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Richland Operations Office
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1222862

14-AMRP-0077

JAN 14 2014

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Addressees:

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION (NOC) APPLICATION/ OFF-PERMIT CHANGE NOTIFICATION FOR THE CENTRAL WASTE COMPLEX (CWC)

This letter transmits a Radioactive Air Emissions NOC application for the CWC. The NOC application and attendant Hanford Air Operating Permit (AOP) Off-Permit Change Notification documentation were prepared in accordance with Washington Administrative Code (WAC) 246-247 and WAC 173-401-724, respectively. The application was prepared to incorporate information from the previous State of Washington Department of Health license approval for the CWC and from the As Low as Reasonably Achievable Control Technology (ALARACT) Demonstration – CWC Box 231ZDR-11 (Letter AIR-13-602, dated June 13, 2013). Additionally, this application proposes management of maintenance and inspection related radiological waste in roll-on/roll-off boxes at the CWC.

The Central Waste Complex Radioactive Air Emissions Notice of Construction Application, DOE/RL-2013-45, Revision 0 is being provided to the State of Washington Department of Health for approval, consistent with their authority to administer and enforce the State radioactive air emissions regulations, including licensing. A copy of this document is also being provided to the State of Washington Department of Ecology (Ecology).

The Notification of Off-Permit Change, Permit Number: 00-05-006, Renewal 2 is being provided to Ecology, per WAC 173-401-724, to facilitate Ecology's administration of the AOP.

TS24

If you have any questions, please contact me or your staff may contact Ray Corey, Assistant Manager for the River and Plateau on (509) 373-9971.

Sincerely,

Matt McCormick
Manager

AMRP:MSC

Attachments

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JAN 14 2014

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DOE/RL-2013-45
Revision 0

Central Waste Complex Radioactive Air Emissions Notice of Construction Application

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

CH2MHILL
Plateau Remediation Company
P.O. Box 1600
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Approved for Public Release;
Further Dissemination Unlimited

DOE/RL-2013-45
Revision 0

Central Waste Complex Radioactive Air Emissions Notice of Construction Application

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Date Published
December 2013

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

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APPROVED
By Julia Raymer at 12:37 pm, Dec 11, 2013

Release Approval Date

Approved for Public Release;
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Terms

ALARA	as low as reasonably achievable
ALARACT	as low as reasonably achievable control technology
ANSI	American National Standards Institute
APQ	annual possession quantity
ARA	Airborne Radioactivity Area
ASME	American Society of Mechanical Engineers
BARCT	best available radionuclide control technology
CA	Contamination Area
CH	contact-handled
CHPRC	CH2M HILL Plateau Remediation Company
Ci	curie
cm	centimeter
cpm	counts per minute
CWC	Central Waste Complex
DE-Ci	Dose equivalent curie: a method of normalizing the radiotoxicity of various radionuclides to plutonium-239 for use in establishing that operations remain within approved safety bases at certain Hanford Site waste management units. The normalization is based on the relative committed effective dose equivalent from inhalation of each radionuclide to that of plutonium-239 using the conversion factors from the International Commission of Radiological Protection (ICRP) Publication 71, "Age Dependent Doses to Members of the Public from Intake of Radionuclides Part 4 Inhalation Dose Coefficients." HNF-EP-0063, Rev. 16
DOE	U.S. Department of Energy
DOE/RL	DOE Richland Operations Office
dpm	disintegrations per minute
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ft	feet
gm	gram
HEPA	High Efficiency Particulate Air

hr	hour
ICRP	International Council for Radiation Protection
LIGO	Laser Interferometer Gravitational Wave Observatory
LLMW	low-level mixed waste
LLW	low-level waste
MEI	maximally exposed individual
mrem	millirem
NOC	Notice of Construction
NOCA	NOC Application
PCM	Periodic Confirmatory Measurement
PTE	potential-to-emit
PTRAEU	portable temporary radioactive air emission unit
RCT	radiological control technician
RH	remote-handled
RO/RO	roll-on/roll-off
RWP	radiological work permit
SEPA	*State Environmental Policy Act of 1971*
SWITS	Solid Waste Information Tracking System
TEDE	total effective dose equivalent
TRU	transuranic
TSCA	*Toxic Substances Control Act of 1976*
WAC	*Washington Administrative Code*
WDOH	Washington State Department of Health
WIPP	Waste Isolation Pilot Plant
WRAP	Waste Receiving and Processing
yr	year

