CAPSULE INTERIM STORAGE UNIT
ADDENDUM H
CLOSURE PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
02/20/2020	8C.2020.1F

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ADDENDUM H
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H.1 Introduction

This addendum discusses closure activities for the Capsule Interim Storage (CIS) Operating Unit Group (OUG) and, furthermore, complies with the closure requirements outlined in Washington Administrative Code (WAC) 173-303-610(2) through (6), Dangerous Waste Regulations, *Closure and post-closure*.

Amendments to this closure plan will be submitted as a permit modification in accordance with WAC 173-303-610(3)(b) and WAC 173-303-830, *Permit changes*, as applicable.

Any deviations from a treatment, storage, and/or disposal (TSD) unit closure plan required by unforeseen circumstances encountered during the closure activities, which do not impact the overall closure strategy, but provide equivalent results, shall be documented in the TSD unit-specific Operating Record. Documentation shall be made available to the Washington State Department of Ecology (Ecology) upon request, or during the course of an inspection in accordance with WA7890008967, Hanford Facility Resource Conservation and Recovery Act Permit (hereinafter referred to as the Hanford Facility RCRA Permit), Condition II.K.6.

H.1.1 Hanford Facility Contact Information

The Hanford Facility contact information is described in CIS Addendum A, "Part A Form."

H.1.2 Hanford Facility Description

The Hanford Facility, located in southeastern Washington State, is owned and operated by the U.S. Department of Energy (DOE). Dangerous waste and mixed waste (i.e., waste containing both dangerous and radioactive components) are generated and managed at the Hanford Facility.

H.1.3 Capsule Interim Storage Operating Unit Group History, Function, Location, and Layout

The CIS OUG is in the western portion of the 200 East Area of the Hanford Facility. CIS was designed as part of the Management of Cesium and Strontium Capsules (W-135) Project for dry storage of the 1,936 cesium and strontium capsules previously stored at the Waste Encapsulation and Storage Facility, as described in Addendum C, "Process Information." Refer to Addendum A, "Part A Form," for waste quantity.

H.1.4 Products and Production Processes

The CIS OUG does not produce products nor have production processes.

H.1.5 Capsule Storage Area Dangerous Waste Management Unit

The CIS OUG consists of one operating miscellaneous Dangerous Waste Management Unit (DWMU): the Capsule Storage Area (CSA). Casks stored on the CSA concrete pad contain cesium chloride and strontium fluoride salts, which are contained within double-walled capsules and Type W overpacks arranged within a Cask Storage System (CSS). Each CSS contains up to 132 capsules arranged within redundant containment in the storage system. See Addendum C, Section C2.2 for additional information on the CSS. The cesium and strontium salts are known to have chemical impurities with associated dangerous waste codes (shown in parentheses) consisting of barium (D005), cadmium (D006), chromium (D007), lead (D008), and silver (D011). CIS Addendum A provides a comprehensive list of waste managed in accordance with *Resource Conservation and Recovery Act of 1976* (RCRA) regulations, including estimated annual quantities.

H.1.5.1 Unit Description

The CSA is an uncovered concrete pad located within CIS in the western portion of the 200 East Area (Figure H-1). Refer to Addendum A for a topographic map of the area and the civil engineering plan of the site. The CSA measures approximately 27 m (90 ft) wide by 56.1 m (184 ft) long. A chain-link fence encircles a portion of the pad to control access to the waste configuration. See Addendum E, "Security"

for further description on security requirements. The CSA is permitted for storage of concrete casks containing capsules of cesium and strontium salts.

Treatment of dangerous or mixed waste will not be conducted within the CSA DWMU.

