximately 0 psig.

7.0 **STOP** HYDRAULIC NUT SUBSYSTEM.

- 7.1 **PRESS** red OFF button on HYDRAULIC NUT PUMP Panel to stop hydraulic pump and **PRESS** red OFF button on VESSEL ROTATION CONTROL Panel.
- 7.2 **DISCONNECT** Hydraulic Pump Hose from hydraulic manifold and **CONNECT** it to Hose Docking Station.
- 7.3 **VERIFY** clamp hanger adjustment bolts have been rotated to the right (Lower) so that clamp hanger rails are clear of clamp slide locks.

Notes

Clamp control key is the same key used in the vessel rotation control panel.

Use of clamp hanger control pendant may be required when local control mode is not operating correctly. See Annex D.

- 7.4 **INSERT** and **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to LOCAL position.
- 7.5 **TURN** amber speed switch on CLAMP HANGER DRIVE CONTROL Panel to FAST.
- 7.6 **PUSH** and **HOLD** green OUT button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel to clear CLAMP HANGER ASSEMBLIES from door clamps, and **RELEASE** OUT button when CLAMP HANGER ASSEMBLIES are approximately 6 inches from each end of the linear bearing rod.
- 7.7 **TURN** amber speed switch on CLAMP HANGER DRIVE CONTROL Panel to SLOW.
- 7.8 **PUSH** and **HOLD** green OUT button (light illuminates) on CLAMP HANGER DRIVE CONTROL Panel, and **RELEASE** OUT button when green HANGERS STOWED POSITION light illuminates.
- 7.9 **TURN** Clamp Control Key in LOCAL/OFF/PENDANT switch to OFF position and **REMOVE**.

Caution

Loose tools or other hardware left on top of or underneath rotating containment vessel may be damaged.

Note

Containment vessel will only stop during normal operations in HOME, SAMPLE, and DRAIN/FILL position after rotating in a counterclockwise direction.

8.0 **POSITION** CONTAINMENT VESSEL for transport.

8.1 **OPERATE** ROTARY AGITATION SUBSYSTEM.

8.1.1 **VERIFY** four PROCESS SHUTDOWN buttons are out, red STEAM LINE MOTION FAULT button is not illuminated, and green VESSEL ROTATION CONTROL ON light is illuminated on VESSEL CONTROL PANEL.

8.1.2 **VERIFY** five green INTERLOCKS READY lights are illuminated on the Hose Docking Station.

8.1.3 **VERIFY** CLAMP INTERLOCK READY light is illuminated.

Notes

Vessel rotation control key must be inserted and turned to AUTO or MANUAL position before containment vessel will rotate.

Containment vessel will not start rotating unless all six interlock lights are illuminated and containment vessel door is closed. However, containment vessel will rotate in BYPASS mode.

8.1.4 **INSERT** and **TURN** Vessel Rotation Control Key in AUTO/OFF/MAN switch to AUTO position (green AUTO READY light, green HOME button, and red HALT light illuminate).

- 8.1.5 **VERIFY** INTERLOCKS key switch is set to ON.
 - 8.1.6 **VERIFY** status of green INTERLOCKS READY light and **PROCEED** as follows:
 - 8.1.6.1 When green INTERLOCKS READY light is illuminated, **PROCEED** to Step 8.1.7.
 - 8.1.6.2 When green INTERLOCKS READY light is not illuminated, **PERFORM** the following:
 - 8.1.6.2.1 **VERIFY** all hoses in Hose Docking Station are secure.
 - 8.1.6.2.2 **VERIFY** HANGERS STOWED light is illuminated and **PROCEED** as follows:
 - 8.1.6.2.2.1 When green INTERLOCKS READY light is illuminated, **PROCEED** to Step 8.1.7.
 - 8.1.6.2.2.2 When green INTERLOCKS READY light is not illuminated, **REQUEST** permission to turn Interlocks Control Key to BYPASS position (BYPASS light illuminates).
 - 8.1.7 **PUSH** green ROTATE button to start CONTAINMENT VESSEL rotation.
 - 8.1.8 When door hinge is at 6 o'clock position, **PUSH** red HALT button to stop CONTAINMENT VESSEL in TRANSPORT position.
 - 8.1.9 **TURN OFF** and **REMOVE** Vessel Rotation Control Key.
- 9.0 **SECURE** VESSEL SUPPORT JACK to support frame to prevent movement during transport.

10.0 **LABEL** all waste with proper labeling IAW the protocol of the laboratory and all local and federal requirements.

Note

Refer to Sampling and Analysis Plan for labeling details.

10.1 **COMPLETE** required chain-of-custody documents.

10.2 **ATTACH** chain-of-custody documents to packed sample.

11.0 **PROCEED** as directed.

SPECIAL REQUIREMENTS:

1. Buddy system must be used for safety.
2. Bleach solution can be corrosive to metal. Thoroughly rinse metal surfaces, allow to dry, and lubricate (if necessary) after being decontaminated.
3. All waste generated during EDS closeout must be properly packaged and analyzed.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Bleach solution (5 percent)	as required
Water	as required
General-purpose detergent	as required
Absorbent towels	as required
Scrub brushes	as required
Waste containers	as required
Plastic bags	as required
Duct tape or equivalent	as required
Plastic sheeting	as required
Open-head drum(s)	as required
Vessel rotation/clamp control key	1 each
EDS operator log	1 each
Indelible ink pen	1 each
Training/shipping metal seal	1 each
Leather gloves	as required
Vessel rotation/clamp control key	1 each

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ANNEX A FORMS

MATERIEL COURIER RECEIPT			SHIPPER'S CONTROL/DOCUMENT NO.	
SHIPPER			SUPPLY ACCOUNT NUMBER	
DESTINATION			SUPPLY ACCOUNT NUMBER	
I certify by my signature that I have received the materiel listed on this form and am aware of the applicable safety and security requirements.			SHIPMENT DESCRIPTION	
			LINE NUMBER	QUANTITY
			SERIAL NUMBERS	REMARKS
SHIPMENT TRANSFERS				
FIRST	LOCATION OF TRANSFER	DATE (YYYYMMDD)		
RECIPIENT'S PRINTED NAME (Last, First, Middle Initial)		ORGANIZATION OR ACCOUNT NO.		
SIGNATURE				
SECOND	LOCATION OF TRANSFER	DATE (YYYYMMDD)		
RECIPIENT'S PRINTED NAME (Last, First, Middle Initial)		ORGANIZATION OR ACCOUNT NO.		
SIGNATURE				
THIRD	LOCATION OF TRANSFER	DATE (YYYYMMDD)		
RECIPIENT'S PRINTED NAME (Last, First, Middle Initial)		ORGANIZATION OR ACCOUNT NO.		
SIGNATURE				
FOURTH	LOCATION OF TRANSFER	DATE (YYYYMMDD)		
RECIPIENT'S PRINTED NAME (Last, First, Middle Initial)		ORGANIZATION OR ACCOUNT NO.		
SIGNATURE				
FIFTH	LOCATION OF TRANSFER	DATE (YYYYMMDD)		
RECIPIENT'S PRINTED NAME (Last, First, Middle Initial)		ORGANIZATION OR ACCOUNT NO.		
SIGNATURE				

DD FORM 1911, APR 2010

PREVIOUS EDITION IS OBSOLETE.

Reset

Adobe Professional 8.0

Figure A-2. DD Form 1911, Materiel Courier Receipt Form

Page of



Analysis Request Form

Chain of Custody

MBFORM-43 Revision 6

Issue Date: August 20, 2012

DELIVER TO: US ARMY RDECOM, ECBC, EML
 ATTN: Steven D. Norman, E3330, RM 184
 5183 Blackhawk Rd, Aberdeen Proving Ground, MD 21010

Requester Contact Information:

POC/ORG:

ALT POC/ORG:

ADDRESS:

PHONE #: Fax #:

EMAIL:

PROJECT:

SAMPLE LOCATION:

SAMPLER(S)/ORG:

LIST ANALYTES REQUESTED FOR ANALYSIS

<input type="checkbox"/>							
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ANALYTE LIST*: GA, GB, GD, GF, HD, HN-1, HN-3, L, DIMP, DMMP, MPA, EMPA, IMPA, PMPA, 1,4-Dithiane, 1,4-Thioxane, Thiodiglycol ** Additional analytes available on request

| COLLECTION DATE and TIME | SAMPLE NAME (Limit to 30 characters) | MATRIX | NUMBER OF CONTAINERS | CONTAINER TYPE | PRESERVATIVE | <input type="checkbox"/> | COMMENTS |
|--------------------------|--------------------------------------|----------------------|----------------------|----------------------|----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------------|
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| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="checkbox"/> | <input type="text"/> |

Observed Suspect Contamination (Check box to indicate a high probability of chemical warfare agent presence, e.g. visible liquid, leaking munition, etc.)

Relinquished By: (Print) <input type="text"/>	(Signature) <input type="text"/>	Date/Time <input type="text"/>	Received By: (Print) <input type="text"/>	(Signature) <input type="text"/>	Date/Time <input type="text"/>
Relinquished By: (Print) <input type="text"/>	(Signature) <input type="text"/>	Date/Time <input type="text"/>	Received By: (Print) <input type="text"/>	(Signature) <input type="text"/>	Date/Time <input type="text"/>
Relinquished By: (Print) <input type="text"/>	(Signature) <input type="text"/>	Date/Time <input type="text"/>	Received By: (Print) <input type="text"/>	(Signature) <input type="text"/>	Date/Time <input type="text"/>

Figure A-3. Request for Analysis (Sheet 1 of 2)

**DIRECTIONS FOR USE OF THE CBARR
ANALYSIS REQUEST FORM/CHAIN OF CUSTODY
MB-FORM 43**

The following directions shall be used to properly fill out the Analysis Request Form/Chain of Custody for submission to the CBARR Monitoring Branch laboratory. The form shall be used to allow the laboratory to know exactly what analysis needs to be conducted, proper reporting of results and proper invoicing to the customer and chain of custody. Please review these directions and the example form prior to submitting an MB-FORM 43.

- The “GOV’T POC” contains the name of the government individual responsible for the project directing the sampling activities.
- The “GOV’T ORG” contains the name of the government organization for the person listed in the POC section above. This is very important for proper invoicing of the sample analysis.
- The “Contact POC” is the name of the person responsible for receiving the final results and the sample themselves. This person is not necessarily the same as the GOV’T POC.
- The Organization, Address, Phone, FAX, and Email is critical information for proper reporting and archival. It is important to fill out this section each time a sample is submitted to ensure that the information remains the same in our database.
- The “Project/Sample/Location” is specific to where and why the samples were collected.
- “Sampler(s)/Organization” refers to the person that took the samples and indicates the company of the sampler. This person may be different than the person indicated in the “Contact POC” section.
- Enter the “Collection Date”, “Sample Name,” and “Matrix” columns with the same information as the chain of custody documentation. This information will be checked prior to acceptance to the ECBC Monitoring Branch laboratory. The Monitoring Branch will request corrected paperwork prior to beginning analysis on any samples.
- The “Analytes Requested for Analysis” section shall be filled in with the desired analyte and then marked in the row corresponding to the sample name. Each column does not necessarily have to have the same analytes requested. A box containing an analyte list is provided and additional compounds can be requested after contacting the Monitoring Branch.
- Several sections are also provided to add comments to the laboratory personnel or general comments concerning the samples.

Figure A-3. Request for Analysis (Sheet 2 of 2)

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is OAASA						Use Part II (<i>reverse</i>) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
TO: (<i>Forward to proponent of publication or form</i>) (<i>Include ZIP Code</i>)						FROM: (<i>Activity and location</i>) (<i>Include ZIP Code</i>)	
PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
PUBLICATION/FORM NUMBER						DATE	TITLE
ITEM	PAGE	PARA-GRAPH	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON	
<i>* Reference to line numbers within the paragraph or subparagraph.</i>							
TYPED NAME, GRADE OR TITLE						TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

DA FORM 2028, FEB 74

REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED.

USAPA V3.01

Figure A-4. Recommended Changes to Publications and Blank Forms (Sheet 1 of 2)

TO: <i>(Forward direct to addressee listed in publication)</i>			FROM: <i>(Activity and location) (Include ZIP Code)</i>				DATE	
PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS								
PUBLICATION NUMBER				DATE		TITLE		
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
PART III - REMARKS <i>(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)</i>								
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION			SIGNATURE	

USAPA V3.01

Figure A-4. Recommended Changes to Publications and Blank Forms (Sheet 2 of 2)

ANNEX B
EXPLOSIVE DESTRUCTION SYSTEM PROCESS ALARMS

**ANNEX B
EXPLOSIVE DESTRUCTION SYSTEM PROCESS ALARMS**

Each of the conditions listed in Table B-1 will trigger an audible alarm buzzer and a red fault warning light will illuminate. The alarm is programmable for duration and interval. The alarm is programmed to beep for 3 seconds. The alarm buzzer volume is adjustable from approximately 85 to 115 decibels. The red fault indicator light will remain illuminated until the fault is corrected.

Table B-1. Process Alarm Conditions

Fault	Location	Cause	Immediate Action
Radio Frequency Signal Fault	Utility Panel	Turns on amber light on utility panel. Indicates loss of radio frequency signal from containment vessel.	Replace lithium ion batteries. If light is still illuminated, contact support maintenance.
Drive Fault	Vessel Control Panel	Turns on red light on vessel control panel. Indicates drive motor cooling fan or controller may be at fault. Depending on fault, automatic rotation drive may or may not stop.	<p>Push Drive Fault Reset button. If Drive Fault Reset button continues to flash on and off, check Motor Terminal Box and vessel rotation:</p> <p style="margin-left: 40px;">a. Motor Terminal Box. See if red light emitting diode is illuminated. If red light emitting diode is not illuminated, immediately provide alternate cooling source for drive motor.</p> <p style="text-align: center;">CAUTION</p> <p>DO NOT OPERATE DRIVE MOTOR FOR MORE THAN 15 MINUTES WITHOUT COOLING DRIVE MOTOR!!</p> <p style="margin-left: 40px;">b. Containment Vessel Rotation. When containment vessel rotation is not normal, halt containment vessel rotation. Push Vessel Rotation Control OFF button and then ON button to reset controller. Start containment vessel rotation. If containment vessel rotation is still not normal, refer to Annex D for rotation pendant operation. Complete processing in manual mode by use of vessel rotation control pendant.</p>

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ANNEX C
LABORATORY SAMPLE BOTTLE EXTRACTION PROCEDURE

ANNEX C
LABORATORY SAMPLE BOTTLE EXTRACTION PROCEDURE

- 1.0 **VERIFY** all necessary parts are on hand for this procedure before beginning.
- 2.0 Inside fume hood, **CLAMP** the sample bottle assembly into a sturdy device (that is, ring stand, vise, or any available clamping device).
- 3.0 **INSTALL** a new gas chromatograph septum into one side of the VCR[®] union.
- 4.0 **REMOVE** the VCR cap from the sample bottle assembly using the two wrenches. **DISCARD** the contaminated metal gasket appropriately.

Caution

For the following steps finger-tighten ONLY. DO NOT tighten with a wrench. Failure to comply may result in damage to equipment.

- 5.0 **INSTALL** the VCR union with previously installed septum onto the sample bottle assembly.
- 6.0 **INSERT** the needle into the septum. A toxic vent may be positioned near the union for the venting process.

WARNING

POINT NEEDLE AWAY FROM CREW MEMBERS WHEN RELIEVING PRESSURE IN BOTTLE. AS MUCH AS 100 POUNDS PER SQUARE INCH PRESSURE COULD BE CONTAINED IN SAMPLE BOTTLE ASSEMBLY. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 7.0 Carefully and slowly **OPEN** the sample bottle assembly valve to relieve the pressure in the valve.
- 8.0 **CLOSE** the sample bottle assembly valve.

-
- 9.0 Using the two wrenches, **REMOVE** sample bottle from the valve body.
- 10.0 **MOVE** contaminated valve body to an appropriate place.
- 11.0 **EXTRACT** liquid sample from sample bottle and **ANALYZE** sample.

SPECIAL REQUIREMENTS:

1. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
5/8-inch open end wrench	1 each
Adjustable wrench or equivalent to hold valve body	1 each
VCR union/coupler	1 each
Gas chromatograph septum	1 each
Needle (used to relieve pressure in the bottle)	1 each

ANNEX D
VESSEL ROTATION CONTROL PENDANT
OPERATION

**ANNEX D
VESSEL ROTATION CONTROL PENDANT
OPERATION**

WARNING

VERIFY PERSONNEL ARE CLEAR OF CONTAINMENT VESSEL BEFORE ROTARY AGITATION SUBSYSTEM IS STARTED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Cautions

When using vessel rotation control pendant to rotate containment vessel, verify support jack is in DOWN position and moved outward to avoid damage to containment vessel or support jack.