NOC History

In September and October 1995, the Washington State Department of Health (WDOH) approved the initial Notice of Construction Application (NOCA) for the Central Waste Complex (CWC): *Radioactive Air Emissions Program Notice of Construction for the Central Waste Complex and Enhanced Radioactive and Mixed Waste Storage, Phase V, Project W-112* (DOE/RL-95-79). Approval of this NOCA established, for CWC, the As Low as Reasonably Achievable Control Technology (ALARACT) for the existing vented containers and the best available radionuclide control technology (BARCT) for future vented containers.

The following subsequent revisions to the NOCA addressed proposed changes in operations and descriptions at CWC:

- NOC Revision, DOE/RL-95-79, Rev 0B: This revision addressed (a) ambient air monitors N-449, N-457, N-964, and N-433 are appropriate air monitors for diffuse and fugitive emissions for CWC; (b) the release fraction for NucFil® filters of 2E-9 is conservative and appropriate for use; and (c) quarterly air samples would be sufficient and weekly smear samples would no longer be necessary.
- NOC Revision DOE/RL-95-79 Rev 1B: Emissions from Buildings 2404-WB and 2404-WC were removed from CWC licensing, being addressed under Waste Receiving and Processing (WRAP) complex operations (emission unit #486, NOC ID#638, Approval #AIR-06-1006).
- NOC Revision DOE/RL-95-79 Rev 1C: This revision identified the placement of a PermaCon Modular containment unit within the 2404-WC building or another similar existing CWC building for the purpose of sampling the headspace gas within solid waste storage containers. Building 2404-WB and 2404-WC were transferred from operations under CWC to WRAP.
- NOC Revision DOE/RL-2000-34: *Radioactive Air Emissions Notice of Construction Application for the Waste Receiving and Processing Facility*. This revision transferred building 2404-WA from CWC to WRAP.

The current CWC approval (AIR 08-801, NOC ID 654, dated 08/05/2008) conditions and limitations for CWC are identified in AOP-00-05-06, *Hanford Site Air Operating Permit, Renewal 2 – Revision A* (http://www.ecy.wa.gov/programs/nwp/permitting/AOP/renewal/two/revision_a/).

This new NOCA replaces all past CWC radioactive air monitoring NOCA documentation addressed above (i.e., all the aforementioned DOE/RL-95-79 documentation), provides for the consolidation of Solid Waste Operations Complex maintenance and inspection-related radiological waste in roll-on/roll-off (RO/RO) containers, and addresses the cleanup of radiological contamination associated with releases from waste containers to outer surfaces and/or to the soil.

