

CCP-HSP-011

Revision 1

CCP Headspace Gas Drum Sampling Health and Safety Plan

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APPROVED FOR USE

RECORD OF REVISION

Revision Number	Date Approved	Description of Revision
0	02/23/2005	Initial issue.
1	12/29/2010	Minor revision to update references to the <i>Waste Isolation Pilot Plant Hazardous Waste Facility Permit</i> .

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1.0 PURPOSE

This Health and Safety Plan (HSP) applies to Headspace Gas (HSG) Drum Sampling. The purpose of this HSP is to describe and document operation and specific safety features of Direct Canister HSG Drum Sampling.

1.1 Scope

This plan applies to sites, as identified in the statement of work and/or the interface document, utilizing Direct Canister Sampling of HSG.

2.0 REQUIREMENTS

2.1 References

Baseline Documents

- *Waste Isolation Pilot Plant Hazardous Waste Facility Permit, Attachments C-C6, Waste Analysis Plan (WAP)*
- *DOE/CBFO-94-1012. U.S. Department of Energy Carlsbad Field Office Quality Assurance Program Document (QAPD)*
- *CCP-PO-001, CCP Transuranic Waste Characterization Quality Assurance Project Plan (QAPjP)*
- *CCP-PO-002, CCP Transuranic Waste Certification Plan (WCP)*

Referenced Documents

- *CCP-QP-002, CCP Training and Qualification Plan*
- *CCP-TP-082, CCP Preparing and Handling Waste Drums for Headspace Gas Sampling*
- *CCP-TP-093, CCP Sampling of TRU Waste Containers*

2.2 Training Requirements

2.2.1 Qualification and training requirements for HSG personnel are contained in CCP-QP-002, *CCP Training and Qualification Plan*.

2.2.2 All individuals associated with HSG Drum Sampling shall have documented evidence as part of his/her training record that he/she has read and understands this document.

- 2.2.3 Personnel associated with HSG Drum Sampling will have completed hazardous waste operator (HAZWOPER) training required by the host site.
 - 2.2.4 Personnel associated with HSG Drum Sampling will have completed any radiological training required by the host site.
 - 2.2.5 Personnel associated with HSG Drum Sampling will have completed any Lockout/Tagout training required by the host site.
- 2.3 HSG Drum Sampling Area Requirements
- 2.3.1 The HSG Sampling area shall be temperature-controlled.
 - 2.3.2 Various levels of utility support include, at a minimum:
 - [A] AC power
 - [B] High-efficiency particulate air (HEPA) ventilation, HEPA blower
 - [C] Phone line
 - [D] Public address (PA) system
- 2.4 Additional Operational Requirements
- [A] A forklift or other suitable equipment is needed to move drums to and from designated HSG Drum Sampling area.
 - [B] HSG Drum Sampling area shall have operating gases ultra-high pure (UHP) Nitrogen and field reference standard (FRS). These gases shall be supplied on an ongoing basis as needed.
 - [C] Emergency exits at the host site facility.
 - [D] Emergency alarm systems.

3.0 RESPONSIBILITIES

NOTE

All personnel will comply with host site procedures that manage and control the potential for heat and cold stress.

3.1 Direct Canister HSG Drum Sampler

3.1.1 Personnel who have met the training requirements set forth in this HSP and CCP-QP-002 will sample in the areas designated by the host site.

3.1.2 Shall have documented evidence as part of his/her training record that he/she has read and understands this document.

3.2 HSG Technical Supervisor (TS)

3.2.1 Provides supervision of all HSG Drum Sampling operations and activities.

3.2.2 Shall have documented evidence as part of his/her training record that he/she has read and understands this document.

3.3 Radiological Control Technician (RCT)

3.3.1 Provides site Health Physics support for HSG Drum Sampling operations.

3.3.2 Shall have documented evidence as part of his/her training record that he/she has read and understands this document.

3.4 Vendor Project Manager (VPM)

3.4.1 Ensures that all work is performed according to this HSP and the specified site-specific requirements.

3.4.2 Provides onsite oversight of sampling operations.

3.4.3 Any changes in operations that do not significantly affect safety or the environment may be approved by the VPM. The VPM shall document the change. Approves any changes in operations that do not significantly affect safety of the environment.