When using vessel rotation control pendant to rotate containment vessel, do not rotate containment vessel for more than 1 hour in one direction. Attempt to alternate equally between rotating containment vessel forward and in reverse directions. Failure to comply may result in erratic rotation operations.

- 1.0 **PREPARE** to rotate CONTAINMENT VESSEL using VESSEL ROTATION CONTROL PENDANT.
- 1.1 **CONNECT** VESSEL ROTATION CONTROL PENDANT P3 to J3 on VESSEL CONTROL PANEL.
- 1.2 **VERIFY** support jack has been lowered.

Caution

Loose tools or other hardware left on top of or underneath rotating EDS containment vessel may be damaged.

Note

Rotation may be stopped at any time by pushing STOP button on vessel rotation control pendant.

2.0 ROTATE ROTARY AGITATION SUBSYSTEM in counterclockwise direction.

2.1 **INSERT** Vessel Rotation Control Key in AUTO/OFF/MAN switch and **TURN** to MAN position (green MANUAL READY light and red HALT button illuminate).

2.2 **PUSH** REV button on VESSEL ROTATION CONTROL PENDANT to start EDS CONTAINMENT VESSEL counterclockwise rotation.

2.3 **RECORD** CONTAINMENT VESSEL rotation start time.

CALLOUT: Announce time containment vessel rotation started.

2.4 **CONTROL** access to EDS platform during CONTAINMENT VESSEL rotation.

3.0 STOP ROTARY AGITATION SUBSYSTEM.

3.1 **PUSH** STOP button on VESSEL ROTATION CONTROL PENDANT to stop CONTAINMENT VESSEL rotation.

3.2 **RECORD** rotation stop time.

CALLOUT: Announce time rotation halted.

Caution

Loose tools or other hardware left on top of or underneath rotating containment vessel may be damaged.

Note

Rotation may be stopped at any time by pushing STOP button on vessel rotation control pendant.

- 4.0 **ROTATE** ROTARY AGITATION SUBSYSTEM in clockwise direction.
 - 4.1 **PUSH** FWD button on VESSEL ROTATION CONTROL PENDANT to start CONTAINMENT VESSEL clockwise rotation.
 - 4.2 **RECORD** CONTAINMENT VESSEL rotation start time.

CALLOUT: Announce time containment vessel rotation started.

- 5.0 **STOP** ROTARY AGITATION SUBSYSTEM.
 - 5.1 **PUSH** STOP button on VESSEL ROTATION CONTROL PENDANT to stop CONTAINMENT VESSEL rotation.
 - 5.2 **RECORD** rotation stop time.

CALLOUT: Announce time rotation halted.

- 6.0 **JOG** CONTAINMENT VESSEL to desired position.
 - 6.1 **JOG** CONTAINMENT VESSEL counterclockwise by pushing REV JOG button on VESSEL ROTATION CONTROL PENDANT and **RELEASE** button when desired position is reached.
 - 6.2 **JOG** CONTAINMENT VESSEL clockwise by pushing FWD JOG button on VESSEL ROTATION CONTROL PENDANT and **RELEASE** button when desired position is reached.

7.0 **STOP** ROTARY AGITATION SUBSYSTEM.

7.1 **TURN** Vessel Rotation Control Key to OFF position and **REMOVE** Vessel Rotation Control Key.

8.0 **DISCONNECT** VESSEL ROTATION CONTROL PENDANT P3 from PENDANT connector J3 on VESSEL CONTROL PANEL.

ANNEX E
JOB HAZARD ANALYSIS

ANNEX E JOB HAZARD ANALYSIS

Potential incident and accident scenarios have been defined and risk assessment codes (RACs) have been assigned in accordance with the *System Safety Management Plan for the Non-Stockpile Chemical Materiel Product* (Program Manager for Chemical Demilitarization, 2001). RACs are based on combinations of hazard severity categories and hazard probability (or frequency of occurrence) categories. Definitions of the hazard severities and hazard probabilities are listed in Tables E-1 and E-2, respectively, and the RAC matrix is provided in Table E-3.

A summary of the hazards identified per procedure is given in Table E-4. A summary of the hazards, along with the RACs assigned, is given in Table E-5. Hazards assigned RAC 1 require corrective action prior to acceptance of the plan. Also, hazards assigned RAC 2 require corrective action, but are of lower priority than RAC 1 hazards. When the resolutions do not lower the RAC to 3 or 4, the RAC 1 and RAC 2 hazards must be formally accepted by the designated authorities in accordance with the System Safety Management Plan.

Table E-1. Hazard Severity Categories

Description	Category	Mishap Definition
Catastrophic	I	May cause death, system loss, or severe environmental damage.
Critical	II	May cause severe injury, severe occupational illness, or major system or environmental damage.
Marginal	III	May cause minor injury, minor occupational illness, or minor system or environmental damage.
Negligible	IV	May cause less than minor injury, occupational illness, or less than minor system or environmental damage.

Source: Program Manager for Chemical Demilitarization, *System Safety Management Plan for the Non-Stockpile Chemical Materiel Product*, August 2001

Table E-2. Hazard Probability Categories

Frequency of Occurrence	Level	Description
Frequent	A	Will be continuously experienced.
Probable	B	Will occur frequently in the life of the system.
Occasional	C	Will occur several times in the life of the system.
Remote	D	Unlikely, but can reasonably be expected to occur in the life of the system.
Improbable	E	Unlikely, but possible to occur in the life of the system.

Source: Program Manager for Chemical Demilitarization, *System Safety Management Plan for the Non-Stockpile Chemical Materiel Product*, August 2001

Table E-3. Risk Assessment Code Matrix

Frequency of Occurrence	Consequence Category			
	I Catastrophic	II Critical	III Marginal	IV Negligible
A – Frequent	1	1	1	3
B – Probable	1	1	2	3
C – Occasional	1	2	3	4
D – Remote	2	2	3	4
E – Improbable	3	3	3	4
Hazard Risk Index	Risk Assessment Code	Action Required		
IA, IB, IC, IIA, IIB, IIIA	1	Unacceptable – immediate corrective action required. Asst. Sec. Army Decision.		
ID, IIC, IID, IIIB	2	Undesirable – reduced priority, corrective action required. RCMD decision.		
IE, IIE, IIIC, IIID, IIIE, IVA, IVB	3	Acceptable – low priority for corrective action (may not warrant action). System Safety Program Manager decision.		
IVC, IVD, IVE	4	Acceptable – no corrective action required.		

Source: Program Manager for Chemical Demilitarization, *System Safety Management Plan for the Non-Stockpile Chemical Materiel Product*, August 2001

Table E-4. Job Hazards by Procedure (EDS Phase 2 Steam Series Units)

Procedure Number	Job Hazards												
	Pinch or Crush	Caught Between/ Struck By	Splash/ Spill	Noise	Burn	Explosive	Sharp Edges	Shock	Ergo - lifting	Chemical Exposure	High Pressure	Slip, Trip, Fall	Heat Stress
3 - Prepare for Liquid & Steam Transfer Operations	X		X		X					X	X		
4 - Prepare EDS Firing System	X					X	X	X					
5 - Select FSS & Explosives	X						X		X				
6 - Transfer Munition						X	X		X	X			X
7 - Assemble FSS & Munition						X	X		X	X			X
8 - Closing & Sealing EDS Vessel Door	X	X		X		X	X		X	X	X		X
9 - Detonate Munition		X			X	X	X	X		X			X
10 - Chemically Treat EDS Vessel Contents		X		X	X						X		X
11 - Collect Neutralent Sample		X		X	X					X	X		X
12 - Remove Neutralent from Vessel		X	X	X	X		X			X	X		X
13 - Rinse & Drain EDS Vessel		X	X	X	X		X				X		X

Table E-4. Job Hazards by Procedure (EDS Phase 2 Steam Series Units) (Continued)

Procedure Number	Job Hazards												
	Pinch or Crush	Caught Between/ Struck By	Splash/ Spill	Noise	Burn	Explosive	Sharp Edges	Shock	Ergo - lifting	Chemical Exposure	High Pressure	Slip, Trip, Fall	Heat Stress
14 - Collect Vapor Sample										X	X		X
15 - Open EDS Vessel Door	X	X		X	X		X			X			X
16 - Remove Solid Waste from Vessel	X	X				X	X			X		X	X
17 - Clean & Prepare Equipment		X	X		X		X			X			X
18 - Drain EDS Tanks	X	X	X										X
19 - Monitor and Decon EDS	X	X		X			X			X	X		X
Annex C - Lab Sample Bottle Extraction										X	X		
Annex D - Vessel Rotation Control	X	X											
Annex I - Decon/Disposal of Overpacks, Packing Material, &PPE	X		X				X		X	X			X
Annex L - Lift Assist Subsystem Operation	X	X					X		X				X

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
1	Procedure 3. Struck by Hazard - Move reagent containers weighing up to 1,000 pounds and lose control of container.	Pinching or crushing injury	(IIC) 2	Use material handling equipment to move containers into position. Wear leather gloves and steel-toe safety shoes. Operators trained on MHE to ensure proper handling of loads.	(IIE) 3	
2	Procedure 3, Steps 2.2, 5.0, and 5.2. Chemical splashes/drips while filling supply tanks or transferring/filling containers with liquids.	Minor injury to personnel (chemical burn)	(IIIC) 3	Operators trained in proper/filling/transfer procedures and handling containers to reduce splash/spill hazards. Operators will wear personal protective equipment (PPE).	(IIID) 3	PPE per Annex in SOP
3	Procedure 3, Step 2.3. Burn Hazard - Personnel contact hot components.	Minor injury to personnel (burn)	(IIID) 3	Incorporate warning in SOP advising personnel to be aware the EDS containment vessel and components of the Steam Treatment Subsystem will present a burn hazard after heating. Use caution to prevent burn injury.	(IIID) 3	
4	Procedure 3, Steps 3.0, 4.0, and 5.0. Pressure hazard if a pressurized line or valve ruptures under pressure.	Minor injury to personnel (contusion)	(IIID) 3	During training, advise operating personnel to stay a reasonable distance from items under pressure. Train operators in proper techniques to connect/disconnect lines/hoses.	(IIID) 3	Whip checks are not appropriate as lines are connected and disconnected throughout the procedure.

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
5	Procedure 4, Steps 2.2, 3.7, 8.1, 11.2, 14.2.3, and 15.5. Unauthorized detonation because safety interlock plug not being maintained.	Personnel injury or death	(IC) 1	Fireset operator trained to maintain control of fireset interlock plug. Procedures call out specific steps to maintain control.	(IE) 3	
6	Procedure 4, Step 7.6.2. Torn PPE from sharp edges and containment vessel door.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will wear leather gloves over rubber gloves to protect from tearing or ripping.	(IIID) 3	
7	Procedure 4, Step 7.6.4. Pinch/Crush Hazard - EDS Containment vessel door is very heavy and presents potential for pinching or crushing body parts.	Serious injury (crushing or pinching)	(IID) 2	Train operators to keep body out of pinch points when closing the containment vessel door. Use two operators and wear leather gloves.	(IIE) 3	
8	Procedure 4, Step 8.0. Shock Hazard - Personnel not cleared of EDS Trailer during high-potential test.	Minor injury to personnel (electric shock)	(IIID) 3	The fireset operator will verify all personnel are clear of the trailer prior to testing the fireset.	(IIIE) 3	If personnel are not clear of EDS Trailer, the potential for contact with high voltage exists. Per Sandia National Laboratories, Firing System does not generate sufficient energy output to seriously harm personnel.

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
9	Procedure 4, Steps 10.0 and 14.2.8. Shock Hazard - High-potential Test and Dry Run Load Test output module fails to discharge to detonator cable.	Personnel injury (electric shock)	(IIID) 3	View voltage gauge and verify the gauge reads zero prior to connecting the detonator cables.	(IIIE) 3	Refer to high-potential test output module. Per Sandia National Laboratories, Firing System does not generate sufficient energy output to seriously harm personnel.
10	Procedure 5, Steps 2.1 and 2.2. Ergonomic Hazard - Lifting heavy objects and being struck by dropped items.	Personnel injury (strain/sprain, crushing or pinching injury)	(IIC) 2	Personnel trained in proper lifting techniques. Use MHE when available. Lifting by multiple operators may be required. Wear appropriate PPE for lifting the loading table and for assembly of the FSS. Refer to EDS FSS/Munition Manual Lifting Limitations.	(IIIC) 3	Operators must plan activities carefully and communicate well during all moves due to weight and awkward shape of parts being assembled. EDS FSS/Munition Manual Lifting Limitations will be followed when lifting/positioning table and FSS. Use of AFSS reduces some ergonomic issues (e.g., handling FSS).

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
11	Procedure 5, Step 3.0. Cut or torn PPE from sharp edges, metal parts, and vessel door.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will wear leather gloves over rubber gloves to protect from tearing or ripping.	(IIID) 3	
12	Procedure 6, Steps 2.0, 7.0, 8.0, 10.3.2, and 10.4.2. Exposure to chemicals.	Personnel injury (dermal contact and/or inhalation)	(IIC) 2	Wear PPE in accordance with PPE annex in the SOP. Continuous monitoring will provide early warning if chemicals are present.	(IIID) 3	
13	Procedure 6, Steps 4.0, 9.0, and 13.2. Dropping armed munition.	Explosion with death and significant equipment damage	(ID) 2	Munition handling by trained explosive operators and non-essential personnel cleared from the area.	(ID) 2	Corrective actions will not reduce the severity or the likelihood of a drop.

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
14	Procedure 6, Steps 4.0, 4.2.2, 9.0, 9.1.2, 10.3.2.3, 10.4.2.3, and 13.2. Ergonomic Hazard - Lifting heavy objects and being struck by dropped items.	Personnel injury (strain/sprain, crushing or pinching injury)	(IIC) 2	Personnel trained in proper lifting techniques. Use MHE when available. Lifting by multiple operators may be required. Wear appropriate PPE for lifting the loading table and for assembly of the FSS. Refer to EDS FSS/Munition Manual Lifting Limitations.	(IIIC) 3	Operators must plan activities carefully and communicate well during all moves due to weight and awkward shape of parts being assembled. EDS FSS/Munition Manual Lifting Limitations will be followed when lifting/positioning table and FSS. Use of AFSS reduces some ergonomic issues (e.g., handling FSS).
15	Procedure 6, Steps 5.1, 7.2, 8.2.2.2.2, and 8.3.2.2.2. Cut or torn PPE from sharp edges, metal parts, and vessel door.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will wear leather gloves over rubber gloves to protect from tearing or ripping.	(IIID) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
16	Procedure 6, Step 11.0. Discovery of armed and fuzed munition.	Severe injury or death to personnel	(ID) 2	<p>RCWM to be processed in the EDS are evaluated by the MARB to determine chemical fill and presence of explosive components and their condition.</p> <p>Operators will review MARB data prior to each operation to ensure received items are the correct item to be processed.</p> <p>Stockpile CWM to be processed will be evaluated and determined suitable for processing in the EDS by local ammo surveillance/QASAS personnel.</p>	(IE) 3	
17	Procedure 6, Step 11.0. Exceeding NEW capacity of EDS vessel resulting in damage to equipment.	Loss of EDS unit	(ID) 2	<p>RCWM to be processed in the EDS are evaluated by the MARB to determine chemical fill and presence of explosive components and their condition.</p> <p>Operators will review MARB data prior to each operation to ensure received items are the correct item to be processed.</p> <p>Stockpile CWM to be processed will be evaluated and determined suitable for processing in the EDS by local ammo surveillance/QASAS personnel.</p>	(IE) 3	EDS vessel operational NEW is rated at 80% of the total explosive weight used when vessel was tested to establish operation NEW. If the system fails because of NEW being exceeded, the containment vessel door is expected to open slightly to release pressure and reclose.

