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CP3-WM-1017 **FRev. 1A**	**TITLE**: Safe Handling and Opening of Sealed Containers	Page 1 of 19

DOCUMENT CATEGORY: ☐ Administrative ☒ Technical

LEVEL OF USE: ☐ Information Level ☒ Reference Level ☐ Continuous Use

FUNCTIONAL AREA: Waste Generation **SUBJECT MATTER AREA:** Waste Generation	**SUBJECT MATTER EXPERT**: Brian Bell, Waste Generator Manager
NUCLEAR SAFETY REVIEW DOCUMENTATION: FRNP-19-0175-S	**APPROVED BY/DATE** (Signature on file): Brian Bell, Waste Generator Manager, 3/12/19
REQUIRED REVIEW DATE (or expiration date for temporary change): 11/27/20	**EFFECTIVE DATE**: 3/18/19

REVISION/CHANGE LOG

Revision/Change Letter	Description of Changes	Pages Affected	Date of Revision/Change
FR0	Bluesheet	All	10/19/17
FR1	Initial Release. Non-intent changes to incorporate bluesheet changes.	All	11/27/17
FR1A	CA-001418, AI-0002128, Add step to 6.5.3 to visually inspect approved flexible web netting for worn spots or defective ratchets.	11	3/12/19

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure describes container requirements related to identifying unsafe (pressurized) containers, specifying opening and closing methods, and correcting a deteriorated container condition.

This procedure is intended to improve worker safety and environmental compliance related to containers by describing safe handling methods and providing compliance with regulatory and other requirements related to these containers.

1.2 Scope

This procedure applies to work performed and/or coordinated by Paducah Gaseous Diffusion Plant (PGDP) Deactivation and Remediation (D&R) contractor for the United States Department of Energy (DOE) at the DOE-owned Paducah Site.
This procedure applies to all sealed containers located at the Paducah Site.
This procedure does **NOT** apply to the following:

- Work that the Plant Shift Superintendent (PSS) directs in response to an emergency condition.
- Containers designed to prevent internal pressure buildup, such as those made of cardboard, wood, open containers, or vented containers.

2.0 REFERENCES

2.1 Use References

- CP2-WM-0011, *Waste Acceptance Criteria for the Treatment, Storage and Disposal Facilities at the Paducah U.S. Department of Energy Site*
- CP3-ES-0003, *Environmental Incident Reporting*
- CP3-NS-1031, *Nuclear Criticality Safety Program*
- CP3-QA-3002, *Operating Experience/Lessons Learned (OE/LL)*
- CP3-SM-0020, *Administrative Controls for Powered Industrial Trucks*
- CP3-SM-0051, *Hoisting and Rigging*
- CP3-WM-1037, *Generation and Temporary Storage of Waste Materials*
- CP3-WM-3015, *Waste Packaging*

2.2 Source References

- CP2-OP-1119, *Readiness Review Program*
- CP3-WM-0015, *Management of Fissile Waste Materials*
- JHA-8692, *Waste Container Handling, Overpacking, and Transportation*
- Memorandum From Dr. Ines R. Triay Dated 12/22/05,
  Safety Alert: *Preventing Waste Drum and Container Explosion*
- Office of Environmental Management Safety Alert, Dated December 2005, *Preventing Waste Drum and Container Explosions*
- Safety Bulletin 2006-04, DOE/EH – 0697, *Gas Build-up in Drums*

3.0 COMMITMENTS

None

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Precautions

4.1.1 Drums that appear to be in acceptable condition may still contain sufficient pressure to inflict injury.

4.1.2 Sealed waste containers have the potential to be pressurized (stored energy) and may contain hazardous and/or radioactive materials in solid and/or liquid form. A pressurized container may constitute various types of chemical and/or physical threats to the worker and/or the environment.

4.1.3 Unless a sealed container is known to be vented, consider all sealed containers to be potentially pressurized, particularly those containing volatile organics, aqueous/organic mixtures, low or high pH solutions, biological wastes or sludge.