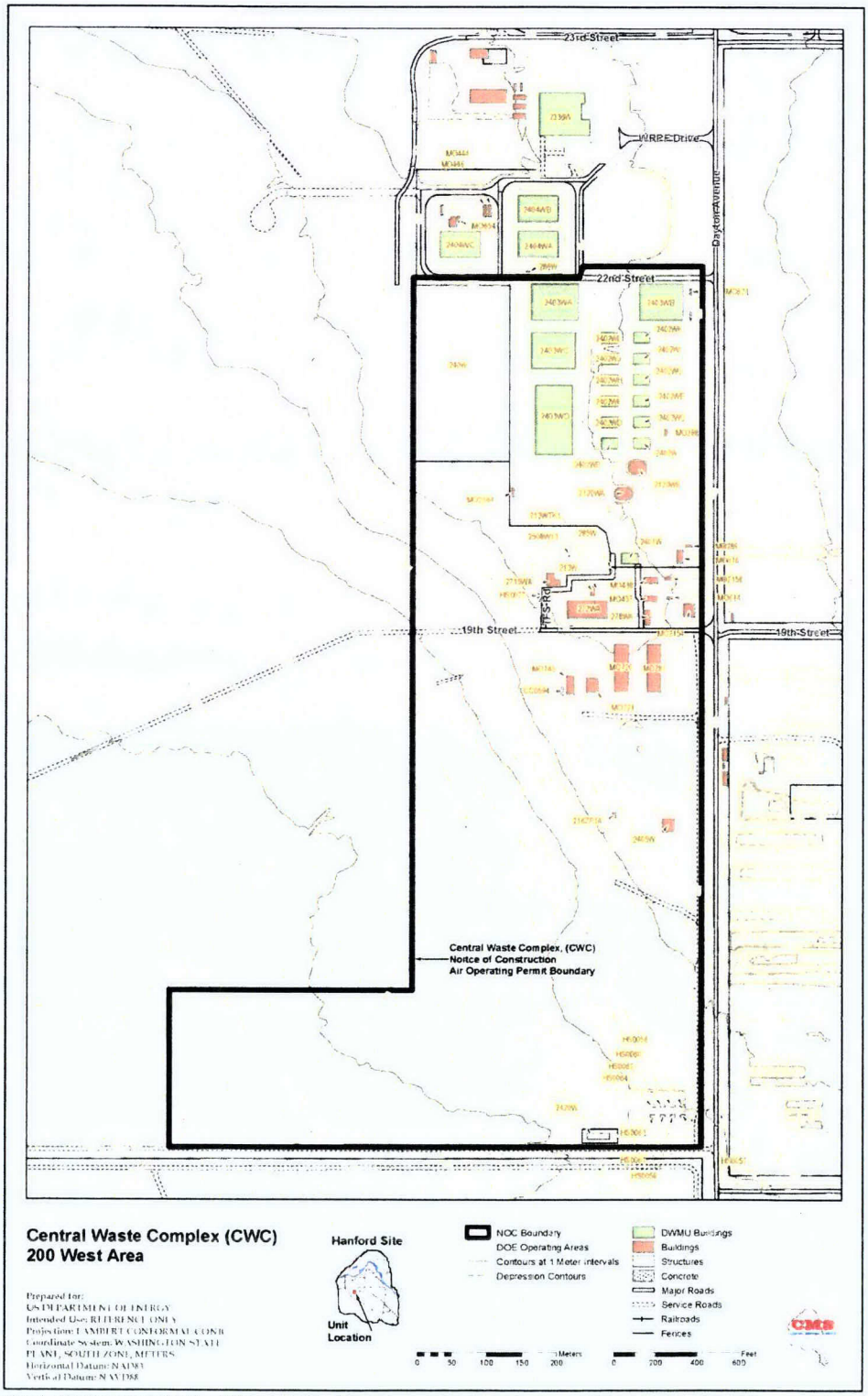
1 Location

Regulatory Requirement: *Name and address of the facility, and location (latitude and longitude) of the emission unit(s). WAC 246-247-110 Appendix A(1).*

The address and geodetic coordinates for the CWC (Figure 1) represented by the Hanford Meteorological Station are as follows:

U.S. Department of Energy, Richland Operations Office (DOE-RL)
Hanford Site
Richland, Washington 99352
46° 33' 14" North Latitude
119° 36' 22" West Longitude

(Based on 2402-W building location, a centrally located CWC building)



131014_CWC_TSD_Closed_Operating_Unit_Topo_11x17_Rev0

Figure 1. Central Waste Complex

2 Responsible Manager

Regulatory Requirement: *Name, title, address, and phone number of the responsible manager. WAC 246-247-110 Appendix A(2).*

Mr. Matthew S. McCormick, Manager
Immediate Office of the Manager

U.S. Department of Energy, Richland Operations Office
P.O. Box 550
Richland, Washington 99352
(509) 373-9971

3 Proposed Action

Regulatory Requirement: *Identify the type of proposed action for which this application is submitted:*