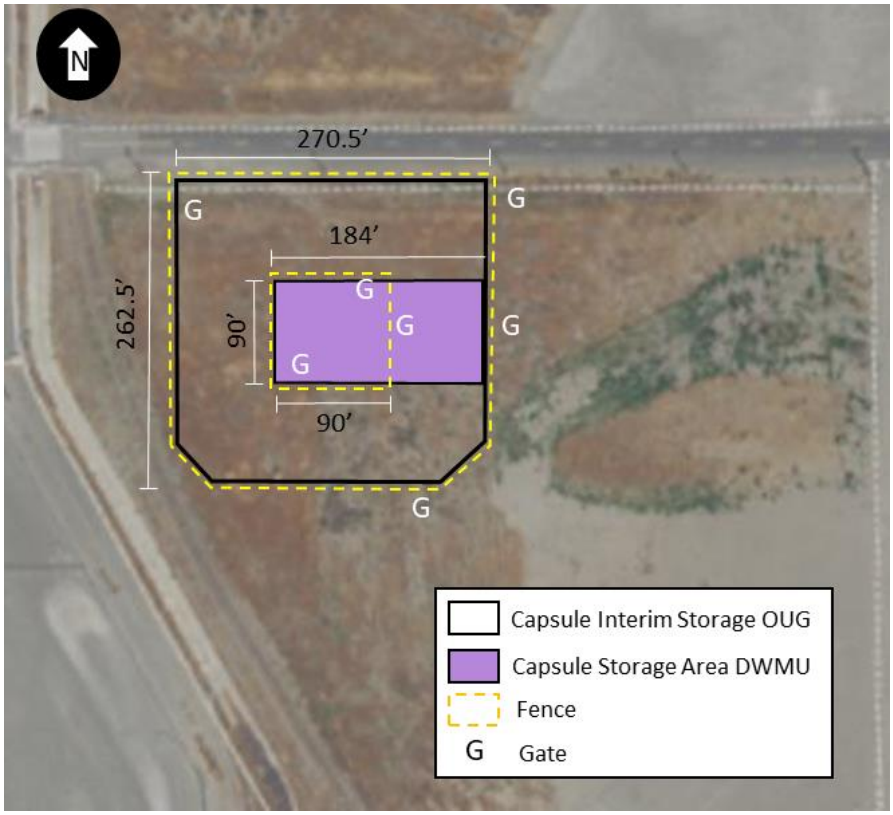

Figure H-1 Capsule Interim Storage Capsule Storage Area Dangerous Waste Management Unit Configuration

H.1.5.2 Maximum Waste Inventory

The CSA is permitted to store cesium chloride and strontium fluoride mixed waste. The maximum waste inventory is 1,936 L (511.4 gal) stored within CSSs, as described in CIS Addendum A.

H.2 Closure Performance Standard

This closure plan addresses the CSA DWMU concrete pad. The CSA will be closed in accordance with the general closure performance standards in WAC 173-303-610(2)(a), which requires closure of the facility in a manner that accomplishes the following objectives:

- Minimize the need for further maintenance.
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment (HHE), post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated runoff, or dangerous waste decomposition products to the ground, surface water, groundwater, or atmosphere.
- Return the land to the appearance and use of surrounding land areas, to the degree possible, given the nature of the previous dangerous waste activity.

Furthermore, clean closure requires removal or decontamination of all dangerous waste; dangerous waste residues; and equipment, bases, liners, soils/subsoils, and other materials containing or contaminated with dangerous waste or dangerous waste residue in accordance with WAC 173-303-610(2)(b).

The CSA will be clean closed by removal of the CSA DWMU concrete pad to the performance standards identified in WAC 173-303-610 through the successful completion of the closure activities described in Section H.4.

H.3 Health and Safety Requirements

Due to the radioactive nature of mixed waste in storage, the Permittees must ensure that all closure activities do not pose a risk to HHE. Closure of the CSA will be performed in a manner to ensure the safety of personnel and the surrounding environment. Qualified personnel will be trained in and perform all necessary closure activities in compliance with the applicable safety and environmental procedures identified in CIS Addendum G, "Personnel Training." All field operations will be performed in accordance with applicable health and safety requirements. Personnel will be equipped with appropriate personal protective equipment (PPE) for the closure activity being performed.

The Permittees have instituted training and qualification programs to meet training requirements imposed by regulations, DOE orders, and national standards such as those published by the American National Standards Institute/American Society of Mechanical Engineers. For example, the environmental, safety, and health training program provides workers with the knowledge and skills necessary to execute assigned duties safely. Attachment 5, *Hanford Facility Personnel Training Program*, to the Hanford Facility RCRA Permit describes specific training requirements for Hanford Facility personnel. The Permittees will comply with the training matrix detailed in CIS Addendum G, which provides training requirements for Hanford Facility personnel associated with the CSA DWMU.