4.1.4 A container may be pressurized for one or more reasons. Gases may be generated by: reaction of content materials with each other; reaction of the contents with the container; vapor phases of contents; decomposition of contents; thermal expansion (sealed in cold area-moved to warmer area) of air or other gases; or a combination of the above causes.

4.1.5 Operation of two-way radio or cellular phones may serve as an ignition source in areas where volatile organic vapors are present.

4.1.6 Keep containers of hazardous waste and/or mixed waste closed except when waste is being added, removed, transferred, or observed/sampled.

4.1.7 The potential for pressurization of a waste container increases if the drum is exposed to direct sunlight or high temperatures, is vigorously or frequently moved or disturbed, or is stored for a long time.

4.1.8 Even an empty container may be pressurized. All sealed containers should be considered to be 'suspect' especially if it is an unmarked container (content unknown).

4.1.9 Contents of a container may cause the container to be pressurized. Positioning any part of the body over or placing any unauthorized objects (for example, tools) on or over the container lid during removal may result in severe injury.

4.1.10 A deteriorated container may be damaged by even "normal" handling resulting in a further loss of container integrity that may result in a spill of contents to the environment and/or personnel injury or exposure.

4.2 Limitations

4.2.1 **DO NOT** touch, move, or otherwise disturb a pressurized container without proper authorization.

4.2.2 **If** a tamper indicator device (TID) is present on a container, **DO NOT** proceed with sampling or other activities that require opening the container (TID removal) until the Field Engineer/Waste and Materials Frontline Supervisor and/or Waste Package Certifier are present.

5.0 PREREQUISITES

Prior to performing work to this procedure consult with Industrial Safety/Hygiene regarding requirements specified in an Exposure Control Plan or Industrial Hygiene Work Permit and RADCON regarding requirements specified in the Radiological Work Permit.

6.0 INSTRUCTIONS

6.1 Field Preparations

<u>Frontline Supervisor</u>

NOTE:
Prior to conducting a pre-job briefing, Radiation Protection and Industrial Safety/Hygiene shall be contacted for guidance.

6.1.1 Conduct a pre-job briefing with all personnel who will be performing work activities by reviewing the following:

- Scope of work identified

- Requirements of any special work permits
- Engineered safety features, such as the use of non-sparking tools or lid restraints
- PPE (personal protective equipment) requirements
- Availability of equipment, tools, and supplies
- Proper response to possible abnormal events
- Personnel have "suspend/stop work"' authority
- Precautions and Limitations

Operator/Sampler/Frontline Supervisor

6.1.2 Visually inspect handling, sampling, and opening equipment to ensure that it is clean prior to use to avoid possible cross-contamination.

6.1.3 **If** material handling equipment such as a forklift mounted drum grabber or "below the hook lifting devices" are used, **then** follow all requirements of CP3-SM-0020, *Administrative Controls for Powered Industrial Trucks* or CP3-SM-0051, *Hoisting and Rigging*, as appropriate.

6.2 Identification of and Response to a Potentially Pressurized Container

Frontline Supervisor/Facility Manager/Operator/Sampler

NOTE:

Over-pressurized containers exhibit one or more of the following characteristics:

- Top center protrudes above rim
- Bottom center protrudes below rim
- Swollen sides
- Emits audible sounds (for example, pinging metal, hissing)

WARNING:

Drums that appear to be in acceptable condition may still contain sufficient pressure to inflict injury.

Sealed waste containers have the potential to be pressurized (stored energy) and may contain hazardous and/or radioactive materials in solid and/or liquid form. A pressurized container may constitute various types of chemical and/or physical threats to the worker and/or the environment.

Unless a sealed container is known to be vented, consider all sealed containers to be potentially pressurized, particularly those containing volatile organics, aqueous/organic mixtures, low or high pH solutions, biological wastes or sludge.

A container may be pressurized for one or more reasons. Gases may be generated by: reaction of content materials with each other; reaction of the contents with the container; vapor phases of contents; decomposition of contents; thermal expansion (sealed in cold area-moved to warmer area) of air or other gases; or a combination of the above causes.