The proposed action for this application is a modification of the diffuse/fugitive permit for the existing emission unit #439, NOC ID #654 as identified in WDOH, 2012, *Radioactive Air Emissions License For The Department of Energy Richland Office Hanford Site License*, License Number *FF-01*. This action addresses the consolidation of low-level radiological wastes in RO/RO containers at CWC that are eligible for disposal at the Hanford Environmental Restoration Disposal Facility (ERDF). The proposed action includes also the addition of container and soil cleanup activities associated with a potential radiological release. The proposed action is an insignificant modification (WAC 246-247-030). Monitoring of air emissions will be performed using four existing ambient air monitors (N-449, N-457, N-964, and N-433) that are maintained as monitors for CWC diffuse/fugitive emissions.

4 State Environmental Policy Act

Regulatory Requirement: *If this project is subject to the requirements of the State Environmental Policy Act (SEPA) contained in chapter 197-11 WAC, provide the name of the lead agency, lead agency contact person, and their phone number. WAC 246-247-110 Appendix A(4).*

The proposed action is categorically exempt from the requirements of *State Environmental Policy Act of 1971* according to WAC 197-11-845, "SEPA Rules," "Department of Social and Health Services," covering most actions by the WDOH, and consistent with the exemption of actions on air operating permits provided by RCW 43.21C.0381, "State Environmental Policy."

5 Process Description

Regulatory Requirement: *Describe the chemical and physical processes upstream of the emission unit(s). WAC 246-247-110 Appendix A(5).*

The mission of the CWC is the storage of mixed and/or radioactive waste that is generated on or off the Hanford Site. There could be up to 88,500 emission units (i.e., containers) within CWC. CWC manages many categories of radioactive materials such as low-level waste (LLW), transuranic (TRU) waste, TRU mixed waste and *Toxic Substances Control Act of 1976* (TSCA) waste, and low-level mixed waste (LLMW) in contact-handled (CH) containers where the external surface dose rate does not exceed 200 mrem/hr. CH containers are defined as packages having surface dose rates of less than 200 mrem/hr. Remote–handled (RH) containers (i.e., containers where the external surface dose rate is equal to or greater than 200 mrem/hr) also are processed and stored at CWC in accordance with the approved safety analysis.

The LLW typically contains rags, paper, rubber gloves, disposal supplies, tools, industrial waste (e.g., failed equipment), and solidified waste that are contaminated with radioactive material. This waste is considered LLW if it contains radioactive material and is not classified as TRU waste, high-level waste, or spent nuclear fuel.

TRU and TRU-mixed waste typically contains rags, paper, rubber gloves, disposable supplies, tools, industrial waste (e.g., failed equipment), solidified process byproducts, and laboratory wastes that are contaminated with TRU material. This waste must contain at least 100 nCi of TRU material per gram of waste, or it is considered LLW. The TRU waste accepted by CWC may contain varying concentration of TRU radionuclides and limited amounts of non-TRU radionuclides. With some exceptions all based on safety analysis, the TRU content of waste containers is generally limited to fifty three (53) Pu-239/Pu-240 dose equivalent curies (DE-Ci), where the DE-Ci is derived by multiplying the isotopic composition (i.e., weight fractions of the various TRU isotopes) by the specific activities of each isotope, and then converting that number with correction factors taken from the Hanford Site Solid Waste Acceptance Criteria. The DE-Ci unit is designed to control inhalation dose impacts independent of radionuclide type. The radionuclides Pu-239 and Pu-240 are considered equivalent and are combined for calculation purposes and are used to track the unabated emissions.

The TRU waste containers are generally equipped with a pressure relief vent device such as the NucFil® filter. This filter allows the release of gases that may be produced as a result of radiolysis inside the container, while preventing release of particulate matter.