Training records are maintained for each employee in an electronic database. The Permittees training organization maintains the training records system.

During the closure period, to prevent threats to HHE, the CSA will be inspected in accordance with WAC 173-303-320, *General inspection*, requirements and CIS Addendum I, "Inspection Plan."

H.4 Closure Activities

The CSA will be clean closed by removal of the concrete pad under Washington State's *Hazardous Waste Management* Act, Chapter 70.105 Revised Code of Washington, and implementing regulations of WAC 173-303. The term "clean closure" refers to performing closure activities that result in full removal of all dangerous wastes and full removal or decontamination of all structures and containment system components, equipment, debris, environmental media (i.e., soil and groundwater) materials affected by releases from the unit so as to satisfy the closure performance standards of WAC 173-303-610(2)(b)(i) and (ii). Clean closure determinations for the CSA will be based on successful completion of the closure activities outlined in this chapter.

The following closure activities, in sequential order, are required to achieve and verify clean closure of the CSA:

- Review cask storage, operating, and inspection records for documented spills or releases of mixed waste and subsequent cleanup actions.
- Perform a visual inspection of the concrete pad to identify any mixed waste related staining, all cracks, holes, or other breaches in the concrete pad, through which dangerous waste might migrate.
- Remove and dispose of the concrete pad and inner fence.
- Transmit closure certification to Ecology.

H.4.1 Records Review and Visual Examination

CIS cask storage, operating, inspection, and spill records will be reviewed for documented spills or potential releases of mixed waste within the CSA, and subsequent cleanup actions.

A visual examination will then be performed to determine and document the presence of any mixed waste related staining, and all cracks, holes, or other breaches in the concrete pad, through which dangerous waste might migrate. A walkdown of the area will be performed and photographs taken for documentation. Locations and dimensions of any staining or breaches will also be documented. Collaborative results of the records review and visual examination will be used to determine if mixed waste or dangerous waste constituents could have been released to the environment. If contaminated environmental media (soil) is identified, the Permittees will work with Ecology to develop a sampling and analysis plan that meets the closure performance standards set forth in WAC 173-303-610.

H.4.2 Demolition

Once all the steps identified in Section H.4.1 have been completed, demolition of the DWMU concrete pad can be initiated. Demolition of the pad will include the following primary activities, described in the sub-sections below:

- Location of utilities.
- Mobilization of equipment.
- Removal and disposal of the concrete pad and inner chain-link fence.

H.4.2.1 Location of Utilities

Prior to demolition, any in-use utilities will be located and marked to ensure that there are no disruptions to the surrounding activities.

H.4.2.2 Equipment Mobilization

The resources, equipment, and materials necessary to perform demolition will be staged in designated laydown areas.

H.4.2.3 Demolition Activities for the Capsule Storage Area

Demolition of the CSA will be accomplished primarily by using shearing and rubblizing. Demolition of the DWMU will require the use of heavy equipment (e.g., excavator with various attachments) to remove and demolish the fencing and concrete. Standard industry or conventional demolition practices may be used (e.g., hydraulic shears with steel shear jaws, concrete pulverizer jaws or breaker jaws).

Selection of demolition methods will be based on the structural elements to be demolished, location, and integrity of the structure. Water may be used to control dust generated from demolition activities. The fire hydrants may be used to supply water for dust control during rubblization of the concrete pad. The amount of water used will be minimized to prevent ponding and runoff.

H.4.3 Identifying and Managing Waste Generated During Closure Activities

Closure activities for the CSA will result in generation of debris in the generation of one known waste stream (debris from demolition) requiring management and disposal. Waste generated during closure activities will be managed as a newly generated waste stream in accordance with WAC 173-303-610(5). Waste generated during the closure period must be properly disposed. The newly generated waste must be handled in accordance with all applicable requirements of WAC 173-303-170, *Requirements for generators of dangerous waste*, through WAC 173-303-230, *Special conditions*.

Management and disposal of waste generated during closure will be documented and included as part of the clean closure certification documentation (Section H.6).