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
18	Procedure 7. Exposure to chemicals.	Personnel injury (dermal contact and/or inhalation)	(IIC) 2	Wear PPE in accordance with PPE annex in the SOP. Continuous monitoring will provide early warning if chemicals are present.	(IIID) 3	
19	Procedure 7. Cut or torn PPE from sharp edges, metal parts, and vessel door.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will wear leather gloves over rubber gloves to protect from tearing or ripping.	(IIID) 3	
20	Procedure 7, Steps 4.1, 4.2.2, 4.3, 4.15, 5.1, 5.13, 5.14, 6.3.1, 6.3.12, 7.8, and 7.9. Ergonomic Hazard - Lifting heavy objects and being struck by dropped items.	Personnel injury (strain/sprain, crushing or pinching injury)	(IIC) 2	Personnel trained in proper lifting techniques. Use MHE when available. Lifting by multiple operators may be required. Wear appropriate PPE for lifting the loading table and for assembly of the munitions holder. Refer to EDS FSS/Munition Manual Lifting Limitations.	(IIIC) 3	Operators must plan activities carefully and communicate well during all moves due to weight and awkward shape of parts being assembled. EDS FSS/Munition Manual Lifting Limitations will be followed when lifting/positioning munitions holder and munitions. Use of AFSS reduces some ergonomic issues (e.g., handling FSS).

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
21	Procedure 7, Steps 4.10, 5.8, 6.3.9, and 7.3. Unauthorized detonation because safety interlock plug not being maintained.	Personnel injury or death	(IC) 1	Fireset operator trained to maintain control of fireset interlock plug. Procedures call out specific steps to maintain control.	(IE) 3	
22	Procedure 8, Steps 2.6 and 12.7.16.2.1. Pinch/Crush/Struck Hazard - Failure to remove clamp control key before attempting to pry apart clamp hanger assemblies or before using screw drive wheel.	Serious injury (crushing or pinching)	(IID) 2	Train operators to keep body out of pinch points when closing the containment vessel door. Operators will wear leather gloves.	(IE) 3	
23	Procedure 8, Steps 1.2, 12.5.4, and 12.7.1. Cut or torn PPE from sharp edges, metal parts, and vessel door.	Minor injury to personnel (laceration)	(IIC) 3	Operators will wear appropriate PPE (i.e., leather gloves over rubber gloves) to protect from tearing or ripping steps.	(IID) 3	
24	Procedure 8, Steps 1.4, 12.7.1, and 12.11. Pinch/Crush Hazard - Containment vessel door is very heavy and presents potential for pinching or crushing body parts.	Serious injury (crushing or pinching)	(IID) 2	Train operators to keep body out of pinch points when opening and closing the containment vessel door. Use two operators and wear leather gloves.	(IE) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
25	Procedure 8, Steps 3.0, 5.0, and 12.7. Noise Hazard - Noise levels above 85 dBA.	Hearing loss	(IIIB) 2	Personnel required to wear hearing protection when noise levels exceed acceptable levels. Noise survey will be conducted and high noise areas demarcated. Personnel enrolled in a Hearing Conservation Program.	(IIID) 3	
26	Procedure 8, Step 6.0. Injection hazard due to grabbing a leaking hydraulic hose under pressure.	Minor injury (laceration)	(IIIC) 3	Operator training.	(III) 3	
27	Procedure 8, Steps 6.5 and 12.5.1. Pressure hazard if a pressurized line or valve ruptures under pressure.	Minor injury to personnel (contusion)	(IIID) 3	During training, advise operating personnel to stay a reasonable distance from items under pressure. Train operators in proper techniques to connect/disconnect lines/hoses.	(IIID) 3	Whip checks are not appropriate as lines are connected and disconnected throughout the procedure.
28	Procedure 8, Steps 6.5 and 12.5. Struck by Hazard - Struck by threaded rods when tensioner under pressure.	Personal injury (laceration)	(IIC) 2	Operator training conducted to ensure personnel do not place body parts in line with threaded rods in case of failure.	(IIE) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
29	Procedure 8, Step 12.7. Pinch/caught by containment vessel door due to unexpected pressure on containment vessel when opening door.	Personal injury (bruise/contusion)	(IIID) 3	Design of clamps prevents door opening, but there could be a vapor release.	(IIIE) 3	
30	Procedure 8, Step 12.7. Potential presence of agent vapors due to venting of containment vessel upon vessel door opening.	Personal injury (exposure to chemical agent)	(IIID) 3	Personnel wear PPE (respiratory protection) to protect against vapor release.	(IIIE) 3	
31	Procedure 8, Steps 12.8.2.5 and 12.8.2.10. Explosive Hazard - Armed munition explodes when being removed from containment vessel.	Severe injury or death	(ID) 2	Munition handling by certified explosive operators and non-essential personnel cleared from the area.	(IE) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
32	Procedure 8, Steps 12.8.2.5 and 12.8.2.10. Ergonomic Hazard - Lifting heavy objects and being struck by dropped items.	Personnel injury (strain/sprain, crushing or pinching injury)	(IIC) 2	Personnel trained in proper lifting techniques. Use MHE when available. Lifting by multiple operators may be required. Wear appropriate PPE for lifting the loading table and for assembly of the munitions holder. Refer to EDS FSS/Munition Manual Lifting Limitations.	(IIIC) 3	Operators must plan activities carefully and communicate well during all moves due to weight and awkward shape of parts being assembled. EDS FSS/Munition Manual Lifting Limitations will be followed when lifting/positioning munitions holder and munitions. Use of AFSS reduces some ergonomic issues (e.g., handling FSS).
33	Procedure 8, Step 12.8.2.5.2.5. Struck by Hazard - Tensioned cable, grappler bar, or cam-lock lifting clamp inadvertently is released due to being over-stressed or material failure.	Minor injury to personnel (contusion)	(IIID) 3	Operating personnel will stay a reasonable distance away and not in line with items under tension.	(IIID) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
34	Procedure 9. Premature detonation due to failure to properly disconnect exterior detonator jack and install exterior shorting jack could allow munition to detonate when door is not secure.	Severe injury or death	(ID) 2	Only trained explosive operators will perform this task. Provide additional warning in SOP and train operations personnel in proper procedure and necessity/importance of ensuring appropriate precautions have been taken.	(IE) 3	
35	Procedure 9, Steps 1.1 and 2.6. Shock Hazard - Personnel not cleared of EDS Trailer during continuity check and EDS Firing System electrically charged prior to detonation.	Minor injury to personnel (electric shock)	(IIID) 3	The Operator will verify all personnel are clear of the trailer.	(IIIE) 3	If personnel are not clear of the trailer, the potential for contact with high voltage exists. Per Sandia National Laboratories, the Firing System is not capable of sufficient energy output to seriously harm personnel.
36	Procedure 9, Steps 1.1, 3.6, and 9.1.3. Unauthorized detonation because safety interlock plug not being maintained.	Personnel injury or death	(IC) 1	Fireset operator trained to maintain control of fireset interlock plug. Procedures call out specific steps to maintain control.	(IE) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
37	Procedure 9, Step 6.0. Chemical agent contamination of helium leak detector internal components if chemical agent migrates across the Grayloc® seal into the annular space during post-detonation helium leak test.	Personnel injury	(IIC) 2	Design and fit of EDS sealing surfaces and seals along with proper preparation and installation of seals normally precludes the migration of chemical agent into the annular space. Use of helium to determine adequacy of seal. Chemical agent monitoring is being conducted during operations. Equipment decontamination procedures.	(IIE) 3	A release of chemical agent vapor into the annular space was given a hazard severity of marginal by the analyst after being resolved because of the design of the EDS, chemical agent monitoring during operations, operators would be working in PPE, and the equipment decontamination procedures.
38	Procedure 9, Step 9.1. Explosive Hazard - Operators do not wait 30 minutes before approaching EDS after misfire.	Severe injury or death	(ID) 2	The Operator will verify that 30 minutes have elapsed before approaching the EDS after a misfire.	(IE) 3	Only explosive operators permitted entry.
39	Procedure 9, Step 10.1. Cut or torn PPE from sharp edges, metal parts, and vessel door.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will be wearing appropriate PPE (i.e., leather gloves over rubber gloves) to protect from tearing or ripping when performing this step.	(IIID) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
40	Procedure 9, Step 10.2. Burn Hazard - Personnel contact hot components.	Minor injury to personnel (burn)	(IIID) 3	Incorporate warning in SOP advising personnel to be aware the EDS containment vessel and components of the Steam Treatment Subsystem will present a burn hazard after heating. Use caution to prevent burn injury.	(IIID) 3	
41	Procedure 9, Step 10.5.2. Caught Between/Struck by Hazard - Personnel become entrapped between Rotary Agitation Subsystem and support structure or struck by loose items (tools, etc.) resting on the containment vessel.	Severe injury or death (pinning or crushing)	(ID) 2	Warning advisory at beginning of SOP requires team leader to verify all personnel are clear prior to initiating containment rotation. AND Caution advisory requires loose items on or around the containment vessel be removed.	(IE) 3	
42	Procedure 10, Steps 2.5, 10.1.3, and 10.2.3. Noise Hazard – Noise levels above 85 dBA.	Hearing loss	(IIIB) 2	Personnel required to wear hearing protection when noise levels exceed acceptable levels. Noise survey will be conducted and high noise areas demarcated. Personnel enrolled in a Hearing Conservation Program.	(IIID) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
43	Procedure 10, Steps 2.7 and 6.4. Pressure hazard if a pressurized line or valve ruptures under pressure.	Minor injury to personnel (contusion)	(IIID) 3	During training, advise operating personnel to stay a reasonable distance from items under pressure. Train operators in proper techniques to connect/disconnect lines/hoses.	(IIID) 3	Whip checks are not appropriate as lines are connected and disconnected throughout the procedure.
44	Procedure 10, Step 6.0. Burn Hazard - Personnel contact hot components.	Minor injury to personnel (burn)	(IIID) 3	Incorporate warning in SOP advising personnel to be aware the EDS containment vessel and components of the Steam Treatment Subsystem will present a burn hazard after heating. Use caution to prevent burn injury.	(IIID) 3	
45	Procedure 10, Step 7.0. Caught Between/Struck by Hazard - Personnel become entrapped between Rotary Agitation Subsystem and support structure or struck by loose items (tools, etc.) resting on the containment vessel.	Severe injury or death (pinching or crushing)	(ID) 2	Warning advisory at beginning of SOP requires team leader to verify all personnel are clear prior to initiating containment rotation. AND Caution advisory requires loose items on or around the containment vessel be removed.	(IE) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
46	Procedure 11. Pressure hazard if a pressurized line or valve ruptures under pressure.	Minor injury to personnel (contusion)	(IIID) 3	During training, advise operating personnel to stay a reasonable distance from items under pressure. Train operators in proper techniques to connect/disconnect lines/hoses.	(IIID) 3	Whip checks are not appropriate as lines are connected and disconnected throughout the procedure.
47	Procedure 11. Exposure to chemicals.	Personnel injury (dermal contact and/or inhalation)	(IIC) 2	Wear PPE in accordance with PPE annex in the SOP. Continuous monitoring will provide early warning if chemicals are present.	(IIID) 3	
48	Procedure 11. Burn Hazard - Personnel contact hot components.	Minor injury to personnel (burn)	(IIID) 3	Incorporate warning in SOP advising personnel to be aware the EDS containment vessel and components of the Steam Treatment Subsystem will present a burn hazard after heating. Use caution to prevent burn injury.	(IIID) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
49	Procedure 11, Steps 2.0, 13.2, and 17.2.2.1. Caught Between/Struck by Hazard - Personnel become entrapped between Rotary Agitation Subsystem and support structure or struck by loose items (tools, etc.) resting on the containment vessel.	Severe injury or death (pinning or crushing)	(ID) 2	Warning advisory at beginning of SOP requires team leader verify all personnel are clear prior to initiating containment rotation. AND Caution advisory requires loose items on or around the containment vessel be removed.	(IE) 3	
50	Procedure 11, Steps 5.2.1.1, 8.0, 12.2.1, 12.2.2, and 17.2.2.5. Noise Hazard - Noise levels above 85 dBA.	Hearing loss	(IIIB) 2	Personnel required to wear hearing protection when noise levels exceed acceptable levels. Noise survey will be conducted and high noise areas demarcated. Personnel enrolled in a Hearing Conservation Program.	(IIID) 3	
51	Procedure 11, Steps 7.0, 11.7, and 23.0. Exposure to Chemicals - Agent release from sample line.	Minor injury or illness to personnel (dermal contact and/or inhalation)	(IIC) 2	Personnel are required to wear appropriate PPE. Perform rinse IAW SOP.	(IIIE) 3	Refer to PPE Annex G of the SOP.

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
52	Procedure 11, Step 17.2.2. Burn Hazard - Draining liquids when containment vessel temperature exceeds 65°C.	Minor injury to personnel (burn)	(IIID) 3	Incorporate warning in SOP advising personnel to be aware the EDS containment vessel and components of the Steam Treatment Subsystem will present a burn hazard after heating. Use caution to prevent burn injury.	(IIID) 3	
53	Procedure 12. Pressure hazard if a pressurized line or valve ruptures under pressure.	Minor injury to personnel (contusion)	(IIID) 3	During training, advise operating personnel to stay a reasonable distance from items under pressure. Train operators in proper techniques to connect/disconnect lines/hoses.	(IIID) 3	Whip checks are not appropriate as lines are connected and disconnected throughout the procedure.
54	Procedure 12. Exposure to chemicals.	Personnel injury (dermal contact and/or inhalation)	(IIC) 2	Wear PPE in accordance with PPE annex in the SOP. Continuous monitoring will provide early warning if chemicals are present.	(IIID) 3	
55	Procedure 12. Burn Hazard - Personnel contact hot components.	Minor injury to personnel (burn)	(IIID) 3	Incorporate warning in SOP advising personnel to be aware the EDS containment vessel and components of the Steam Treatment Subsystem will present a burn hazard after heating. Use caution to prevent burn injury.	(IIID) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
56	Procedure 12, Steps 1.2, 4.5.2.1, and 7.10.1. Cut or torn PPE from sharp edges, metal parts, and vessel door.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will wear appropriate PPE (i.e., leather gloves over rubber gloves) to protect from tearing or ripping steps.	(IIID) 3	
57	Procedure 12, Step 2.3. Caught Between/Struck by Hazard - Personnel become entrapped between Rotary Agitation Subsystem and support structure or struck by loose items (tools, etc.) resting on the containment vessel.	Severe injury or death (pinning or crushing)	(ID) 2	Warning advisory at beginning of SOP requires team leader verify all personnel are clear prior to initiating containment rotation. AND Caution advisory requires loose items on or around the containment vessel be removed.	(IE) 3	
58	Procedure 12, Step 4.0. Burn Hazard - Draining liquids when containment vessel temperature exceeds 65°C.	Minor injury to personnel (burn)	(IIID) 3	Incorporate warning in SOP advising personnel to be aware the EDS containment vessel and components of the Steam Treatment Subsystem will present a burn hazard after heating. Use caution to prevent burn injury.	(IIID) 3	
59	Procedure 12, Step 4.0. Spill, Contact with Chemicals - Level of liquid in containers overflows.	Minor injury to personnel (dermal and/or inhalation)	(IIIC) 3	Wear PPE as specified in PPE annex of the SOP. Containers set up in secondary containment and on calibrated weight scales during pre-operations check. Target weight identified prior to commencing drain.	(IVC) 4	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
60	Procedure 12, Step 4.3.2.2.1. Noise Hazard - Noise levels above 85 dBA.	Hearing loss	(IIIB) 2	Personnel required to wear hearing protection when noise levels exceed acceptable levels. Noise survey will be conducted and high noise areas demarcated. Personnel enrolled in a Hearing Conservation Program.	(IIID) 3	
61	Procedure 13. Pressure hazard if a pressurized line or valve ruptures under pressure.	Minor injury to personnel (contusion)	(IIID) 3	During training, advise operating personnel to stay a reasonable distance from items under pressure. Train operators in proper techniques to connect/disconnect lines/hoses.	(IIID) 3	Whip checks are not appropriate as lines are connected and disconnected throughout the procedure.
62	Procedure 13. Caught Under Hazard – Waste container is knocked off of waste containment pan by MHE.	Severe injury or death (pinning or crushing)	(ID) 2	Waste containers set on weight scales mounted to the waste containment pan. MHE operators guided around waste containers to ensure no contact. Operators are trained to implement emergency procedures, don PPE as appropriate should waste container be compromised.	(IE) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
63	Procedure 13. Exposure to Chemicals - Hazardous chemical release to the atmosphere when waste container is knocked off its waste containment pan.	Minor injury or illness to personnel (dermal contact and/or inhalation)	(IIC) 2	Waste containers set on weight scales mounted to the waste containment pan. MHE operators guided around Waste containers to ensure no contact. Operators are trained to implement emergency procedures, don PPE as appropriate should waste container be compromised.	(IIIC) 3	Refer to PPE Annex G of the SOP.
64	Procedure 13, Steps 2.0, 3.0, 8.0, and 10.0. Caught Between/Struck by Hazard - Personnel become entrapped between Rotary Agitation Subsystem and support structure or struck by loose items (tools, etc.) resting on the containment vessel.	Severe injury or death (pinning or crushing)	(ID) 2	Warning advisory at beginning of SOP requires team leader to verify all personnel are clear prior to initiating containment rotation. AND Caution advisory requires loose items on or around the containment vessel be removed.	(IE) 3	
65	Procedure 13, Steps 3.9.2.1, 7.3, 11.2.1, 12.0, 13.0, 14.0, 16.0, and 17.0. Burn Hazard - Personnel contact hot components.	Minor injury to personnel (burn)	(IIID) 3	Incorporate warning in SOP advising personnel to be aware the EDS containment vessel and components of the Steam Treatment Subsystem will present a burn hazard after heating. Use caution to prevent burn injury.	(IIID) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
66	Procedure 13, Steps 4.2.1.2, 14.1.2.2.3, and 15.2.2.2.2. Noise Hazard - Noise levels above 85 dBA.	Hearing loss	(IIIB) 2	Personnel required to wear hearing protection when noise levels exceed acceptable levels. Noise survey will be conducted and high noise areas demarcated. Personnel enrolled in a Hearing Conservation Program.	(IIID) 3	
67	Procedure 13, Step 12.0. Spill, Contact with Chemicals - Level of liquid in containers overflows.	Minor injury to personnel (dermal and/or inhalation)	(IIIC) 3	Wear PPE as specified in PPE annex of the SOP. Containers set up in secondary containment and on calibrated weight scales during pre-operations check. Target weight identified prior to commencing drain.	(IVC) 4	
68	Procedure 13, Step 15.4.2.1. Cut or torn PPE from sharp edges, metal parts, and vessel door.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will wear appropriate PPE (i.e., leather gloves over rubber gloves) to protect from tearing or ripping steps.	(IIID) 3	
69	Procedure 14. Pressure hazard if a pressurized line or valve ruptures under pressure.	Minor injury to personnel (contusion)	(IIID) 3	During training, advise operating personnel to stay a reasonable distance from items under pressure. Train operators in proper techniques to connect/disconnect lines/hoses.	(IIID) 3	Whip checks are not appropriate as lines are connected and disconnected throughout the procedure.