3.4.4 Documents any changes to this HSP.

4.0 SAFETY SYSTEMS

CAUTION

HSG Drum Sampling will take place in a radiological control area due to the content of the waste being transuranic (TRU) and/or mixed waste. HSG Drum Sampling will be performed by penetrating the septa and exposing the sampling needle to the headspace of the waste. All of the work performed for HSG Drum Sampling takes place under continual RCT coverage to ensure proper radiological control in the operation area.

4.1 Radiation Safety System

4.1.1 Hazards

- [A] There is a possibility of a radioactive particle emission from a waste drum. Radioactive waste drums are typically sealed and vented through particle filters. Failure of the particle filter or the drum seal could result in radioactive particle emission. In this event, a health hazard may develop from radioactive particles from waste drums mixing with room air.
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NOTE

Through personnel training and qualification, the Central Characterization Project (CCP) will ensure that only trained/qualified personnel conduct this operation.

4.1.2 Controls

- [A] HSG Drum Sampling will only be done on vented drums that are in compliance with the container equilibrium requirements as documented in the *Waste Isolation Pilot Plant Hazardous Waste Facility Permit* issued to the Waste Isolation Pilot Plant, Identification No. NM4890139088-TSDF, by the New Mexico Environment Department, Attachment C, *Waste Analysis Plan (WAP) Attachment C1*.
- [B] Carlsbad Field Office (CBFO) approved filters will be installed on all drums.
- [C] Only waste containers within the designated HSG Drum Sampling operation area will be sampled.

- [D] Use of the appropriate tools and required personal protective equipment (PPE) will be in accordance with host site requirements and governing host site radiological work permit (RWP), and at a minimum, as indicated in Attachment 1, Personal Protective Equipment Requirements, will minimize or prevent exposure to hazardous waste constituents during HSG Drum Sampling.
- [E] All HSG Drum Sampling operations will be conducted with a HEPA blower (e.g., an elephant-trunk), or approved alternative.

NOTE

On-site RCT personnel will be available during HSG Sampling Operations as required.

- [F] The RCT(s) will monitor the work areas, as well as the immediate area where HSG drum samples are taken.
- [G] All materials used during HSG Drum Sampling Operations shall be cleared by RCT before any equipment can be removed from the designated HSG Drum Sampling area.
- [H] Upon completion of each step of handling sample drums that could expose the employees to radiological contamination, the RCT will survey equipment and employees to ensure adequate radiological control in the sampling area.
- [I] A Thermoluminescent Dosimeter (TLD) or other approved dosimeter as required by the host site shall be worn by all personnel involved with TRU waste drum sampling operations. For all drums with a contact dose rate of >100 millirem per hour (mrem/hr) at 30 cm, personnel will carry supplemental dosimetry as directed by the host site.
- [J] Personnel will comply with site-specific emergency response and evacuation procedures.

4.2 Radiation Monitoring Safety System

4.2.1 Hazards

- [A] Radioactive contamination poses the risk of ingestion and/or inhalation of radioactive material. Ingestion and/or inhalation of radioactive material may result in a source of neutron, beta and/or alpha radiation entering the body.

4.2.2 Controls

- [A] A Continuous Air Monitor (CAM) alarm system will be utilized to alert individuals that immediate action is necessary in order to minimize or terminate inhalation exposure within the HSG Drum Sampling operations area.

NOTE

Drums with an alpha count greater than 20-disintegrations per minute (dpm)/100 cm² will not be sampled.

Drums with a beta/gamma count greater than 200 dpm/100 cm² will not be sampled.

Limiting conditions will be specified on Radiological Control documents.