6.2.1 Visually inspect containers to identify characteristics of potential over-pressurization (as defined above).

6.2.2 **If** there are no obvious visual or audible signs that a container may be pressurized as described above, **then** proceed to **Section 6.3.**

6.2.3 **If** any of the characteristics of pressurized containers are observed, **then** alert **and** evacuate personnel in the immediate area.

<u>Frontline Supervisor/Facility Manager</u>

6.2.4 Contact the PSS.

6.2.5 **If** the contents **DO NOT** contain fissionable or potentially fissionable material, **then** set up an exclusion zone by securing the immediate area around the pressurized container of a minimum radial distance of 20 feet (or greater distance for higher degree of hazard depending on the contents of the container).

6.2.6 Complete CP3-WM-1017-F01, *Pressurized Waste Container Notification.*

6.2.7 Inspect the container and note the following information:

- All labels and markings
- Waste Container Identification number

- Contents (based on markings)
- Container condition (deterioration, rust, leaks, etc.)
- Container size and type, and configuration of the container head (i.e. bungs, removable, etc.)
- Any other information that could determine the cause of pressurization
- Location of the container and accessibility for drum handling equipment

6.2.8 Review documentation/records of the contents of the container to determine if the contents/conditions are present which could lead to the build-up of pressure within the drum. Review information collected in Step **6.2.7** with:

- PSS
- Waste Engineer
- Industrial Hygiene/Safety
- Radiological Control (RADCON)
- Other SME, as needed

Frontline Supervisor/Facility Manager/Industrial Safety-Hygiene/RADCON

6.2.9 **If** observed container condition can be mitigated safely without PSS intervention, **then** utilize one of the container opening techniques identified in **Section 6.3.**

Frontline Supervisor/Facility Manager

6.2.10 Contact additional personnel according to CP3-WM-1017-F01.

6.2.11 **If** the contents of the pressurized container include fissionable material **or** if an observed spill occurs in a fissionable material storage area, **then** follow CP3-NS-1031, *Nuclear Criticality Safety Program* **and** contact NCS.

6.2.12 Follow any instructions or request from the PSS to assist in mitigating the condition.

6.2.13 Take appropriate actions to investigate whether other similar containers are also pressurized.

6.2.14 Develop a course of action to depressurize the container in conjunction with the personnel listed in Step **6.2.8**.

NOTE:

Authorization Basis approval is required for repackaging of material or relocating materials to Waste Management facilities.

6.2.15 Begin planning activities to have the waste in the formerly pressurized container either repackaged **or** over packed in accordance with CP3-WM-3015, *Waste Packaging* or direction by Waste Management.

6.3 Opening a Sealed Container

Operator/Sampler

WARNING:

Operation of two-way radio or cellular phones may serve as an ignition source in areas where volatile organic vapors are present.

Keep containers of hazardous waste and/or mixed waste closed except when waste is being added, removed, transferred, or observed/sampled.

6.3.1 **If** a container is to be opened **and** the container does **NOT** exhibit characteristics of pressurization listed in **Section 6.2**, **then** depress the top of the container with the palms of both hands by placing one hand on the top of the other.

6.3.2 Estimate the relative resistance encountered (pressure exerted) to flex the top of the container based on experience with other containers as applicable.

WARNING:

The potential for pressurization of a waste container increases if the drum is exposed to direct sunlight or high temperatures, is vigorously or frequently moved or disturbed, or is stored for a long time.

Even an empty container may be pressurized. All sealed containers should be considered to be 'suspect' especially if it is an unmarked container (content unknown).

6.3.3 **If** the top of the container does **NOT** flex easily **or** significant resistance is encountered, **then** treat the container as being potentially over-pressurized **and** return to **Section 6.2**.

WARNING:

Contents of a container may cause the container to be pressurized. Positioning any part of the body over or placing any unauthorized objects (e.g., tools) on or over the container lid during removal may result in severe injury.

6.3.4 **If** the container is a metal box, **then** proceed to **Section 6.4**.