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
70	Procedure 14, Step 2.0. High Pressure Condition - Vapor release if, when attempting to take vapor sample and containment vessel pressure is above 5 psig.	Minor injury or illness to personnel (dermal contact and/or inhalation)	(IIC) 2	Wear PPE as specified in PPE annex of the SOP and put warning in SOPs. SOP contains steps to address when vessel pressure is not 5 psig.	(IIIC) 3	Refer to PPE Annex G of the SOP.
71	Procedure 15, Steps 1.0 and 3.0. Burn Hazard - Personnel contact hot components.	Minor injury to personnel (burn)	(IIID) 3	Incorporate warning in SOP advising personnel to be aware the EDS containment vessel and components of the Steam Treatment Subsystem will present a burn hazard after heating. Use caution to prevent burn injury.	(IIID) 3	
72	Procedure 15, Steps 2.0, 8.0, 10.0, and 17.0. Caught Between/Struck by Hazard - Personnel become entrapped between Rotary Agitation Subsystem and support structure or struck by loose items (tools, etc.) resting on the containment vessel.	Severe injury or death (pinning or crushing)	(ID) 2	Warning advisory at beginning of SOP requires team leader ensure all personnel are clear prior to initiating containment rotation. AND Caution advisory requires loose items on or around the containment vessel be removed.	(IE) 3	
73	Procedure 15, Steps 5.0 and 14.0. Injection hazard due to grabbing a leaking hydraulic hose under pressure.	Minor injury (laceration)	(IIIC) 3	Operator training.	(III) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
74	Procedure 15, Steps 6.1 and 14.5. Pressure hazard if a pressurized line or valve ruptures under pressure.	Minor injury to personnel (contusion)	(IIID) 3	During training, advise operating personnel to stay a reasonable distance from items under pressure. Train operators in proper techniques to connect/disconnect lines/hoses.	(IIID) 3	Whip checks are not appropriate as lines are connected and disconnected throughout the procedure.
75	Procedure 15, Steps 6.2 and 14.6. Struck by Hazard - Struck by threaded rods when tensioner under pressure.	Personal injury (laceration)	(IIC) 2	Operator training conducted to ensure personnel do not place body parts in line with threaded rods in case of failure.	(IIE) 3	
76	Procedure 15, Steps 6.4, 8.1, and 12.1. Cut or torn PPE from sharp edges, metal parts, and vessel door.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will wear appropriate PPE (i.e., leather gloves over rubber gloves) to protect from tearing or ripping steps.	(IIID) 3	
77	Procedure 15, Step 8.0. Pinch/caught by containment vessel door due to unexpected pressure on containment vessel when opening door.	Personal injury (bruise/contusion)	(IIID) 3	Design of clamps prevents door opening, but there could be a vapor release.	(IIIE) 3	
78	Procedure 15, Steps 8.0 and 8.18. Potential presence of agent vapors due to venting containment vessel upon vessel door opening.	Personal injury (exposure to chemical agent)	(IIID) 3	Personnel wear PPE (respiratory protection) to protect against vapor release.	(IIIE) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
79	Procedure 15, Step 8.0. Noise Hazard - Noise levels above 85 dBA.	Hearing loss	(IIIB) 2	Personnel required to wear hearing protection when noise levels exceed acceptable levels. Noise survey will be conducted and high noise areas demarcated. Personnel enrolled in a Hearing Conservation Program.	(IIID) 3	
80	Procedure 15, Steps 8.18 and 10.2. Pinch/Crush Hazard - Containment vessel door is very heavy and presents potential for pinching or crushing body parts.	Serious injury (crushing or pinching)	(IID) 2	Train operators to keep body out of pinch points when closing the containment vessel door. Use two operators and wear leather gloves.	(IIE) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
81	Procedure 16. Crush/Pinch/Cut Hazards - Personal injury from cleaning out containment vessel.	Minor injury to personnel	(IIID) 3	Operators are trained to use extreme caution when removing materials from containment vessel after processing. Wear PPE as specified in SOP. Refer to EDS FSS/Munition Manual Lifting Limitations.	(IVD) 4	Operators must plan activities carefully and communicate well during all moves due to weight and awkward shape of parts being assembled. EDS FSS/Munition Manual Lifting Limitations will be followed when lifting/positioning munitions holder and munitions. Use of AFSS reduces some ergonomic issues (e.g., handling FSS).
82	Procedure 16. Exposure to chemicals.	Personnel injury (dermal contact and/or inhalation)	(IIC) 2	Wear PPE in accordance with PPE annex in the SOP. Continuous monitoring will provide early warning if chemicals are present.	(IIID) 3	
83	Procedure 16, Steps 1.0 and 4.0. Explosive Hazard - Explosive components are found.	Severe injury or death	(ID) 2	Explosive operators are trained to recognize untreated explosives. Procedures address proper handling of untreated explosives. Personnel wear PPE.	(IE) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
84	Procedure 16, Steps 1.2, 1.3.2.1, 5.2.2.2, and 6.1. Cut or torn PPE from sharp edges, metal parts, and vessel door.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will wear appropriate PPE (i.e., leather gloves over rubber gloves) to protect from tearing or ripping steps.	(IIID) 3	
85	Procedure 16, Steps 1.2.1.2.3 and 6.2.2.3. Struck by Hazard - Tensioned cable, grapples bar, or cam-lock lifting clamp inadvertently is released due to being over-stressed or material failure.	Minor injury to personnel (contusion)	(IIID) 3	Operating personnel will stay a reasonable distance away and not in line with items under tension.	(IIID) 3	
86	Procedure 16, Step 2.2. Exposure to Chemicals - Personnel do not properly decontaminate serviceable AFSS components.	Minor injury to personnel (dermal contact and/or inhalation)	(IID) 2	Wear appropriate level of PPE until AFSS components are decontaminated, monitored, and proven to be cleared to appropriate level.	(IIE) 3	
87	Procedure 16, Step 2.3. Slip, Trip, or Fall Hazards - Material improperly secured in working/walking area.	Minor injury to personnel	(IIID) 3	Ensure debris pans or drums are available to keep the working/walking space clear of slip, trip, or fall hazards.	(IIID) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
88	Procedure 16, Step 5.2.2.2. Pinch/Crush Hazard - Containment vessel door is very heavy and presents potential for pinching or crushing body parts.	Serious injury (crushing or pinching)	(IID) 2	Train operators to keep body out of pinch points when closing the containment vessel door. Use two operators and wear leather gloves.	(IIE) 3	
89	Procedure 17. Exposure to chemicals.	Personnel injury (dermal contact and/or inhalation)	(IIC) 2	Wear PPE in accordance with PPE annex in the SOP. Continuous monitoring will provide early warning if chemicals are present.	(IIID) 3	
90	Procedure 17, Step 2.1. Cut or torn PPE from sharp edges, metal parts, and vessel door.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will wear appropriate PPE (i.e., leather gloves over rubber gloves) to protect from tearing or ripping steps.	(IIID) 3	
91	Procedure 17, Step 18.0. Burn Hazard - Draining liquids when Tank 3 temperature exceeds 65°C.	Minor injury to personnel (burn)	(IIID) 3	Incorporate warning in SOP advising personnel to be aware containment vessel and components of the Steam Treatment Subsystem present a burn hazard after heating. Use caution to prevent burn injury.	(IIID) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
92	Procedure 17, Step 18.0. Spill, Contact with Chemicals - Level of liquid in containers overflows.	Minor injury to personnel (dermal and/or inhalation)	(IIIC) 3	Wear PPE as specified in PPE annex of the SOP. Containers set up in secondary containment and on calibrated weight scales during pre-operations check. Target weight identified prior to commencing drain.	(IVC) 4	
93	Procedure 17, Step 28.4. Caught Under Hazard – Waste container is knocked off of its waste containment pan stand by MHE.	Severe injury or death (pinning or crushing)	(IID) 2	Waste containers set on weight scales mounted to the waste containment pan. MHE operators guided around waste containers to ensure no contact. Operators are trained to implement emergency procedures, don PPE as appropriate should waste container be compromised.	(IE) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
94	Procedure 17, Step 28.4. Exposure to Chemicals - Hazardous chemical release to the atmosphere when waste container is knocked off its waste containment pan.	Minor injury or illness to personnel (dermal contact and/or inhalation)	(IIC) 2	Waste containers set on weight scales mounted to the waste containment pan. MHE operators guided around Waste containers to ensure no contact. Operators are trained to implement emergency procedures, don PPE as appropriate should waste container be compromised.	(IIIC) 3	Refer to PPE Annex G of the SOP.
95	Procedure 17, Step 37.5. Chemical splashes/drips while filling supply tanks or transferring/filling containers with liquids.	Minor injury to personnel (chemical burn)	(IIIC) 3	Operators trained in proper/filling/transfer procedures and handling containers to reduce splash/spill hazards. Operators will wear PPE.	(IIID) 3	PPE per Annex in SOP
96	Procedure 17, Steps 38.0 and 39.1.1. Burn Hazard - Personnel contact hot components.	Minor injury to personnel (burn)	(IIID) 3	Incorporate warning in SOP advising personnel to be aware the EDS containment vessel and components of the Steam Treatment Subsystem will present a burn hazard after heating. Use caution to prevent burn injury.	(IIID) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
97	Procedure 18. Move reagent containers weighing up to 1,000 pounds and lose control of container.	Pinching or crushing injury	(IIC) 2	Use material handling equipment to move containers into position. Wear leather gloves and steel-toe safety shoes. Operators trained on MHE to ensure proper handling of loads.	(IIE) 3	
98	Procedure 18, Step 1.1.8. Caught Under Hazard - IBC is knocked off of its waste containment pan by MHE.	Severe injury or death (pinning or crushing)	(ID) 2	IBC sets on weight scale mounted to the waste containment pan. MHE operators guided around IBC to ensure no contact. Operators are trained to implement emergency procedures, don PPE as appropriate should IBC be compromised.	(IE) 3	
99	Procedure 18, Step 1.2. Chemical splashes/drips while filling supply tanks or transferring/filling containers with liquids.	Minor injury to personnel (chemical burn)	(IIIC) 3	Operators trained in proper filling/transfer procedures and handling containers to reduce splash/spill hazards. Operators will wear PPE.	(IIID) 3	PPE per Annex in SOP
100	Procedure 19. Exposure to chemicals.	Personnel injury (dermal contact and/or inhalation)	(IIC) 2	Wear PPE in accordance with PPE annex in the SOP. Continuous monitoring will provide early warning when chemicals are present.	(IIID) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
101	Procedure 19, Step 4.5. Pinch/Crush Hazard - Containment vessel door is very heavy and presents potential for pinching or crushing body parts.	Serious injury (crushing or pinching)	(IID) 2	Train operators to keep body out of pinch points when closing the containment vessel door. Use two operators and wear leather gloves.	(IIE) 3	
102	Procedure 19, Steps 4.5 and 5.1. Cut or torn PPE from sharp edges, metal parts, and vessel door.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will wear appropriate PPE (i.e., leather gloves over rubber gloves) to protect from tearing or ripping steps.	(IIID) 3	
103	Procedure 19, Step 5.0. Noise Hazard - Noise levels above 85 dBA.	Hearing loss	(IIIB) 2	Personnel required to wear hearing protection when noise levels exceed acceptable levels. Noise survey will be conducted and high noise areas demarcated. Personnel enrolled in a Hearing Conservation Program.	(IIID) 3	
104	Procedure 19, Step 6.4. Injection hazard due to grabbing a leaking hydraulic hose under pressure.	Minor injury (laceration)	(IIIC) 3	Operator training.	(IIIC) 3	
105	Procedure 19, Step 6.5. Injection hazard due to grabbing a leaking hydraulic hose under pressure.	Minor injury (laceration)	(IIIC) 3	Operator training.	(III) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
106	Procedure 19, Step 6.5. Struck by Hazard - Struck by threaded rods when tensioner under pressure.	Personal injury (laceration)	(IIC) 2	Operator training conducted to ensure personnel do not place body parts in line with threaded rods in case of failure.	(IIE) 3	
107	Procedure 19, Step 8.0. Caught Between/Struck by Hazard - Personnel become entrapped between Rotary Agitation Subsystem and support structure or struck by loose items (tools, etc.) resting on the containment vessel.	Severe injury or death (pinning or crushing)	(ID) 2	Warning advisory at beginning of SOP requires team leader ensure all personnel are clear prior to initiating containment rotation. Caution advisory requires loose items on or around the containment vessel be removed.	(IE) 3	
108	Annex C, Step 7.0. Exposure to Chemical - Operator mishandles needle when venting sample bottle.	Severe injury or death (high pressure and puncture)	(ID) 2	Exercise caution when handling needle and comply with warning. Operators trained and use the SOP. Place warning in SOP.	(IE) 3	
109	Annex D, Steps 2.0 and 4.0. Caught Between/Struck by Hazard - Personnel become entrapped between Rotary Agitation Subsystem and support structure or struck by loose items (tools, etc.) resting on the containment vessel.	Severe injury or death (pinning or crushing)	(ID) 2	Warning advisory at beginning of SOP requires team leader ensure all personnel are clear prior to initiating containment oscillation. AND Caution advisory requires loose items on or around the containment vessel be removed.	(IE) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
110	Annex I. Exposure to chemicals.	Personnel injury (dermal contact and/or inhalation)	(IIC) 2	Wear PPE in accordance with PPE annex in the SOP. Continuous monitoring will provide early warning if chemicals are present.	(IIID) 3	
111	Annex I. Cut or torn PPE from sharp edges, metal parts, and payload.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will wear appropriate PPE (i.e., leather gloves over rubber gloves) to protect from tearing or ripping steps.	(IIID) 3	
112	Annex I. Spill, Contact with Chemicals - Chemical spill while decontaminating overpack and/or packaging material.	Minor injury to personnel (dermal and/or inhalation)	(IIIC) 3	Wear PPE as specified in PPE annex of the SOP. Containers set up in secondary containment during operations. Target weight identified prior to commencing drain.	(IVC) 4	
113	Annex I. Ergonomic Hazard - Lifting heavy objects and being struck by dropped items.	Personnel injury (strain/sprain, crushing or pinching injury)	(IIC) 2	Personnel trained in proper lifting techniques. Use MHE when available. Lifting by multiple operators may be required. Wear appropriate PPE for lifting the overpacks and for moving waste containers.	(IIIC) 3	
114	Annex L. Pinch/Crush Hazard - Mounting points for lift assist jib and rotary joints present potential for pinching or crushing of body parts.	Serious injury (crushing or pinching)	(IID) 2	Train operators to be aware of body positions when maneuvering payload.	(IIIE) 3	

Table E-5. Job Hazards Analysis (EDS Phase 2 Steam Series Units) (Continued)

Item	Hazardous Condition	Effect	Risk Assessment Code (RAC)	Resolution	Controlled RAC	Comment
115	Annex L. Move payload weighing more than 500 pounds while using lift assist or FSS lifting tool and it fails.	Pinching or crushing injury	(IIC) 2	Use material handling equipment to move payload into position. Wear leather gloves and steel-toe safety shoes. Operators trained on MHE to ensure proper handling of loads.	(IIE) 3	
116	Annex L. Cut or torn PPE from sharp edges, metal parts, and payload.	Minor injury to personnel (laceration)	(IIIC) 3	Operators will wear appropriate PPE (i.e., leather gloves over rubber gloves) to protect from tearing or ripping steps.	(IIID) 3	
117	Annex L, Step 4.2. Caught Between/Struck by Hazard - Personnel become entrapped or struck or pinned as payload is being moved.	Serious injury (crushing or pinching)	(IID) 2	Train operators to be aware of body positions when maneuvering payload.	(IIIE) 3	
118	Heat stress from wearing PPE while conducting operations.	Severe injury or death	(IC) 1	Comply with Heat Stress Program for the use of chemical protective clothing.	(IE) 3	Heat Stress Program in Health and Safety Plan.