H.4.3.1 Debris from Demolition

Debris generated from demolition will be packaged at the CSA and transported to an appropriate waste disposal facility. Debris includes, but is not limited to, the following:

- Concrete and associated rubblized debris.
- Fencing materials.
- Miscellaneous (e.g., rubber, glass, paper, PPE, cloth, plastic, and metal).
- Equipment and construction materials.

The preferred management of debris resulting from demolition of the pad is in bulk form. Bulk waste will be designated and placed into bulk containers, such as roll-off boxes, for disposal. These bulk containers will be stored in a suitable area in proximity to the DWMU or, if debris designates as dangerous waste, it may be accumulated for up to 90 days in accordance with WAC 173-303-200, *Conditions for exemption for a large quantity generator that accumulates dangerous waste*. Bulk containers of waste will be covered when waste is not being added or removed. Lightweight material (e.g., plastic and paper) will be bagged, if appropriate, prior to placement in the bulk container, to eliminate the potential for materials blowing out of the bulk container.

Debris will be containerized and labeled for waste characterization. Waste subject to land disposal restriction (LDR) requirements of WAC 173-303-140, *Land disposal restrictions*, which includes by reference 40 Code of Federal Regulations (CFR) 268, *Land Disposal Restrictions*, will be characterized and designated at the CSA, as applicable, prior to being stored, treated, and/or disposed of in an approved facility.

H.4.4 Identifying and Managing Contaminated Environmental Media

A sampling and analysis plan will be developed upon identification of possible contaminated environmental media (Section H.4.1). Contaminated soil will be managed as a newly generated waste stream in accordance with WAC 173-303-610(5). Contaminated soil must be handled in accordance with all applicable requirements of WAC 173-303-170 through WAC 173-303-230. Contaminated soil will be containerized, labeled, and sampled for waste characterization. Soil accumulations will be placed in the U.S. Department of Transportation compliant containers and sent to an approved disposal facility or staged at less than 90-day accumulation areas in accordance with WAC 173-303-200 standards. Waste subject to LDR requirements of WAC 173-303-140, which includes by reference 40 CFR 268, will be characterized and designated at the CSA, as applicable, prior to being stored, treated and/or disposed of in an approved facility.

H.5 Role of the Independent Qualified Registered Professional Engineer

An Independent Qualified Registered Professional Engineer (IQRPE) will be retained to provide certification of closure, as required by WAC 173-303-610(6). The IQRPE will be responsible for observing field activities and reviewing documents associated with clean closure of the CSA. At minimum, the following activities will be performed by the IQRPE:

- Review of the CSA DWMU visual inspection.
- Review demolition activities.
- Review of newly generated waste management and disposition records.
- Verify that closure activities were performed in accordance with this closure plan.

The IQRPE will record observations and reviews in the closure certification, which will then be provided to Ecology and maintained in the CIS portion of the Hanford Facility Operating Record.

H.6 Closure Certification

In accordance with WAC 173-303-610(6), within 60 days of completion of closure of the CSA, a certification that the DWMU has been closed in accordance with the specifications in this closure plan will be submitted to Ecology by registered mail. The certification will be signed by the owner or operator and an IQRPE.

Upon request by Ecology, in accordance with WAC 173-303-610(6), information will be submitted to support closure certification. This information could include the following:

- All field notes and photographs related to closure activities.
- Description and justification of any minor deviations from the approved closure plan and justification for these deviations.
- Documentation of the removal and final disposition of all dangerous and mixed wastes residues and any corresponding residues.
- Description of the DWMU area appearance at completion of closure.

H.7 Conditions that will be Achieved when Closure is Complete

Once the CSA concrete pad has been removed, no possible contaminated environmental media is identified, and it meets the closure performance standards, the CSA DWMU will be considered clean closed, at which point only bare soil will remain. A permit modification request will be submitted after clean closure has been confirmed by Ecology to remove the CSA DWMU from the Hanford Facility RCRA Permit.