6.3.5 **If** the container is a drum with a bung, **then** proceed to **Section 6.5**.

6.3.6 **If** the container is an open top sealed drum without a bung, **then** proceed to **Section 6.6**.

6.4 Opening a Metal Box

Operator/Sampler

6.4.1 Restrain the lid during opening of a pressurized box by positioning an approved forklift with the tines resting approximately 1-2 inches over the container lid.

6.4.2 Slowly loosen the closure device just enough to be able to break the seal.

NOTE:

For large boxes, the tines of a forklift may be used in lieu of a pry bar.

6.4.3 Stand upwind (if possible) and break the seal on the lid using a non-sparking tools/pry bar, if needed.

6.4.4 **If** any hissing sound is heard, **then** immediately move away from the container.

6.4.5 From a safe distance, wait for the hissing to stop **and** record container identification, if available.

6.4.6 Notify Frontline Supervisor before proceeding.

6.4.7 Remove the closure device and the lid from the metal box.

Operator/Sampler

NOTE:

Any tools or items used must be surveyed by the RADCON Technician.

6.4.8 Perform any sampling, treatment in place, or other activities related to the contents.

6.4.9 **When** the container is ready to be closed, close container in accordance with CP3-WM-3015 and manufacturer's instructions.

6.5 Opening a Drum with a Bung

Operator/Sampler

6.5.1 **If** needed for pressure release, **then** remote drum opener may be used according to manufacturer instructions.

> NOTE:
>
> A typical drum lid restraint is pictured in Appendix B, *Example of Web Type Drum Lid Restraint*. This restraint must be installed/used in accordance with manufacturer's instructions to promote the highest level of personnel safety.

6.5.2 Restrain the lid during opening using one of the following, for pressurized drums:

- A rigid lid restraint mechanical device that captures the lid if the lid rapidly releases (for example, ridged clamp on device or forklift tine).
- An approved flexible web netting device that can capture the lid if the lid rapidly releases.

6.5.3 Visually inspect approved flexible web netting device for worn spots or defective ratchets. **If** worn spots or defective areas are found, **then** contact FLS. Chg A

6.5.4 Insert the appropriate fitting of the bung wrench into the bung to be removed.

> NOTE:
>
> Bung removal is performed in accordance with **Steps 6.5.5** through **6.5.9**

6.5.5 Stand upwind (if possible) and slowly turn the bung wrench counterclockwise while listening for any hissing sound.

6.5.6 **If** hissing sound is heard, **then** immediately move away from container (upwind if possible).

6.5.7 Contact the Frontline Supervisor **and** wait for the hissing sound to stop.

6.5.8 Repeat **Step 6.5.5** as necessary until bung is removed.

6.5.9 Remove the bung from the container.

6.5.10 Perform any sampling, treatment in place, or other activities related to the contents.

6.5.11 **When** the container is ready to be closed, close container according to CP3-WM-3015 and manufacturer's instructions.

6.6 Opening a Sealed Open Top Drum without a Bung

Operator/Sampler

6.6.1 **If** needed for pressure release, **then** remote drum opener may be used according to manufacturer instructions.

NOTE:

A typical drum lid restraint is pictured in Appendix B, *Example of Web Type Drum Lid Restraint*. This restraint must be installed/used in accordance with manufacturer's instructions to promote the highest level of personnel safety.

6.6.2 Restrain the lid during opening using one of the following, for pressurized drums:

- A rigid lid restraint mechanical device that captures the lid if the lid rapidly releases.
- An approved flexible web netting device that can capture the lid if the lid rapidly releases.

6.6.3 Position the selected lid restraint device such that access to the locking ring bolt is **NOT** obstructed.

6.6.4 Slowly loosen the nut on the locking ring bolt using a wrench, an adjustable wrench, or a ratchet and socket combination.

6.6.5 Slowly break the seal using a non-sparking pry bar while standing as far away and upwind from the drum as practical.