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**ANNEX F
ANNULAR SPACE VACUUM
AND
HELIUM LEAK RATE DECISION MATRIX**

ANNEX F
ANNULAR SPACE VACUUM AND HELIUM LEAK RATE DECISION MATRIX

Based on test results, operational experience, and supporting data, the following decision matrix tables (Tables F-1 and F-2) for conduct of Explosive Destruction System (EDS) explosive operations has been created. This matrix is intended for use as a guide. Also, other factors (such as the condition of the munition, the proximity of populated areas, etc.) must be considered in any “go/no-go” analysis.

The annular space vacuum decay leak rate check is performed for all operations; whereas, the helium leak test is only conducted for the first 36 detonations in a new containment vessel and then every 28th detonation to confirm the integrity of the vessel seal.

Table F-1. EDS Annular Space Vacuum Guidance Chart

Helium Leak Detector Display	Action
Annular Space Vacuum Display Figure Stabilized	Proceed with operation when helium signal digital display on the helium leak detector or helium leak detector remote control stabilizes. Recommended time for figure to stabilize is 5 minutes.
Annular Space Vacuum Display Figure Does Not Stabilize	Open the EDS containment vessel door and reseal the containment vessel to obtain a stabilized annular vacuum figure unless RCMD, in conjunction with the appropriate safety and EOD personnel, determine the risk of opening the EDS containment vessel door is greater than the risk of the EDS containment vessel door leaking.

Table F-2. EDS Helium Leak Rate Guidance Chart

Helium Leak Rate (cubic centimeters per second)	Action
2×10^{-3} or Below	Proceed with operation.
Above 2.0×10^{-3}	Open the EDS containment vessel door and reseal the containment vessel to obtain leak rate at or below 2.0×10^{-3} cc/sec unless RCMD, in conjunction with the appropriate safety and EOD personnel, determine the risk of opening the EDS containment vessel door is greater than the risk of the EDS containment vessel door leaking. (Based on prior experience during EDS testing, all parties agree that a decision to proceed with a helium leak rate above 2.0×10^{-3} cc/sec would be extremely rare.)

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ANNEX G

PERSONAL PROTECTIVE EQUIPMENT LEVELS

ANNEX G PERSONAL PROTECTIVE EQUIPMENT LEVELS

Personal protective equipment (PPE) will be worn by all personnel working within the Explosive Destruction System (EDS) Exclusion Zone and Personnel Decontamination Station. PPE is designed to protect workers from known or suspected vapor, solid, and liquid contamination. The PPE levels for individual work tasks are specified and have been selected based upon the anticipated concentrations of contaminants that may be encountered, as well as their chemical properties, toxicity, exposure routes, and contaminant matrix (see Table G-1).

Level C PPE is recommended when air monitoring has confirmed the chemical vapor concentration within the EDS work area does not exceed allowable exposure limits of 1.0 short-term exposure limit (STEL). When chemical agent vapor concentrations exceed the allowable exposure limit of 1.0 STEL, Level B PPE must be donned.

A preliminary hazard assessment of the EDS operations was completed using the guidelines from Military Standard 882D, Army Regulation 385-10, and the *System Safety Management Plan for the Non-Stockpile Chemical Materiel Product* (Program Manager for Chemical Demilitarization, 2001). Hazards were assessed based on the hardware, process, and operational descriptions for the EDS that were available at that time. Controls were identified to reduce exposure of EDS operators to hazards to an acceptable level. PPE recommendations were made based on this analysis.

Table G-1. PPE Levels

Task	PPE Requirement
Emergency Operations or Response (When work space is at or above action levels)	Level B <ul style="list-style-type: none"> • SCBA/SAR respiratory protection • Toxicological Agent Protective Ensemble Self-Contained or Trelleborg® or Tyvek® F • Butyl rubber boots
Site Setup	Level D <ul style="list-style-type: none"> • Long-sleeve shirts, as required • Trousers • Leather gloves • Steel-toe boots/shoes • Safety glasses
Air Monitoring	Level D <ul style="list-style-type: none"> • Slung mask (M40-series or NIOSH-approved respirator^a for industrial chemicals [for example, North 7600 Series with HEPA and acid gas organic vapor cartridge]) • Long-sleeve shirts and trousers • Gloves • Steel-toe boots/shoes • Safety glasses
Filling Chiller Reservoir	Level D <ul style="list-style-type: none"> • Long-sleeve shirts and trousers • Nitrile gloves or equivalent, as required • Leather gloves, as required • Steel-toe boots/shoes • Safety glasses
Loctite® N-7000™ Application	Level D <ul style="list-style-type: none"> • Long-sleeve shirts and trousers • Nitrile gloves or equivalent, as required • Leather gloves, as required • Steel-toe boots/shoes • Safety glasses
Handling Munitions/Chemical-Filled Cylinders Upon Initial Receipt and Assessment	Level C <ul style="list-style-type: none"> • M40-series mask or NIOSH-approved respirator^a for industrial chemicals (for example, North 7600 Series with HEPA and acid gas organic vapor cartridge) • Hood • M2A1 butyl rubber boots with safety toe or equivalent • Butyl rubber gloves (M3, M4, or approved nonstandard gloveset) or equivalent • Butyl rubber apron or equivalent • Leather gloves, as required

Table G-1. PPE Levels (Continued)

Task	PPE Requirement
Loading Multiple Items Without Air Monitoring	<p>Level B</p> <ul style="list-style-type: none"> • SCBA/SAR respiratory protection • Toxicological Agent Protective Ensemble Self-Contained or Trelleborg or Tyvek F • Butyl rubber boots
Transferring Reagent Between Reagent Drum and EDS Vessel	<p>Level C</p> <ul style="list-style-type: none"> • NIOSH-approved respirator for industrial chemicals (for example, North 7600 Series with HEPA and acid gas organic vapor cartridge) • M2A1 butyl rubber boots with safety toe or equivalent • Butyl rubber gloves (M3, M4, or approved nonstandard gloveset) or equivalent • Hearing protection, as needed • Butyl rubber apron or equivalent, as required
Collecting Liquid or Vapor Samples (Workspace is below action levels)	<p>Level C</p> <ul style="list-style-type: none"> • M40-series mask or NIOSH-approved respirator^a for industrial chemicals (for example, North 7600 Series with HEPA and acid gas organic vapor cartridge) • Hood • Hearing protection, as needed • M2A1 butyl rubber boots with safety toe or equivalent • Butyl rubber gloves (M3, M4, or approved nonstandard gloveset) or equivalent • Butyl rubber apron or equivalent
Collecting Liquid or Vapor Samples (Workspace is at or above action levels)	<p>Level B</p> <ul style="list-style-type: none"> • SCBA/SAR respiratory protection • Hearing protection, as needed • Toxicological Agent Protective Ensemble Self-Contained or Trelleborg or Tyvek F • Butyl rubber boots
Opening/Closing EDS Containment Vessel Door	<p>Level C</p> <ul style="list-style-type: none"> • M40-series mask or NIOSH-approved respirator^a for industrial chemicals (for example, North 7600 Series with HEPA and acid gas organic vapor cartridge) • Hood • M2A1 butyl rubber boots with safety toe or equivalent • Butyl rubber gloves (M3, M4, or approved nonstandard gloveset) or equivalent • Leather gloves, as required • Hearing protection • Toxicological Agent Protective Ensemble Self-Contained or Tyvek F • Butyl rubber apron or equivalent, as required

Table G-1. PPE Levels (Continued)

Task	PPE Requirement
Sampling Solid Waste and Removal of Munition/AFSS/FSS Metal Parts	<p>Level C</p> <ul style="list-style-type: none"> • M40-series mask or NIOSH-approved respirator^a for industrial chemicals (for example, North 7600 Series with HEPA and acid gas organic vapor cartridge) • Hood • M2A1 butyl rubber boots with safety toe or equivalent • Butyl rubber gloves (M3, M4, or approved nonstandard gloveset) or equivalent • Leather gloves, as required • Butyl rubber apron or equivalent
Handling Cleared Liquid Waste Drums	<p>Level D</p> <ul style="list-style-type: none"> • Long-sleeve shirts and trousers • Leather gloves • Steel-toe boots/shoes • Safety glasses • Butyl rubber apron or equivalent
Handling Uncleared Waste Materials and Containers	<p>Level C</p> <ul style="list-style-type: none"> • M40-series mask or NIOSH-approved respirator^a for industrial chemicals (for example, North 7600 Series with HEPA and acid gas organic vapor cartridge) • Hood • M2A1 butyl rubber boots with safety toe or equivalent • Butyl rubber gloves (M3, M4, or approved nonstandard gloveset) or equivalent • Leather gloves, as required • Toxicological Agent Protective Ensemble Self-Contained or Tyvek F • Butyl rubber apron or equivalent, as required
Routine and Occasional Maintenance (When workspace has been cleared to the WPL and ARSENICAL MIXTURES HAVE NEVER BEEN PROCESSED IN UNIT)	<p>Level D</p> <ul style="list-style-type: none"> • Long-sleeve shirts and trousers • Nitrile gloves or equivalent, as required • Leather gloves, as required • Steel-toe boots/shoes • Safety glasses
Routine and Occasional Maintenance (When workspace has been cleared to the WPL and ARSENICAL MIXTURES HAVE BEEN PROCESSED IN UNIT)	<p>Level D</p> <ul style="list-style-type: none"> • M2A1 butyl rubber boots with safety toe or equivalent • Butyl rubber gloves (M3, M4, or approved nonstandard gloveset) or Nitrile gloves or equivalent • Leather gloves, as required • Tyvek F or Saranax overalls with hood • Safety goggles or face protection when using spraying devices • Butyl rubber apron or equivalent, as required • Disposable gloves and booties^b

Table G-1. PPE Levels (Continued)

Task	PPE Requirement
Site Operations Support Personnel Data Collection Project Observers Non-chemical Workers Visitors	Level D <ul style="list-style-type: none"> • Slung or readily available^c mask (M40-series mask, escape mask, escape bottle, or NIOSH-approved respirator^a for industrial chemicals [for example, North 7600 Series with HEPA and acid gas organic vapor cartridge]) • Long-sleeve shirts, as required • Trousers • Gloves, as required • Steel-toe boots/shoes • Safety glasses, as required
DAAMS Technicians (When collecting DAAMS tubes and workspace is at or above action levels)^e	Level B <ul style="list-style-type: none"> • SCBA/SAR respiratory protection • Toxicological Agent Protective Ensemble Self-Contained or Trelleborg or Tyvek F • Butyl rubber boots
DAAMS Technicians (When collecting DAAMS tubes and workspace is below action levels)^e	Level C ^d <ul style="list-style-type: none"> • M40-series mask or NIOSH-approved respirator^a for industrial chemicals (for example, North 7600 Series with HEPA and acid gas organic vapor cartridge) • Hood • M2A1 butyl rubber boots with safety toe or equivalent • Butyl rubber gloves (M3, M4, or approved nonstandard gloveset) or equivalent • Butyl rubber apron or equivalent, as required Level D ^d <ul style="list-style-type: none"> • Slung mask (M40-series mask or NIOSH-approved respirator^a for industrial chemicals [for example, North 7600 Series with HEPA and acid gas organic vapor cartridge]) • Long-sleeve shirts and trousers • Gloves • Steel-toe boots/shoes • Safety glasses
DAAMS Technicians (When installing/collecting DAAMS tubes during site setup)	Level D <ul style="list-style-type: none"> • Slung mask (M40-series mask or NIOSH-approved respirator^a for industrial chemicals [for example, North 7600 Series with HEPA and acid gas organic vapor cartridge]) • Long-sleeve shirts and trousers • Gloves • Steel-toe boots/shoes • Safety glasses

Table G-1. PPE Levels (Continued)

Task	PPE Requirement
Decontamination Personnel	<p>Level C</p> <ul style="list-style-type: none"> • M40-series mask or NIOSH-approved respirator^a for industrial chemicals (for example, North 7600 Series with HEPA and acid gas organic vapor cartridge) • Hood • M2A1 butyl rubber boots with safety toe or equivalent • Butyl rubber gloves (M3, M4, or approved nonstandard gloveset) or equivalent • Butyl rubber apron or equivalent

Notes:

- ^a A Department of the Army (DA)-approved NIOSH-certified full facepiece air-purifying respirator with organic vapors/acid gases cartridge/filter will be worn when conducting operations with the specific chemical agents referenced in DA Office of the Chief of Staff, Memorandum, Subject: *Generic Approval of Commercial Chemical Protective Equipment*, 1 May 2003.
- ^b Disposable gloves and booties will be worn over normal boots and gloves when processing arsenical compounds.
- ^c Personnel entering the EDS operations site will possess, as a minimum, a protective mask that allows them to escape the site with respiratory protection in the event of a release outside engineering controls. Readily available for the purposes of this document is defined as being able to retrieve and don the mask without impedance to the person being tasked, for example, distance to, direction to, and/or barriers to the mask.
- ^d Level/type of respiratory protection dependent on monitoring results.
- ^e Applicable for chemical agent operations only. In the event of a WPL excursion, the site-specific WPL Excursion Plan will be put into effect. Level/type of respiratory protection dependent on monitoring results.