- [B] The host site RCT is responsible to swipe test the drums before delivery to the designated HSG Drum Sampling area.
- [C] A hand and foot monitor or applicable equipment will be located outside the HSG Drum Sampling operation area in accordance with host site controls.
- [D] All HSG Drum Sampling will be conducted under a snorkle (e.g., elephant trunk) which is at negative pressure with a HEPA Filter system in place or an approved alternative.
- [E] RCTs will perform periodic radiation surveys and post the designated HSG Drum Sampling area as appropriate. They will maintain survey records in accordance with site-specific requirements and notify HSG Drum Samplers of conditions and any changes on a regular basis.
- [F] All personnel involved in HSG Drum Sampling operations shall wear TLD badges or other approved dosimeter. If required by the host site, extremity dosimeters and/or finger rings that are read periodically shall be worn.
- [G] Personnel will comply with site-specific emergency response and evacuation procedures.

4.3 Electrical Equipment Safety Systems

4.3.1 Hazards

- [A] All electrical equipment installed and maintained in the host site facility is potentially an electrical hazard. Electrical shock can be caused while working on energized equipment or equipment that is turned off, but has stored energy.

4.3.2 Controls

- [A] All electrical equipment installed and maintained in the host site facility will be maintained by host site personnel.

4.4 Noise Monitoring Safety Systems

4.4.1 Hazards

- [A] Noise from equipment within and around the HSG Drum Sampling area and other equipment may exceed noise level acceptance.

4.4.2 Controls

- [A] Noise monitoring will be conducted by the host site at the discretion of the host site Industrial Hygienist.
- [B] Hearing protection will be worn if noise levels exceed 84 dBA or as required by the host site.
- [C] Industrial Hygiene (IH) monitoring will be conducted as determined by the host site IH.

4.5 Fire Safety Systems

NOTE

Primary fire detection system may be inside the host site facility where the HSG Drum Sampling area is located.

4.5.1 Hazards

- [A] TRU waste stored in drums have the potential to have flammable headspace from radioactive decay of the waste.
- [B] Fire hazards in the designated HSG Drum Sampling area include combustibles such as paper, cloth, and some plastic.

4.5.2 Controls

- [A] The TRU Waste Acceptable Knowledge (AK) Summary Report MUST be read prior to HSG Drum Sampling activities to flag potential combustibles present in drums.
- [B] Use of appropriate tools as indicated in the HSG Drum Sampling procedure will minimize or eliminate the potential for fires or explosions due to accumulation of flammables in waste containers.
- [C] An automatic sprinkler system or other approved fire suppression system within the host site facility.
- [D] The HSG Drum Sampling area will have a hand-held ABC fire extinguisher. Only trained operators will be allowed to use the fire extinguisher.
- [E] The exit door for the operator's work area shall be clearly marked.
- [F] HSGTS and HSG Drum Samplers shall meet site-specific fire extinguisher training requirements.
- [G] Personnel will comply with site-specific emergency response and evacuation procedures.

4.6 Heated Zones Safety Systems

4.6.1 Hazards

CAUTION

The following areas may have hot spots, which should be avoided.

- [A] Insulated enclosure
- [B] Temperature indicators
- [C] Insulated transfer lines

4.6.2 Controls

- [A] Thermal hazards ($\geq 125^{\circ}$ F) will be labeled as such.

- [B] Leather gloves and PPE will be worn in heated zones when appropriate.
- [C] When applicable, heated zones will be cooled to appropriate working temperatures.
- [D] Personnel will comply with site-specific emergency response and evacuation procedures.

4.7 Hazardous Materials Safety Systems

4.7.1 Hazards

- [A] The chemicals used for HSG Drum Sampling and dry chemicals in the fire extinguisher can cause eye, skin, and respiratory discomfort.
- [B] Volatile Organic Compounds (VOCs) can emit from drums being sampled.

4.7.2 Controls

- [A] All personnel will be familiar with the Material Safety Data Sheet (MSDS) prior to operating the fire extinguisher.
- [B] All chemicals, which are used and/or stored near the HSG Drum Sampling area shall have an MSDS and chemical tracking log.
- [C] All personnel shall be familiar with the MSDS for chemicals they are handling.
- [D] Small quantities of chemicals allowed for storage are limited to those needed for routine operation at the HSG Drum Sampling area.
- [E] Unwanted or expired chemicals shall be disposed of properly.
- [F] Chemicals will be stored in appropriate containers.
- [G] All personnel shall wear appropriate PPE as recommended in MSDSs and as directed by IH.
- [H] Personnel will comply with site-specific emergency response and evacuation procedures.