6.6.6 Remove the lid restraint device, if installed.

6.6.7 Remove the locking ring from the top of the drum.

6.6.8 Remove the lid from the top of the drum.

Operator/Sampler

6.6.9 Perform any sampling, treatment in place, or other activities related to the contents.

6.6.10 **When** the container is ready to be closed, close container in accordance with CP3-WM-3015 and manufacturer's instructions.

6.7 Identification and Evaluation of Deteriorated Containers

Operator/Sampler

NOTE(S):

This note applies to Section **6.7**.

It is assumed that any pressurized containers have already been relieved of any internal pressure and opened by actions performed in previous sections of this procedure.

Containers that have deteriorated or have lost containment integrity exhibit one or more of the following characteristics:

- Signs of prior pressurization (refer to **Section 6.2**).
- Puncture by emergency squad to relieve signs of pressurization.
- Deformation due to freezing/thawing of contents.
- Physical damage due to dents, cuts, crushed areas, or drops.
- Excessive corrosion (general or local, such as near a seam).
- Evidence of leakage (container/floor/secondary containment area).

WARNING:

A deteriorated container may be damaged by even "normal" handling resulting in a further loss of container integrity that may result in a spill of contents to the environment and/or personnel injury or exposure.

6.7.1 Inspect containers for deterioration/degradation or loss of containment integrity.

6.7.2 **If** any of the above conditions are observed, **then** notify the Facility Manager and the Frontline Supervisor.

6.7.3 **If** a spill has occurred, **then** notify the Facility Manager, Frontline Supervisor, and Regulatory Compliance (RC).

6.7.4 **If** a spill has occurred, **then** alert and evacuate other work groups in the immediate area as appropriate.

Frontline Supervisor/Facility Manager

NOTE:

The PSS must be contacted in the event of a spill.

6.7.5 **If** a spill has occurred, **then** make notifications according to CP3-ES-0003, *Environmental Incident Reporting*.

6.7.6 **If** the contents of any container include fissionable material **or if** a spill occurs in a fissionable material storage area, **then** CP3-NS-1031, **and** contact NCS.

6.7.7 **If** problems are observed that are beyond the capability of the project to mitigate **and/or** is considered a threat that could affect personnel outside the affected facility besides PGDP D&R contractor and their subcontractors, **then** notify the PSS**.**

NOTE:

Several notifications in addition to those listed below may have already been made as emergency notifications by the PSS after they were notified.

6.7.8 Contact the following additional personnel:

- Remediation Project Manager
- Project Manager
- Health and Safety Manager
- Quality Assurance (if problem meets reporting criteria for an occurrence report)

6.7.9 **If** the condition does **NOT** pose a threat, **then** follow CP3-WM-3015 for repackaging or overpacking container.

6.7.10 Document all information listed on the container, if safe to do so.

6.7.11 **If** the container is currently located in or was recently moved from a permitted waste facility, **then** request characterization information on the contents from Waste Management.

6.7.12 **If** the waste is being packaged **or** has recently been packaged by a waste generator, **then** contact the waste generator for information concerning characterization of the contents of the container.

6.7.13 Secure the area around a spill with barricades **and** evacuate the immediate area to prevent unnecessary personnel access (minimize exposures and spread of contamination).

6.7.14 Contact the following as necessary:

- RC (All Spills)
- RADCON (Spills containing radioactive material)
- PSS (Large Spills)

6.7.15 Initiate necessary immediate emergency actions in accordance with PGDP D&R contractor site emergency procedures and PGDP D&R contractor emergency management procedures.

NOTE:
Spill pans made of material compatible with liquid waste contents may be used to temporarily contain leaking liquid non-fissile waste from a deteriorated or damaged container while waiting for transfer to a new container.

6.7.16 **If** contents of the deteriorated container are known **and DO NOT** include fissile material, **then** initiate interim actions to minimize effects of the spill while waiting for transfer to a new container.

6.7.17 **If** the contents of the deteriorated container may contain fissile or potentially fissile material, **then** CP3-NS-1031.

6.7.18 Clarify all problems (for example, contents, seriousness of integrity loss) with the deteriorated container before making a repack/overpack decision.