- AFSS = Advanced Fragment Suppression System
- DAAMS = Depot Area Air Monitoring System
- EDS = Explosive Destruction System
- FSS = Fragment Suppression System
- HEPA = high efficiency particulate air
- NIOSH = National Institute for Occupational Safety and Health
- PPE = personal protective equipment
- SAR = supplied air respirator
- SCBA = self-contained breathing apparatus
- WPL = worker population limit

ANNEX H ACRONYMS/ABBREVIATIONS

ANNEX H ACRONYMS/ABBREVIATIONS

AFSS	Advanced Fragment Suppression System
amp	ampere
AR	Army Regulation
BCC	Boiler Chiller Container
BCP	Boiler Control Panel
BITE	built in test equipment
CAIRA	Chemical Accident or Incident Response and Assistance
CDU	capacitor discharge unit
CMA	Chemical Material Activity
coliwasa	composite liquid waste sampler
CPRP	Chemical Personnel Reliability Program
CSC	conical-shaped charge
CSM	chemical surety material
CWM	chemical warfare materiel
DA Pam	Department of the Army Pamphlet
DAAMS	Depot Area Air Monitoring System
DOT	Department of Transportation
EDS	Explosive Destruction System
EOD	explosive ordnance disposal
FSS	Fragment Suppression System
ft-lbs	foot-pounds
GFCI	ground fault circuit interrupter
HASP	Health and Safety Plan
HEPA	High Efficiency Particulate Air
Hg	mercury
HI-POT	high potential
HMI	Human Machine Interface
IAW	in accordance with
kV	kilovolt
LSA	liquid sample adapter
LSC	linear-shaped charge
mΩ	milliohms
MRC	multiple round container

mL	milliliter
mm	millimeter
MSDS	Material Safety Data Sheet
NIOSH	National Institute for Occupational Safety and Health
O&M	operations and maintenance
P2	Phase 2
P2R	Phase 2 Retrofit
PCC	propelling charge container
PCD	Pueblo Chemical Depot
PDS	Personnel Decontamination Station
PMCD	Program Manager for Chemical Demilitarization
PMCS	Preventive Maintenance Checks and Services
PPE	personal protective equipment
psig	pounds per square inch gauge
QASAS	Quality Assurance Specialist (Ammunition Surveillance)
RAC	risk assessment code
RCMD	Recovered Chemical Materiel Directorate
RCWM	recovered chemical warfare materiel
SAR	supplied air respirator
SCBA	self-contained breathing apparatus
SDS	Safety Data Sheet
SNL	Sandia National Laboratories
SOP	Standing Operating Procedure
SRC	single round container
STEL	short-term exposure limit
TNT	trinitrotoluene
TSDF	treatment, storage, and disposal facility
V	volt
V-F	vacuum flange
VCR®	registered trademark of the Swagelok Company
VDC	volts direct current

**ANNEX I
DECONTAMINATION/DISPOSAL
OF OVERPACKS, PACKAGING MATERIAL, AND PERSONAL
PROTECTIVE EQUIPMENT**

ANNEX I
DECONTAMINATION/DISPOSAL OF OVERPACKS, PACKAGING MATERIAL,
AND PERSONAL PROTECTIVE EQUIPMENT

The purpose of this annex is for the decontamination of munition/chemical agent overpack containers (Multiple Round Container [MRC], Single Round Container [SRC], Propelling Charge Container [PCC] or other types of containers) packaging material, and personal protective equipment (PPE) and other miscellaneous items (buckets, sumps, step pans, catch trays, etc.) for either reuse or disposal as hazardous waste.

PRECONDITIONS:

1. Waste Disposal Contractor has been contacted regarding treatment, storage, and disposal facility (TSDf)-specific container and weight requirements for the receipt of waste containers containing liquids and solids.
2. PPE must be worn IAW Annex G.
3. PDS must be available.
4. Air monitoring must be operational.
5. Laboratory has provided sampling equipment per Laboratory Quality Control Plan and was provided with the necessary tools for sample bottle assemblies.
6. Receipt of samples has been coordinated with laboratory and courier.

WARNINGS

PPE LEVELS WILL BE WORN ACCORDING TO THE TASK BEING PERFORMED AND IN CONJUNCTION WITH MONITORING RESULTS IAW ANNEX G, PPE LEVELS.

FAILURE TO DON LEATHER GLOVES MAY CAUSE RUBBER GLOVES TO BE COMPROMISED WHEN COMING INTO CONTACT WITH SHARP EDGES.

REAGENT AND SOLVENT CHEMICALS ARE HAZARDOUS. WEAR APPROPRIATE PPE WHEN HANDLING REAGENTS AND SOLVENTS.

USE PROPER MATERIALS HANDLING TECHNIQUES AND/OR MATERIAL HANDLING EQUIPMENT WHEN MOVING HEAVY ITEMS.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Notes

Item(s) to be monitored must be kept at a minimum ambient temperature of 21°C (70°F) and for a minimum of 4 hours before being monitored.

When waste containers contain only liquid waste, the hazardous waste labels will be annotated with the contents and the weight in pounds.

When waste containers contain only solid waste, the hazardous waste labels will be annotated with the contents and the weight in pounds.

When waste containers contain liquid waste and solid waste, the hazardous waste labels will be annotated with the contents, weight in pounds, and the amount of free liquid in gallons.

- 1.0 **PREPARE** munition/chemical agent overpack, packing material, and/or PPE for processing.
 - 1.1 **DON** leather gloves, if necessary.

-
- 1.2 **PROCEED** as follows:
- 1.2.1 **PLACE** munition/chemical agent overpack with overpack lid into plastic bag and **SEAL** plastic bag.
 - 1.2.2 When packing material is present, **PLACE** into a separate plastic bag(s) and **SEAL** plastic bag(s).
 - 1.2.3 When PPE is present, **PLACE** into a separate plastic bag(s) and **SEAL** plastic bag(s).
 - 1.2.4 When miscellaneous items are present, **PLACE** into a separate plastic bag(s) and **SEAL** plastic bag(s).
- 1.3 **STORE** bagged item(s) at a minimum ambient air temperature of 21°C (70°F) for a minimum of 4 hours.
- 1.4 **PROCEED** as follows:
- 1.4.1 When processing munition/chemical agent overpacks, **PROCEED** to Step 2.0.
 - 1.4.2 When processing PPE and/or miscellaneous items, **PROCEED** to Step 3.0.

2.0 **PROCESS** bagged munition/chemical agent overpack and overpack lid.

Note

Monitor item(s) IAW local monitoring program.

2.1 **MONITOR** bagged munition/chemical agent overpack and overpack lid.
RECORD monitoring results and **PERFORM** one of the following:

CALLOUT: Announce overpack and overpack monitoring results.

2.1.1 When bagged munition/chemical agent overpack and overpack lid are below clearance level, **PERFORM** the following:

2.1.1.1 When munition/chemical agent overpack and overpack lid are not to be reused, **MARK** with clearance level and **PLACE** in solid waste container. **PROCEED** to Step 2.8.

2.1.1.2 When munition/chemical agent overpack and overpack lid are to be reused, **MARK** with clearance level. **PROCEED** to Step 2.8.

2.1.2 When bagged munition/chemical agent overpack and overpack lid are not below clearance level, **PERFORM** one of the following:

2.1.2.1 When munition/chemical agent overpack and overpack lid are an MRC, **PROCEED** as follows:

2.1.2.1.1 **REMOVE** MRC overpack and overpack lid from plastic bag and **PLACE** into secondary containment.

2.1.2.1.2 **PLACE** plastic bag into another plastic bag and **SEAL** plastic bag.

2.1.2.1.3 **PROCEED** to Step 2.3.

2.1.2.2 When munition/chemical agent overpack and overpack lid are not an MRC, **PROCEED** as follows:

2.1.2.2.1 **REMOVE** overpack(s) and overpack lid(s) from plastic bag.

2.1.2.2.2 **PLACE** overpack(s) with open end up, overpack lid(s), and plastic bag into waste container.

2.1.2.2.3 **FILL** waste container with appropriate decontaminant until contents are totally submerged.

Note

When using any decontaminant, observe the recommended contact time to allow for the neutralization of the chemical agent.

2.1.2.2.4 **STIR** contents of waste container using stirring tool until contents are evenly covered with appropriate decontaminant.

2.1.2.2.5 **RINSE** stirring tool with water.

2.2 **PROCESS** stirring tool.

2.2.1 **PERFORM** one of the following:

2.2.1.1 When there is a need to use stirring tool again during present operation, **PLACE** into secondary containment. **PROCEED** to Step 2.6.

2.2.1.2 When there is no longer a need to use stirring tool, **PERFORM** one of the following:

2.2.1.2.1 When stirring tool is disposable, **PLACE** into solid wastes container. **PROCEED** to Step 2.6.

2.2.1.2.2 When wanting to use stirring tool for future operations, **PROCEED** as follows:

2.2.1.2.2.1 **ALLOW** stirring tool to dry.

2.2.1.2.2.2 **PLACE** stirring tool into plastic bag and **SEAL** plastic bag.

2.2.1.2.2.3 **STORE** bagged stirring tool at a minimum ambient air temperature of 21°C (70°F) for a minimum of 4 hours.

Note

Monitor item(s) IAW local monitoring program.

2.2.2 **MONITOR** bagged stirring tool. **RECORD** monitoring results and **PERFORM** one of the following:

CALLOUT: Announce stirring tool monitoring results.

2.2.2.1 When stirring tool is below clearance level, **PROCEED** as follows:

2.2.2.1.1 **REMOVE** stirring tool from plastic bag.

2.2.2.1.2 **MARK** stirring tool with clearance level and **PLACE** it in appropriate storage location.

2.2.2.1.3 **PLACE** plastic bag into solid wastes container and **PROCEED** as directed.

2.2.2.2 When stirring tool is not below clearance level, **PLACE** bagged stirring tool in solid wastes container and **PROCEED** as directed.

2.3 **DECONTAMINATE** and **RINSE** MRC overpack and overpack lid.

2.3.1 **DECONTAMINATE** MRC overpack and overpack lid with appropriate decontaminant.

2.3.2 **RINSE** MRC overpack and overpack lid with water.

2.3.3 **ALLOW** MRC overpack and overpack lid to dry.

2.3.4 **PLACE** MRC overpack and overpack lid into plastic bag and **SEAL** plastic bag.

2.3.5 **STORE** bagged MRC overpack and overpack lid at a minimum ambient air temperature of 21°C (70°F) for a minimum of 4 hours.

Note

Monitor item(s) IAW local monitoring program.

- 2.4 **MONITOR** decontaminated MRC overpack and overpack lid. **RECORD** monitoring result and **PROCEED** as follows:

CALLOUT: Announce overpack and overpack monitoring results.

- 2.4.1 When decontaminated MRC overpack and overpack lid are below clearance level, **MARK** with clearance level and **PROCEED** to Step 2.6.
- 2.4.2 When decontaminated MRC overpack and overpack lid are not below clearance level, **PERFORM** one of the following:
- 2.4.2.1 When directed to decontaminate again, **RETURN** to Step 2.3.1.
- 2.4.2.2 When directed not to decontaminate again, **PERFORM** the following:
- 2.4.2.2.1 **REMOVE** MRC overpack(s) and overpack lid(s) from plastic bag and **PLACE** overpack(s) with open end up, overpack lid(s), and plastic bag into waste container.
- 2.4.2.2.2 **FILL** waste container with appropriate decontaminant until contents are totally submerged.
- 2.4.2.2.3 **STIR** contents of waste container using stirring tool until contents are evenly covered with appropriate decontaminant.
- 2.4.2.2.4 **RINSE** stirring tool with water.

2.5 **PROCESS** stirring tool.

2.5.1 **PERFORM** one of the following:

2.5.1.1 When there is a need to use stirring tool again during present operation, **PLACE** into secondary containment. **PROCEED** to Step 2.6.

2.5.1.2 When there is no longer a need to use stirring tool, **PERFORM** one of the following:

2.5.1.2.1 When stirring tool is disposable, **PLACE** into solid wastes container. **PROCEED** to Step 2.6.

2.5.1.2.2 When wanting to use stirring tool for future operations, **PROCEED** as follows:

2.5.1.2.2.1 **ALLOW** stirring tool to dry.

2.5.1.2.2.2 **PLACE** stirring tool into plastic bag and **SEAL** plastic bag.

2.5.1.2.2.3 **STORE** bagged stirring tool at a minimum ambient air temperature of 21°C (70°F) for a minimum of 4 hours.

Note

Monitor item(s) IAW local monitoring program.

2.5.2 **MONITOR** bagged stirring tool. **RECORD** monitoring results and **PERFORM** one of the following:

CALLOUT: Announce stirring tool monitoring results.

2.5.2.1 When stirring tool is not below clearance level, **PLACE** bagged stirring tool in solid wastes container and **PROCEED** as directed.

2.5.2.2 When stirring tool is below clearance level, **PROCEED** as follows:

2.5.2.2.1 **REMOVE** stirring tool from plastic bag.

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- 2.5.2.2.2 **MARK** stirring tool with clearance level, and **PLACE** it in appropriate storage location.
 - 2.5.2.2.3 **PLACE** plastic bag into solid wastes container.
 - 2.5.2.2.4 **PROCEED** as directed.
- 2.6 **COLLECT** liquid sample(s) from waste container.
- 2.6.1 **INSPECT** liquid sample container. **REPLACE**, if necessary, and **RECORD** liquid sample container label number.
 - 2.6.2 **OPEN** liquid sample container and **PLACE** it on catch tray beside waste container.
 - 2.6.3 **INSERT** coliwasa tube into waste container and **LOWER** it all the way to the waste container bottom.
 - 2.6.4 **SEAL** coliwasa tube and **REMOVE** it from waste container.
 - 2.6.5 **PLACE** coliwasa tube into liquid sample container.
 - 2.6.6 **CHECK** coliwasa tube liquid contents and **PROCEED** as follows:
 - 2.6.6.1 When stratification is not present, **PERFORM** the following:
 - 2.6.6.1.1 **DRAIN** contents into liquid sample container.
 - 2.6.6.1.2 **REPEAT** Steps 2.6.3 through 2.6.6.1.1 until liquid sample container(s) are within levels designated by the supporting laboratory.
 - 2.6.6.1.3 **PROCEED** to Step 2.6.7.
 - 2.6.6.2 When more than one phase is seen in coliwasa tube, **PERFORM** the following:
 - 2.6.6.2.1 **DRAIN** each phase of the stratification into a separate liquid sample container.
 - 2.6.6.2.2 **REPEAT** Steps 2.6.3 through 2.6.6.2.1 until liquid sample container(s) are within levels designated by the supporting laboratory.

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- 2.6.7 **CLOSE** liquid sample container(s).
 - 2.6.8 **PROCESS** coliwasa tube.
 - 2.6.8.1 **DON** leather gloves.
 - 2.6.8.2 **PLACE** coliwasa tube into sampled liquid waste container.
 - 2.6.8.3 **BREAK** coliwasa tube against waste container's inner side and **VERIFY** all coliwasa tube fragments are within liquid waste container.
 - 2.6.8.4 **INSTALL** bung plug in liquid waste container.
 - 2.7 **PROCESS** liquid sample container(s).
 - 2.7.1 **PLACE** liquid sample container into pail of decontaminant.
 - 2.7.2 **REMOVE** liquid sample container from decontaminant pail and **PLACE** into pail of rinsewater.
 - 2.7.3 **REMOVE** liquid sample container from rinse pail and **DRY**.
 - 2.7.4 **PACK** liquid sample container into a separate secondary container or sample bag.

Note

Monitor item IAW local monitoring program.

- 2.7.5 **MONITOR** exterior of liquid sample container. **RECORD** monitoring results.

CALLOUT: Announce liquid sample container monitoring results.

- 2.7.6 **PERFORM** one of the following:
 - 2.7.6.1 When monitoring results for liquid sample container are below established limits, **PROCEED** to Step 2.7.7.
 - 2.7.6.2 When monitoring results for liquid sample container are not below established limits, **RETURN** to Step 2.7.1.

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- 2.7.7 **PLACE** packaged liquid sample container into overpack. **SEAL** and **CARRY** overpack to PDS.
- 2.7.8 **COMPLETE** required chain-of-custody documents. **ATTACH** chain-of-custody documents to packed sample and **TRANSFER** to courier.
- 2.8 **PROCEED** as follows:
- 2.8.1 When analysis results are below clearance criteria, **APPLY** appropriate hazardous waste information to waste container. **PROCEED** to Step 2.9.
- 2.8.2 When analysis results are above clearance criteria, **PERFORM** the following:
- 2.8.2.1 **REMOVE** waste container lid.
- 2.8.2.2 **VERIFY** waste container can accept more appropriate decontaminant. If not, **DIVIDE** contents and **PLACE** into a second like waste container.
- 2.8.2.3 **ADD** more appropriate decontaminant to waste container(s).
- 2.8.2.4 **STIR** contents of waste container(s) until contents are evenly covered with appropriate decontaminant.
- 2.8.2.5 **RINSE** stirring tool with water.

2.9 **PROCESS** stirring tool.

2.9.1 **PERFORM** one of the following:

2.9.1.1 When there is a need to use stirring tool again during present operation, **PLACE** into secondary containment. **RETURN** to Step 2.6.

2.9.1.2 When there is no longer a need to use stirring tool, **PERFORM** one of the following:

2.9.1.2.1 When stirring tool is disposable, **PLACE** into solid wastes container. **RETURN** to Step 2.6.

2.9.1.2.2 When wanting to use stirring tool for future operations, **PROCEED** as follows:

2.9.1.2.2.1 **ALLOW** stirring tool to dry.

2.9.1.2.2.2 **PLACE** stirring tool into plastic bag and **SEAL** plastic bag.

2.9.1.2.2.3 **STORE** bagged stirring tool at a minimum ambient air temperature of 21°C (70°F) for a minimum of 4 hours.

Note

Monitor item(s) IAW local monitoring program.

2.9.2 **MONITOR** bagged stirring tool. **RECORD** monitoring results and **PERFORM** one of the following:

CALLOUT: Announce stirring tool monitoring results.