H.8 Closure Schedule and Time Frame

Major Milestone M-092 addresses the disposition path for the cesium and strontium capsules, with a milestone due date of December 31, 2047 to complete the acquisition and modification of facilities necessary for the storage, treatment/processing, and disposal of the capsules. Currently, a viable disposal option for the capsules is not available. Milestone M-092-20 requires a disposition pathway evaluation every four years until such time that disposition is determined. Due to these circumstances, storage of the CSS at the CSA is expected to take place over an extended period, and meeting the 30-day requirement to begin closure activities after receiving the last known volume of waste, as required in WAC 173-303-610(4)(b), is not possible. Therefore, the Permittees request an extension to the start of closure. Approval of this closure plan will grant the Hanford Facility an extension to the start of closure, in accordance with WAC 173-303-610(3)(c), and a separate extension request will not be filed. In accordance with WAC 173-303-610(3)(c)(i), a notification of intent to close the CSA DWMU will be submitted to Ecology at least 45 days prior to the date on which closure is expected to begin.

In accordance with WAC 173-303-610(4)(b), closure activities will be completed no more than 180 days after the start of closure (Table H-1 and Figure H-2) for the CSA. Should unexpected circumstances arise and an extension to the 180-day closure period be deemed necessary, a permit modification will be submitted to Ecology for approval at least 30 days prior to the 180-day expiration date in accordance with WAC 173-303-610(4)(c) and WAC 173-303-830, Appendix I, Section D.1.b. The extension request would also demonstrate that all steps to prevent threats to HHE, including compliance with all applicable permit requirements, have been and will continue to be taken. In the event of a proposed change in facility design or operation or an unexpected event that affects the closure plan, a permit modification request to amend the closure plan will be submitted to Ecology per WAC 173-303-610(3)(b)(iii).

Closure certification will be submitted to Ecology within 60 days following completion of closure activities at the CSA, as outlined in Section H.6.

H.9 Closure Costs

An annual report outlining updated projections of anticipated closure costs for the Hanford Facility treatment, storage and disposal units having final status is not required per Permit Condition II.H. The Hanford Facility is owned by DOE and operated by DOE and its contractors; therefore, in accordance with WAC 173-303-620(1)(c), provisions of WAC 173-303-620, *Financial requirements*, are not applicable to the Hanford Facility.

Table H-1 Capsule Storage Area Dangerous Waste Management Unit Closure Activity Description

Closure Activity Description		Expected Duration
Primary Activity	**Secondary Activity**	
Prior to Closure		
Submit Notification to Ecology of Intent to Close the CSA DWMU	In accordance with WAC 173-303-610(3)(c)(i), at least 45 days prior to the date on which closure is expected to begin.	--
Begin Closure of the CSA DWMU	Once all casks are removed from the CSA, closure of the CSA DWMU will commence.	Day 0
Closure Activities		
Records Review	Perform review of cask storage, inspection, and spill records.	70 Days (Day 70)
Visual Inspection of Concrete Pad	Inspect structural integrity for any mixed waste related staining, cracks, holes, or other breaches in the concrete pad.	20 Days (Day 90)
	Document visual inspection with photos, locations, and dimensions of staining and cracks (if any).	
Remove Concrete Pad and Fence	Remove concrete pad and fence with large equipment.	90 Days (Day 180)
	Containerize waste debris.	
	Dispose of debris in approved disposal facility.	
RCRA Closure Activities Complete		
Owner/Operators and IQRPE Submit Clean Closure Certification	In accordance with WAC 173-303-610(6), within 60 days of completion of closure of the DWMU; certification that the DWMU has been closed in accordance with the specifications in the approved closure plan (Section H.6 provides details on the clean closure certification).	60 Days (Day 240)