- [I] An elephant trunk/snorkle connected to a HEPA blower is utilized during sampling of drums.

4.8 Material Handling Safety System

4.8.1 Hazards

- [A] Potential hazards when handling drums include pinch points, hand and foot injuries, breached drums, and releases.
- [B] There are hazards associated with sharp edges or points with canister needles, hand tools, and enclosures.
- [C] Due to the large size and weight of the drums, there is a potential for personal injury and/or equipment damage. Material handling accidents can result in serious consequences.

4.8.2 Controls

NOTE

A trained and qualified person shall perform all handling of drums requiring forklifts. Refer to host site requirements.

- [A] All drums will be moved using the appropriate tools while in the HSG Drum Sampling area.
- [B] Material handling aids (forklift, loader) shall be used whenever practical.
- [C] Safety shoes and safety glasses with side shields are required.
- [D] Personnel will comply with site-specific emergency response and evacuation procedures.
- [E] Material handling aids (e.g., forklift, loader) shall be used whenever practicable and whenever the material or drum weight exceeds 50 pounds or 1/3 body weight, whichever is less.

4.9 Pressurized Gas Cylinders Safety Systems

4.9.1 Hazards

- [A] Compressed gases have the potential for creating hazardous working environments. Mishandled cylinders may rupture violently, release their hazardous contents, or become dangerous projectiles.

4.9.2 Controls

- [A] Proper use of required PPE (Attachment 1) shall be used while handling gas cylinders.
- [B] Pressure regulators will be installed on gas cylinders that are in service.
- [C] Pressure relief valves will be used on gas cylinders.
- [D] Personnel will ensure that caps are placed on all pressurized gas cylinders. This includes certified gas cylinders required for operation of HSG Drum Sampling that are empty or in storage. A limited inventory of gas cylinders will be maintained in order to keep HSG Drum Sampling in operation.
- [E] Personnel will routinely inspect gas cylinders and replace them as needed.
- [F] All pressurized gas cylinders will be properly stored in an upright position with safety caps and nylons straps or chained in place when not in use.
- [G] All cylinders will be properly labeled indicating contents. In addition, cylinders will be properly tagged when empty.
- [H] Personnel will comply with site-specific emergency response and evacuation procedures.
- [I] Gas cart within the HSG Drum Sampling area is secured with nylon straps to the work bench.

4.10 Emergency Response Plans and Procedures

- 4.10.1 Spills will be handled in accordance with host site-specific controls.

- 4.10.2 All CCP personnel assigned to the host site for HSG Drum Sampling are trained on, and must be familiar with, the contents of the site-specific emergency plans and are required to respond to emergencies as specified in the site-specific plan.
- 4.10.3 CCP personnel will participate in all host site drills concerning recognition and response to emergencies.
- 4.10.4 CCP personnel will go to the nearest phone or pager and dial the emergency number and report any injuries and the alarm condition to the dispatcher. Do **NOT** hang up until directed to do so by the dispatcher.
- 4.10.5 Inclement weather hazards shall be controlled by appropriate work shutdowns, weather protection, and snow and ice removal.

4.11 Personnel Safety and Barriers/Boundaries

NOTE

All personnel should be aware of radiological control zone barriers and postings.

- 4.11.1 Persons in the host site facility will wear approved dosimeters as specified in the host site Radiological Control Plan.
- 4.11.2 Persons performing anything other than administrative work shall wear PPE as identified in the site-specific Radiological Control Plan and Health and Safety Plan.
- 4.11.3 Maintain personal awareness and body position in relation to forklift. Stay clear of load.
- 4.11.4 Use established/designated traffic lanes for container movement. Be aware of backup alarms and use a spotter for backing or in tight clearance areas.
- 4.11.5 Maintain awareness of surroundings (to include inclement weather conditions) and walk with caution around vehicles and on uneven surfaces to prevent slipping and tripping accidents.
- 4.11.6 Ensure supplemental lighting such as flashlights or equivalent are available.
- 4.11.7 When moving heavy loads, such as drums, personnel within the vicinity shall wear protective safety shoes with steel toes and gloves.