2.9.2.1 When stirring tool is not below clearance level, **PLACE** bagged stirring tool in solid wastes container and **PROCEED** as directed.

2.9.2.2 When stirring tool is below clearance level, **PROCEED** as follows:

2.9.2.2.1 **REMOVE** stirring tool from plastic bag.

2.9.2.2.2 **MARK** stirring tool with clearance level, and **PLACE** it in appropriate storage location.

2.9.2.2.3 **PLACE** plastic bag into solid wastes container.

2.9.2.2.4 **PROCEED** as directed.

2.10 **PROCEED** as follows:

2.10.1 When processing packing material/PPE/miscellaneous items, **PROCEED** to Step 3.0.

2.10.2 When not processing packing material/PPE/miscellaneous items, **PROCEED** to Step 4.0.

3.0 **PROCESS** bagged packing material/PPE/miscellaneous items.

Note

Monitor item(s) IAW local monitoring program.

3.1 **MONITOR** bagged packing material/PPE/miscellaneous items.

3.1.1 When bagged packing material/PPE/miscellaneous items are below clearance level, **MARK** overpack material/PPE with clearance level and **PLACE** in solid waste container. **PROCEED** to Step 4.0.

3.1.2 When bagged packing material/PPE/miscellaneous items are not below clearance level, **PROCEED** as follows:

3.1.2.1 **PLACE** plastic bag containing packing material/PPE/miscellaneous items into an open top waste container.

3.1.2.2 **OPEN** plastic bag containing packing material/PPE/miscellaneous items to allow appropriate decontaminant to access plastic bag's contents.

3.1.2.3 **ADD** appropriate decontaminant to open top waste container until contents are totally submerged.

3.1.2.4 **STIR** contents of open top waste container with stirring tool until contents are evenly covered with appropriate decontaminant.

3.1.2.5 **RINSE** stirring tool with water.

3.2 **PROCESS** stirring tool.

3.2.1 **PERFORM** one of the following:

3.2.1.1 When there is a need to use stirring tool again during present operation, **PLACE** into secondary containment. **PROCEED** to Step 3.3.

3.2.1.2 When there is no longer a need to use stirring tool, **PERFORM** one of the following:

3.2.1.2.1 When stirring tool is disposable, **PLACE** into solid wastes container. **PROCEED** to Step 3.3.

3.2.1.2.2 When wanting to use stirring tool for future operations, **PROCEED** as follows:

3.2.1.2.2.1 **ALLOW** stirring tool to dry.

3.2.1.2.2.2 **PLACE** stirring tool into plastic bag and **SEAL** plastic bag.

3.2.1.2.2.3 **STORE** bagged stirring tool at a minimum ambient air temperature of 21°C (70°F) for a minimum of 4 hours.

Note

Monitor item(s) IAW local monitoring program.

- 3.2.2 **MONITOR** bagged stirring tool. **RECORD** monitoring results and **PERFORM** one of the following:

CALLOUT: Announce stirring tool monitoring results.

- 3.2.2.1 When stirring tool is not below clearance level, **PLACE** bagged stirring tool in solid wastes container and **PROCEED** as directed.
- 3.2.2.2 When stirring tool is below clearance level, **PROCEED** as follows:
 - 3.2.2.2.1 **REMOVE** stirring tool from plastic bag.
 - 3.2.2.2.2 **MARK** stirring tool with clearance level, and **PLACE** it in appropriate storage location.
 - 3.2.2.2.3 **PLACE** plastic bag into solid wastes container.
 - 3.2.2.2.4 **PROCEED** as directed.
- 3.3 **COLLECT** liquid sample(s) from waste container.
 - 3.3.1 **INSPECT** liquid sample container. **REPLACE**, if necessary, and **RECORD** liquid sample container label number.
 - 3.3.2 **OPEN** liquid sample container and **PLACE** it on catch tray beside waste container.
 - 3.3.3 **INSERT** coliwasa tube into waste container and **LOWER** it all the way to the waste container bottom.
 - 3.3.4 **SEAL** coliwasa tube, **REMOVE** it from waste container, and **CHECK** for stratification in the coliwasa tube liquid contents.
 - 3.3.5 **PLACE** coliwasa tube into liquid sample container.

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- 3.3.6 **CHECK** coliwasa tube contents and **PROCEED** as follows:
 - 3.3.6.1 When stratification is not present, **PERFORM** the following:
 - 3.3.6.1.1 **DRAIN** contents into liquid sample container.
 - 3.3.6.1.2 **REPEAT** Steps 3.3.3 through 3.3.6.1.1 until liquid sample container(s) are within levels designated by the supporting laboratory.
 - 3.3.6.1.3 **PROCEED** to Step 3.3.7.
 - 3.3.6.2 When more than one phase is seen in coliwasa tube, **PERFORM** the following:
 - 3.3.6.2.1 **DRAIN** each phase of the stratification into a separate liquid sample container.
 - 3.3.6.2.2 **REPEAT** Steps 3.3.3 through 3.3.6.2.1 until liquid sample container(s) are within levels designated by the supporting laboratory.
 - 3.3.7 **CLOSE** liquid sample container(s).
 - 3.3.8 **PROCESS** coliwasa tube.
 - 3.3.8.1 **DON** leather gloves.
 - 3.3.8.2 **PLACE** coliwasa tube into sampled liquid waste container.
 - 3.3.8.3 **BREAK** coliwasa tube against waste container's inner side and **VERIFY** all coliwasa tube fragments are within liquid waste container.
 - 3.3.8.4 **INSTALL** bung plug in liquid waste container.
 - 3.4 **PROCESS** liquid sample container(s).
 - 3.4.1 **PLACE** liquid sample container into pail of decontaminant.
 - 3.4.2 **REMOVE** liquid sample container from decontaminant pail and **PLACE** into pail of rinsewater.

-
- 3.4.3 **REMOVE** liquid sample container from rinse pail and **DRY**.
 - 3.4.4 **PACK** liquid sample container into a separate secondary container or sample bag.

Note

Monitor item IAW local monitoring program.

- 3.4.5 **MONITOR** exterior of liquid sample container. **RECORD** monitoring results.

CALLOUT: Announce liquid sample container monitoring results.

- 3.4.6 **PERFORM** one of the following:
 - 3.4.6.1 When monitoring results for liquid sample container are below established limits, **PROCEED** to Step 3.4.7.
 - 3.4.6.2 When monitoring results for liquid sample container are not below established limits, **RETURN** to Step 3.4.1.
- 3.4.7 **PLACE** packaged sample container into overpack. **SEAL** and **CARRY** overpack to PDS.
- 3.4.8 **COMPLETE** required chain-of-custody documents. **ATTACH** chain-of-custody documents to packed sample and **TRANSFER** to courier.

3.5 PROCEED as follows:

- 3.5.1 When analysis results for waste container below clearance criteria, **PROCEED** to Step 4.0.
- 3.5.2 When analysis results for waste container are above clearance criteria, **PERFORM** the following:
 - 3.5.2.1 **REMOVE** open top container lid.
 - 3.5.2.2 **VERIFY** open top waste container can accept more appropriate decontaminant. If not, **DIVIDE** contents and **PLACE** into a second open top waste container.

-
- 3.5.2.3 **ADD** appropriate decontaminant to open top waste container until contents are totally submerged.
 - 3.5.2.4 **STIR** household appropriate decontaminant in open top container using stirring tool until contents are evenly covered.
 - 3.5.2.5 **RINSE** stirring tool with water.
- 3.6 **PROCESS** stirring tool.
- 3.6.1 **PERFORM** one of the following:
 - 3.6.1.1 When there is a need to use stirring tool again during present operation, **PLACE** into secondary containment. **RETURN** to Step 3.3.
 - 3.6.1.2 When there is no longer a need to use stirring tool, **PERFORM** one of the following:
 - 3.6.1.2.1 When stirring tool is disposable, **PLACE** into solid wastes container. **RETURN** to Step 3.3.
 - 3.6.1.2.2 When wanting to use stirring tool for future operations, **PROCEED** as follows:
 - 3.6.1.2.2.1 **ALLOW** stirring tool to dry.
 - 3.6.1.2.2.2 **PLACE** stirring tool into plastic bag and **SEAL** plastic bag.
 - 3.6.1.2.2.3 **STORE** bagged stirring tool at a minimum ambient air temperature of 21°C (70°F) for a minimum of 4 hours.

Note

Monitor item(s) IAW local monitoring program.

- 3.6.2 **MONITOR** bagged stirring tool. **RECORD** monitoring results and **PERFORM** one of the following:

CALLOUT: Announce stirring tool monitoring results.

- 3.6.2.1 When stirring tool is not below clearance level, **PLACE** bagged stirring tool in solid wastes container and **PROCEED** as directed.
 - 3.6.2.2 When stirring tool is below clearance level, **PROCEED** as follows:
 - 3.6.2.2.1 **REMOVE** stirring tool from plastic bag.
 - 3.6.2.2.2 **MARK** stirring tool with clearance level, and **PLACE** it in appropriate storage location.
 - 3.6.2.2.3 **PLACE** plastic bag into solid wastes container.
 - 3.6.2.2.4 **PROCEED** as directed.
- 4.0 **PREPARE** filled waste containers for removal from EE.
- 4.1 **VERIFY** all waste containers are properly sealed.
 - 4.2 **CHECK** waste containers for any visible signs of leakage and/or damage.

Note

Monitor item(s) IAW local monitoring program.

- 4.3 **MONITOR** exterior of waste containers. **RECORD** monitoring results.

CALLOUT: Announce waste containers monitoring results.

-
- 4.4 **PERFORM** one of the following:
- 4.4.1 When monitoring results are below established limits, **PROCEED** to Step 4.5.
 - 4.4.2 When monitoring results are not below established limits, **PERFORM** the following:
 - 4.4.2.1 **DECONTAMINATE** exterior of waste container(s) with appropriate decontaminant.
 - 4.4.2.2 **RINSE** waste container(s) with water.
 - 4.4.2.3 **ALLOW** waste container(s) to dry.
 - 4.4.2.4 **STORE** waste container(s) at a minimum ambient air temperature of 21°C (70°F) for a minimum of 4 hours.
 - 4.4.2.5 **RETURN** to Step 4.3.
- 4.5 **VERIFY** all waste container(s) have been annotated with the appropriate hazardous waste information.
- 5.0 **PROCEED** as directed.

SPECIAL REQUIREMENTS:

1. Label waste containers IAW Waste Management Plan.
2. Air monitoring must be in place unless all waste containers are decontaminated.
3. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Decontaminant pail	as required
Rinse pail	as required
Reagent	as required
Liquid waste drums	as required
Open-head drums	as required
Appropriate decontaminant	as required
Rags	as required
Waste bags	as required
Primary tool kit	1 each
EDS operator log	1 each
Indelible ink pen	1 each
Leather gloves	as required
Coliwasa tube	as required
Catch tray	as required
Stirring tool	as required
Waste overpack drums	as required

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ANNEX J REFERENCES

ANNEX J REFERENCES

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**ANNEX K
INSTALL VAPOR AND
LIQUID SAMPLE ASSEMBLIES**

ANNEX K INSTALL VAPOR AND LIQUID SAMPLE ASSEMBLIES

The purpose of this annex is to install vapor and liquid sample assemblies on the EDS containment vessel door during initial setup of the EDS unit.

PRECONDITIONS:

1. Laboratory has provided sampling equipment per Laboratory Quality Control Plan and was provided with the necessary tools for working with sample bottle valve assemblies.
2. Setup and daily startup checklists are being completed or have been completed.

1.0 **INSTALL** vapor sample and/or liquid sample assemblies.

- 1.1 **VERIFY** all valves on EDS CONTAINMENT VESSEL door are CLOSED.
- 1.2 **VERIFY** sample numbers on sample assemblies being installed.

CALLOUT: Announce vapor and liquid sample bottle assembly numbers. Verify Monitoring receives applicable sample numbers.

2.0 **INSTALL** sample bottle assembly(ies).

- 2.1 When only installing a vapor sample bottle assembly or sample bag valve assembly, **PROCEED** to Step 3.0.
- 2.2 When installing a liquid sample bottle assembly and a vapor or sample bag valve assembly, **PROCEED** to Step 3.0.
- 2.3 When installing a liquid sample adapter (LSA) assembly and a vapor or sample bag valve assembly, **PROCEED** to Step 5.0.
- 2.4 When only installing a liquid sample bottle assembly, **PROCEED** to Step 4.0.
- 2.5 When only installing a liquid sample adapter assembly, **PROCEED** to Step 5.0.

-
- 3.0 **INSTALL** vapor sample bottle assembly (valve 20) or sample bag valve assembly.
- 3.1 **INSPECT** vapor sample bottle assembly for serviceability. **DISCARD**, **REPLACE**, and **RECORD** on sample log when assembly is damaged.
 - 3.2 **VERIFY** vapor sample bottle assembly has correct sample number label.
 - 3.3 **VERIFY** thread lubricant has been applied to valve piping external threads prior to installing vapor sample bottle assembly.
 - 3.4 **LOOSEN** handle securing valve 1 to bracket and **SLIDE** valve 1 to the left.
 - 3.5 **TIGHTEN** both stop collars (left-hand threads) on sample piping finger-tight and **BACK OFF** 1/4 turn.
 - 3.6 **SLIP** assembly on stem of valve 3.
 - 3.7 **SLIDE** valve 1 toward vapor sample bottle assembly and **FINGER-TIGHTEN** both fittings on right and left of assembly.
 - 3.8 **HOLD** vapor sample bottle assembly body with 3/4-inch open-end wrench, and **TIGHTEN** both fittings to 30 ft-lbs using appropriate torque wrench.
 - 3.9 **VERIFY** torque (30 ft-lbs) on all valve fittings between valves 1 and 3.
 - 3.10 **VERIFY** valves 1, 2, and 3 are CLOSED.
 - 3.11 **PERFORM** one of the following:
 - 3.11.1 When having installed a vapor sample bottle assembly or a sample bag valve assembly and liquid sample bottle assembly has to be installed, **PROCEED** to Step 3.0.
 - 3.11.2 When having installed only a vapor sample bottle assembly or sample bag valve assembly, **PROCEED** as directed.
 - 3.11.3 When having installed a vapor sample bottle assembly or a sample bag valve assembly and LSA assembly has to be installed, **PROCEED** to Step 5.0.

-
- 4.0 **INSTALL** liquid sample bottle assembly (valve 9).
- 4.1 **INSPECT** liquid sample bottle assembly for serviceability. **DISCARD, REPLACE, and RECORD** on sample log when assembly is damaged.
 - 4.2 **VERIFY** liquid sample bottle assembly has correct sample label on it.
 - 4.3 **VERIFY** thread lubricant has been applied to valve piping external threads prior to installing liquid sample bottle assembly.
 - 4.4 **LOOSEN** handle securing valve 8 to the bracket, and **SLIDE** valve 8 to the left.
 - 4.5 **TIGHTEN** both stop collars on sample piping finger-tight and **BACK OFF** 1/4 turn.
 - 4.6 **SLIP** liquid sample bottle assembly onto the stem of valve 10.
 - 4.7 **SLIDE** valve 8 toward liquid sample bottle assembly and **FINGER-TIGHTEN** both fittings on left and right of assembly.
 - 4.8 **HOLD** liquid sample bottle assembly body with 3/4-inch open-end wrench and **TIGHTEN** both fittings to 30 ft-lbs using the appropriate torque wrench.
 - 4.9 **VERIFY** torque (30 ft-lbs) on all valve fittings between valves 6 and 8.
 - 4.10 **TIGHTEN** handle securing valve 6.
 - 4.11 **VERIFY** valves 8, 9, and 10 are CLOSED.
 - 4.12 **PROCEED** as directed.
- 5.0 **INSTALL** LSA assembly (valve 9).
- 5.1 **INSPECT** LSA assembly for serviceability. **DISCARD, REPLACE, and RECORD** on sample log when assembly is damaged.
 - 5.2 **VERIFY** thread lubricant has been applied to valve piping external threads prior to installing liquid sample bottle assembly.
 - 5.3 Loosely **SECURE** LSA assembly bracket to EDS CONTAINMENT VESSEL door using a crescent wrench.
 - 5.4 **LOOSEN** handle securing valve 8 to the bracket, and **SLIDE** valve 8 to the left.