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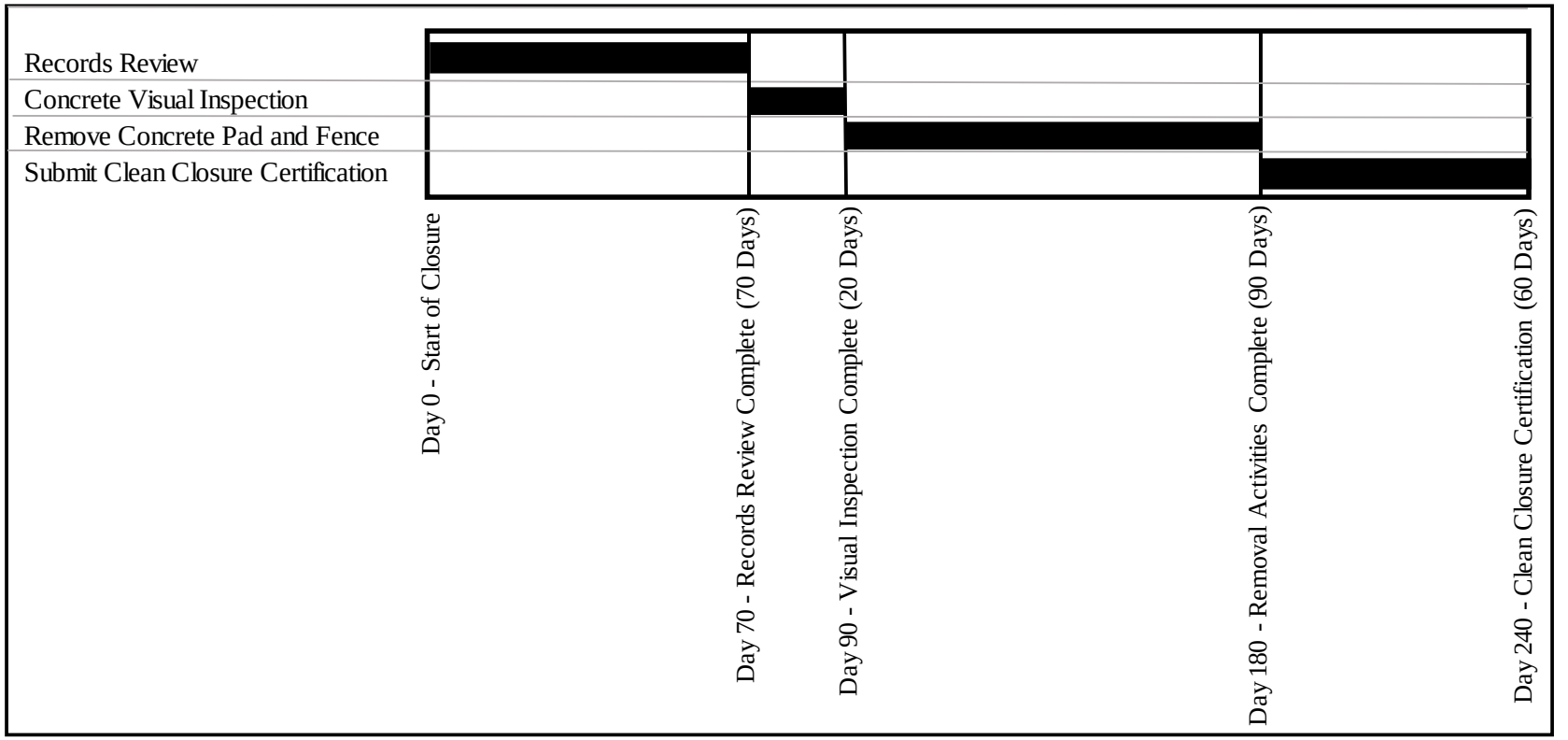

Figure H-2 Capsule Storage Area Closure Schedule Activities

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H.10 References

40 CFR 268, *Land Disposal Restrictions*, Code of Federal Regulations. Available at: https://www.ecfr.gov/cgi-bin/text-idx?SID=8ed4dbc82239fd075f48a3f71ea03d9b&mc=true&node=pt40.29.268&rgn=div5.

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WAC 173-303-170, *Requirements for generators of dangerous waste*.

WAC 173-303-200, *Conditions for exemption for a large quantity generator that accumulates dangerous waste*.

WAC 173-303-230, *Special conditions*.

WAC 173-303-320, *General inspection*.

WAC 173-303-610, *Closure and post-closure*.

WAC 173-303-620, *Financial requirements*.

WAC 173-303-830, *Permit changes*.

WA7890008967, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion for the Treatment, Storage, and Disposal of Dangerous Waste*, Revision 8C, as amended, Washington State Department of Ecology. Available at: https://fortress.wa.gov/ecy/nwp/permitting/hdwp/rev/8c/index.html.

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