7.0 ACCEPTANCE CRITERIA

None

8.0 POST PERFORMANCE WORK ACTIVITIES

Operator

8.1 Make appropriate changes to any inventory records.

Frontline Supervisor/Facility Manager

8.2 Review all documentation to verify field information has been documented on the appropriate data forms or in logbooks as required.

Operator/Sampler

8.3 Clean/Decontaminate all reusable opening tools and equipment with the assistance of RADCON.

8.4 Disposition any original deteriorated containers (unless over packed) in accordance with instructions.

8.5 Dispose of all waste material, such as PPE, according to site-specific waste management requirements specified in CP2-WM-0011, *Waste Acceptance Criteria for the Treatment, Storage and Disposal Facilities at the Paducah U.S. Department of Energy Site* or CP3-WM-1037, *Generation and Temporary Storage of Waste*.

8.6 Return all work areas to acceptable housekeeping standards.

Frontline Supervisor/Facility Manager

8.7 Close out any permits, if any, required to perform the work.

8.8 Conduct a post-task meeting with the persons who performed and supported the work to identify the following:

- Problem areas that need to be addressed before the same task is performed again at a later date
- Ideas/suggestions for improvement

8.9 Conduct follow-up activities to correct problem areas and to investigate and/or implement suggestions for improvements.

8.10 Develop and issue Lessons Learned, as applicable, in accordance with the requirements of CP3-QA-3002, *Operating Experience/Lessons Learned (OE/LL).*

9.0 RECORDS

9.1 Records Generated

The following records may be generated by this procedure:
CP3-WM-1017-F01, *Pressurized Waste Container Notification*
Forms are to be completed in accordance with CP3-OP-0024, *Forms Control*.

9.2 Records Disposition

The records are to be maintained in accordance with CP3-RD-0010, *Records Management Process*.

Appendix A – Acronyms/Definitions

ACRONYMS

D&R – Deactivation and Remediation

DOE – U.S. Department of Energy

PGDP – Paducah Gaseous Diffusion Plant

PPE – personal protective equipment

PSS – Plant Shift Superintendent

RADCON – Radiological Control

RC – Regulatory Compliance

TID – Tamper Indication Device

DEFINITIONS

DRUM LID RESTRAINT – A mechanical means of restraining a drum lid during removal in order to protect the worker from the projectile hazard of the drum lid when the waste drum is pressurized.

OPERATOR – An individual responsible for the daily operating requirements identified in 401 *KAR* 47:120, 48:090, or 48:170.

Appendix B – Example of Web Type Drum Lid Restraint

CP3-WM-1017-F01 – Pressurized Waste Container Notification

Initial Notification	**Reported By:**	**Date:**	**Time (24-hour):**
Container Identification	**Container Number:**	**Barcode Number:**	
Container Location	**Facility:**	**Grid:**	
Does waste material in this container include fissionable material?		**Yes_☐**	**No__☐**

Parties Initially Notified:					
Yes	N/A	Personnel in the Immediate Area	Yes	N/A	Nuclear Criticality Safety (if fissionable)
Yes	N/A	Plant Shift Superintendent	Yes	N/A	Other (specify)
Yes	N/A	Facility Manager	Yes	N/A	Other (specify)
Yes	N/A	Front Line Manager	Yes	N/A	Other (specify)
Secondary Notifications					
Yes	N/A	Project Manager (Facility Owner/Designee)	Yes	N/A	Regulatory Compliance Representative
Yes	N/A	Project Director	Yes	N/A	H&S/ISM Manager
Yes	N/A	Facilities Operations Manager	Yes	N/A	Other (specify)
Yes	N/A	Quality Assurance	Yes	N/A	Other (specify)

Actions Taken:	Drum Lid Restraint Installed: Yes_ No_ N/A_

Identification of Other Containers within Same Waste Stream or with Similar Characteristics

Front Line Supervisor Approval:	**Signature:**	**Date:**
Facility Manager Approval:	**Signature:**	**Date:**