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- 5.5 **TIGHTEN** both stop collars on sample piping finger-tight and **BACK OFF** 1/4 turn.
 - 5.6 **SLIP** LSA assembly valve 9 onto the stem of valve 10.
 - 5.7 **SLIDE** valve 8 toward LSA assembly valve 9 and **FINGER-TIGHTEN** both fittings on left and right of valve 8.
 - 5.8 **TIGHTEN** completely the LSA assembly bracket to EDS CONTAINMENT VESSEL door using a crescent wrench.
 - 5.9 **HOLD** LSA assembly body with 3/4-inch open-end wrench and **TIGHTEN** both fittings to 30 ft-lbs using the appropriate torque wrench.
 - 5.10 **VERIFY** torque (30 ft-lbs) on all valve fittings between valves 8 and 10.
 - 5.11 **TIGHTEN** handle securing valve 8.
 - 5.12 **VERIFY** valves 8, 9, 10, and 11 are CLOSED.
 - 5.13 **VERIFY** reagent-filled bottle contains the appropriate reagent for the chemical fill being treated IAW Table 3-1.
 - 5.14 **RAISE** LSA assembly lever to OPEN position.
 - 5.15 **INSTALL** reagent-filled bottle and **LOWER** LSA assembly lever to CLOSED position.
 - 5.16 **PROCEED** as directed.

SPECIAL REQUIREMENTS:

1. Label sample containers IAW Sampling and Analysis Plan.
2. PPE must be worn IAW Annex G.

EQUIPMENT, TOOLS, AND SUPPLIES:

<u>ITEM:</u>	<u>QUANTITY:</u>
Reagent	as required
Liquid sample bottle assembly	1 each
Sample bag valve assembly	1 each
Liquid sample adapter assembly	1 each
Primary tool kit	1 each
Open-end wrench, 3/4-inch open-end	1 each
Open-end wrench, 5/8-inch open-end	1 each
Torque wrench, 5/8-inch, 30 ft-lbs	1 each
EDS operator log	1 each
Indelible ink pen	1 each

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ANNEX L
EDS LIFT ASSIST SUBSYSTEM OPERATION

ANNEX L EDS LIFT ASSIST SUBSYSTEM OPERATION

The purpose of this annex is to lift and position heavy objects using the Explosive Destruction System (EDS) Lift Assist Subsystem.

PRECONDITIONS:

1. EDS Lift Assist Subsystem jib crane has been weight tested to 650 pounds and weight test is still current.
2. FSS Lifting Tool has been weight tested to 500 pounds and weight test is still current.
3. EDS Lift Assist Subsystem has been programmed in accordance with (IAW) vendor's operating manual.
4. Wear personal protective equipment (PPE) IAW Annex I.

WARNINGS

THE TWO LIFT ASSIST JIB MOUNTING POINTS ON THE VERTICAL SUPPORT BEAM AND THE TWO ROTARY JOINTS PRESENT PINCHING HAZARDS. BE AWARE OF BODY POSITION WHEN PERFORMING THE FOLLOWING STEPS.

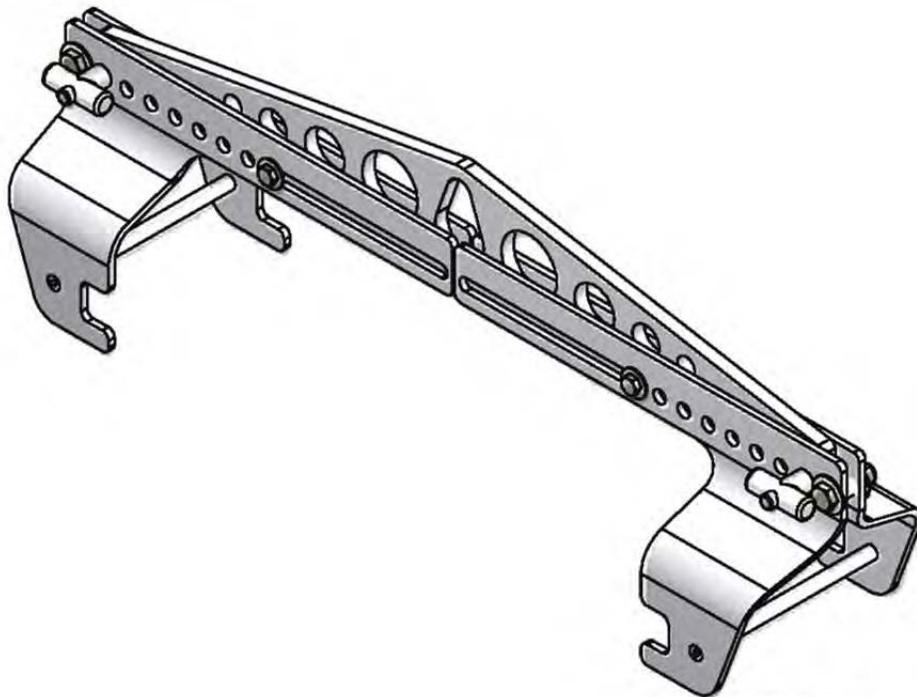
WHEN USING THE FRAGMENT SUPPRESSION SYSTEM (FSS) LIFTING TOOLS, DO NOT ATTEMPT TO LIFT ANY ITEM WEIGHING OVER 500 POUNDS.

WEAR LEATHER GLOVES WHENEVER HANDLING HEAVY OBJECTS OR OBJECTS WITH SHARP EDGES AND OTHER PPE IAW ANNEX G.

FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

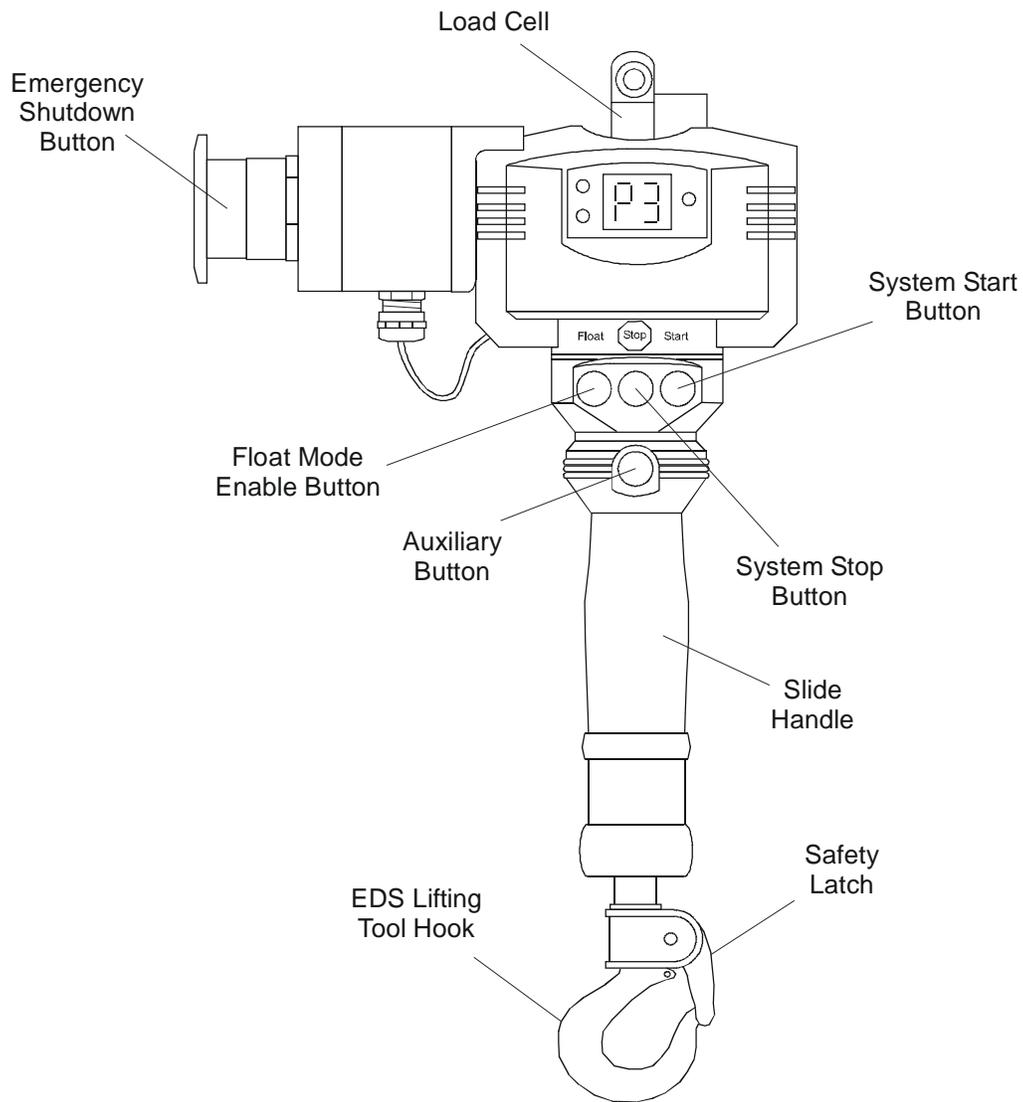
- 1.0 **DON** leather gloves, as needed. **VERIFY** steel-toed shoes are worn.
- 2.0 **PREPARE** Lift Assist Subsystem for operations. to payload.
 - 2.1 **VERIFY** control hub setting is set to correct profile.

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- 2.2 **PERFORM** one of the following:
 - 2.2.1 When not using FSS Lifting Tool, **PROCEED** to Step 3.0.
 - 2.2.2 When using FSS Lifting Tool (Figure L-1), **PERFORM** the following:
 - 2.2.2.1 **SELECT** appropriate FSS Lifting Tool for payload.
 - 2.2.2.2 **REMOVE** quick-release pin(s) from arm(s) of FSS Lifting Tool.
 - 2.2.2.3 **POSITION** the arms so payload is secure between them and the lifting eye is centered above payload.
 - 2.2.2.4 **RE-INSTALL** the two quick-release pin(s) to secure arm(s).
 - 2.2.2.5 **VERIFY** FSS Lifting Tool is properly positioned and attached to payload.
 - 3.0 **OPERATE** EDS Lift Assist Subsystem.
 - 3.1 **VERIFY** EMERGENCY SHUTDOWN button is out (Figure L-2).
 - 3.2 **PRESS** green system start button on central hub (Figure L-2).
 - 3.3 **PRESS** blue system float mode enable button on central hub to place EDS Lift Assist Subsystem in float mode (Figure L-2).
 - 3.4 **PRESS** red system stop button and **VERIFY** red stop mode light illuminates (Figure L-2).
 - 3.5 Securely **GRASP** slide handle (Figure L-2) and **MOVE** jib crane to position over payload.
 - 3.6 **PRESS** green system start button and **LOWER** central hub by pulling slide handle downwards.
 - 3.7 **PRESS** red system stop button and **VERIFY** red stop mode light illuminates.
 - 3.8 **PRESS** and **HOLD** safety latch release button and then **ROTATE** safety latch to the OPEN position.



P-0020-005, FSS Lifting Tool.ppt
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Figure L-1. FSS Lifting Tool



P-0020-005; Central Hub.cdr
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Figure L-2. Central Hub

3.9 **PERFORM** one of the following:

3.9.1 When not using FSS Lifting Tool, **PERFORM** the following:

3.9.1.1 **CONNECT** EDS Lifting Tool hook to payload eyebolt lifting plug and **RELEASE** safety latch release button.

3.9.1.2 **VERIFY** payload eyebolt lifting plug is securely enclosed within EDS Lifting Tool hook and safety latch (Figure L-2) is in the CLOSE position.

3.9.1.3 **PROCEED** to Step 4.0.

3.9.2 When using FSS Lifting Tool (Figure L-1), **PERFORM** the following:

3.9.2.1 **CONNECT** EDS Lifting Tool hook to FSS Lifting Tool and **RELEASE** safety latch release button.

3.9.2.2 **VERIFY** FSS Lifting Tool is securely enclosed within EDS Lifting Tool hook and safety latch (Figure L-2) is in the CLOSE position.

4.0 **LIFT** and **POSITION** payload.

4.1 **PRESS** green system start button.

WARNING

PAYLOAD PRESENTS CRUSHING OR PINCHING HAZARDS. BE AWARE OF BODY POSITION WHEN PAYLOAD IS BEING MOVED. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

Note

Blue float mode light must be illuminated for float mode to function. Float mode will commence to operate once payload is initially moved using slide handle.

4.2 Securely **GRASP** payload and **RAISE** payload to the desired height.

4.3 **PRESS** red system stop button and **VERIFY** red stop mode light illuminates.

WARNING

PAYLOAD AND ROTARY JOINTS PRESENT CRUSHING OR PINCHING HAZARDS. ENSURE PERSONNEL ARE NOT WITHIN SWING ARC AREA BEFORE MOVING PAYLOAD. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY.

- 4.4 **VERIFY** swing arc area is clear prior to commencing payload horizontal movement.

Caution

Hardware, equipment, and other fixtures need to be removed or location noted prior to movement of payload to avoid damage to them or the payload.

- 4.5 While maintaining control of payload, **SWING** payload and **POSITION** it over desired location.
- 5.0 **LOWER** and **DISCONNECT** payload.
- 5.1 **PRESS** green system start button.
- 5.2 **PERFORM** one of the following:
- 5.2.1 When not using black auxiliary button to control lowering of payload, **PROCEED** as follows:
 - 5.2.1.1 **LOWER** payload.
 - 5.2.1.2 **VERIFY** payload is stabilized.
 - 5.2.1.3 **PROCEED** to Step 5.3.
 - 5.2.2 When using black auxiliary button to control lowering of payload, **PROCEED** as follows:
 - 5.2.2.1 **PRESS** and **HOLD DOWN** black auxiliary button.
 - 5.2.2.2 **LOWER** payload.

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- 5.2.2.3 **VERIFY** payload is stabilized
 - 5.2.2.4 **RELEASE** black auxiliary button.
 - 5.3 **PRESS** red system stop button and **VERIFY** red stop mode light illuminates.
 - 5.4 **PERFORM** one of the following:
 - 5.4.1 When not using FSS Lifting Tool, **PERFORM** the following:
 - 5.4.1.1 **PRESS** and **HOLD** safety latch release button and then **ROTATE** safety latch to the OPEN position.
 - 5.4.1.2 **REMOVE** EDS Lifting Tool hook from eyebolt lifting plug.
 - 5.4.1.3 **PROCEED** to Step 6.0.
 - 5.4.2 When using FSS Lifting Tool, **PERFORM** the following:
 - 5.4.2.1 **REMOVE** quick-release pin and **REMOVE** FSS Lifting Tool from payload.
 - 5.4.2.2 **REPLACE** quick-release pin.
 - 6.0 **MOVE** jib crane.
 - 6.1 **PRESS** green system start button (Figure L-2) on central hub.
 - 6.2 Securely **GRASP** slide handle and **RAISE** central hub away from payload.
 - 6.3 **PRESS** red system stop button and **VERIFY** red stop mode light illuminates.

Caution

Hardware, equipment, and other fixtures need to be removed or location noted prior to movement of jib crane to avoid damage.

- 6.4 **SWING** jib crane back to desired position.

7.0 **PERFORM** one of the following:

7.1 When another payload needs to be moved, **PROCEED** as follows:

7.1.1 **PRESS** green system start button and **LOWER** central hub by pulling slide handle downwards to payload.

7.1.2 **PRESS** red system stop button and **VERIFY** red stop mode light illuminates.

7.1.3 **PERFORM** one of the following:

7.1.3.1 When not using FSS Lifting Tool, **RETURN** to Step 3.8.

7.1.3.2 When using FSS Lifting Tool, **PERFORM** the following:

7.1.3.2.1 **REMOVE** quick-release pin(s) from arm(s) of FSS Lifting Tool.

7.1.3.2.2 **POSITION** the arms so payload is secure between them and the lifting eye is centered above payload.

7.1.3.2.3 **RE-INSTALL** the quick-release pin(s) to secure arm(s).

7.1.3.2.4 **VERIFY** FSS Lifting Tool is properly positioned and attached to payload.

7.1.3.2.5 **RETURN** to Step 4.0.

7.2 When no other payload needs to be moved, **PERFORM** one of the following:

7.2.1 When not using FSS Lifting Tool, **STOW** jib crane in appropriate location.

7.2.2 When using FSS Lifting Tool, **PERFORM** the following:

7.2.2.1 **PRESS** and **HOLD** safety latch release button and then **ROTATE** safety latch to the OPEN position.

7.2.2.2 **REMOVE** FSS Lifting Tool from EDS Lifting Tool hook.

7.2.2.3 **RELEASE** safety latch release button and **STOW** FSS Lifting Tool in appropriate location.

7.2.2.4 **STOW** jib crane in appropriate location.