4.12 Other Operational Safety Requirements (OSRs)

4.12.1 Telephone communications should be available and near designated HSG Sampling area. If telephone communications are not available, portable 2-way radios will be utilized.

4.12.2 CCP personnel will comply with site-specific communications requirements.

4.13 Waste Produced

NOTE

Waste that will be produced as a result of CCP characterization activities include non-contaminated items such as packaging materials and spent office supplies; and radioactive contaminated items such as PPE and swipes generated from routine radiological surveys, cleanup, and contamination control.

4.13.1 Non-contaminated waste will be disposed of by the host site.

4.13.2 Radioactive-contaminated waste and secondary (job controlled) waste generated by CCP characterization activities will be collected, packaged and disposed of through a Waste Coordinator assigned to CCP by the host site.

4.14 Maintenance, Inspections, and Quality Assurance

4.14.1 The VPM and HSG Drum Samplers shall ensure all radiation monitoring equipment is functional, and have current yearly calibrations posted by the HSG Drum Sampling area.

4.14.2 Primary heat/smoke detector shall have a functional check per site-specific procedures.

4.14.3 Emergency lights shall have a functional check per site-specific procedures. See posting in the HSG Drum Sampling operation area.

4.14.4 The VPM or HSG Drum Samplers shall ensure all signs and warning lights are in place and functional before beginning any work.

4.14.5 All modifications or changes to the safety equipment shall be reviewed, approved, and documented by the VPM.

- 4.14.6 Any equipment modification that could alter radiation protection shall be reviewed and approved by the VPM, and site-specific RCT. After the modifications are completed, a survey shall be conducted to ensure personnel will not be exposed to unacceptable levels of radiation.
- 4.14.7 Emergency response plans and procedures will be followed, as applicable.
- 4.15 Visitor Requirements
 - 4.15.1 Visitors shall follow the site-specific visitor's rules and regulations.
 - 4.15.2 Visitors may be allowed to enter the designated HSG Drum Sampling area within the host site facility for business purposes when approved by the VPM and host site Shift Supervisor (SS).
 - 4.15.3 It is also the responsibility of the escort to provide the visitor with a briefing of the associated radiation and safety hazards in the host site facility.
 - 4.15.4 Visitors may be required to wear dosimeters and appropriate PPE as specified in the host site Radiological Control Plan and Health and Safety Plan.

5.0 RECORDS

5.1 No records are generated as a result of this HSP.

Attachment 1 – Personal Protective Equipment Requirements

Procedure	Operation/ Conditions	Respiratory Protection	Protective Clothing	Dosimetry
CCP-TP-093	HSG Drum Sampling	N/A	Nitrile gloves, steel toe shoes, safety glasses, and required PPE per Radiological Control Documentation	Dosimetry requirements will be specified in the Radiological documents (e.g., RWP)
CCP-TP-093	Preparing Drums for Sampling	N/A	Leather gloves for drum handling and for sharps, safety glasses, steel toe shoes, and required PPE per Radiological Control Documentation	Dosimetry requirements will be specified in the Radiological documents (e.g., RWP)
CCP-TP-093	Changing or moving of UHP, FRS	N/A	Leather gloves, safety glasses, steel toe shoes, and required PPE per Radiological Control Documentation	Dosimetry requirements will be specified in the Radiological documents (e.g., RWP)
CCP-TP-082	Drum filter replacement	N/A	Leather gloves for drum handling and for sharps, nitrile gloves for handling Loctite, safety glasses, steel toe shoes, and required PPE per Radiological Control Documentation	Dosimetry requirements will be specified in the Radiological documents (e.g., RWP)
CCP-HSP-011	Visitors (tours) of the host site facility	N/A	Safety glasses, steel toe shoes, and required PPE per Radiological Control Documentation	Dosimetry requirements will be specified in the Radiological documents (e.g., RWP)