The waste storage areas and facilities at CWC (Figure 1) include the following:

- Shipping and Receiving Area
- Outdoor Waste Storage Areas
- Flammable & Alkali Metal Waste Storage Modules
- Mixed and/or Radioactive Waste Storage Buildings
- RO/RO containers

As needed, the operational activity at CWC includes overpacking waste containers found to be in unsatisfactory condition. Additionally, there may be future instances where potential radiological contamination associated with the outer surfaces of containers and soils needs to be managed. As discussed in AIR 13-602, *Central Waste Complex (CWC) Box 231ZDR-11 As Low As Reasonably Achievable. Control Technology (ALARACT) Approval*, a general purpose burial box dripped contaminated water to the soil. Following discovery, the contaminated water was contained in collection containers that are emptied periodically. The ALARACT described actions to be taken to place the container in a configuration that would allow installation of a cover, move the container, and provide for the management of contaminated soil and materials disturbed during the activity (as needed). The ALARACT also identified associated radiological controls, monitoring, and records/documentation. To address potential radiological releases from a container, the cleanup of containers, buildings, equipment, and/or contaminated soil would be performed in a manner that is protective of workers and the environment. To address potential future releases from a CWC waste container, Section 6 identifies controls that would be implemented to remediate the radiological release.

5.1 Shipping and Receiving Area

Containers are delivered to and transferred from the shipping and receiving area by truck or forklift. In this area, incoming containers, boxes, and drums are unloaded, visually inspected, labeled, and radiologically surveyed. The resulting information pertaining to each container is entered into the Solid Waste Information Tracking System (SWITS) database.

Following visual inspection, containers are transferred to an appropriate storage area.

5.2 Outdoor Waste Storage Areas

Some waste containers, including fiberglass reinforced plywood boxes, Connex boxes, large metal boxes, and miscellaneous containers are stored outside of the CWC buildings due to container size, CWC building fire hazard controls that prevent inside storage, and the need for short-term placement of containers in areas in proximity to buildings while container movement activities are being performed. The primary outdoor waste storage areas (East Outside Storage Area, Outside Storage Area A, Outside Storage Area B, Tank D-10 Outside Storage Area, and areas adjacent to mixed and/or radioactive storage buildings) are depicted in Figure 1. Other small areas may also be used for the storage of radioactive contaminated waste.

5.3 Flammable & Alkali Metal Waste Storage Modules

The Flammable & Low Flash Point and Alkali Metal Mixed Waste Storage Modules are pre-engineered storage modules that are designed for storage of hazardous and radioactive waste containers. The modules are designed to address the unique aspects of the waste and associated safety and regulatory requirements such as spill and secondary containment, fire codes, and floor loading.

5.4 Mixed and/or Radioactive Waste Storage Buildings

There are numerous buildings and structures used for waste storage at CWC (see Figure 1).

5.4.1 Mixed Waste Storage Buildings

The 2400-series mixed waste storage buildings have similar construction and function. The buildings are uniquely numbered and include 2402-W, 2402-WB through 2402-WL, 2403-WA through 2403-WD, and 2420-W.

5.4.2 PermaCon Unit

A PermaCon modular containment unit may be placed in select, existing CWC buildings for the purpose of sampling the head space gas within solid waste storage containers. Such buildings would have roof-mounted exhausters, rated at a minimum of 16,000 cubic feet per minute.

PermaCon sampling activities would involve moving containers already stored at CWC into the PermaCon unit. Typically, containers would be moved in batches of approximately 20 containers at a time. Most containers would already have been processed through the Hanford Site WRAP Facility. The NucFil® filter will be removed with a wrench, a sampler attached, a 100 milliliter to 250 milliliter sample withdrawn by applying a vacuum, and the NucFil® filter replaced in the container's threaded bung hole by hand and tightened manually. The NucFil® housing is constructed of stainless steel and designed to be installed and removed from container lids. Negligible disturbance of the container contents is expected to occur, thus a static condition is expected within any given container.

Samples also may be taken in either of the following ways:

- In containers with older design NucFil®: a needle can be injected through the filter and a sample withdrawn. The old NucFil® filter then will be replaced with a new NucFil® filter.
- In containers with vent clips: the lid can be punctured, sampled, then remove the lid and replace it with a lid containing a NucFil® filter. A variation of this would be to replace the lid first with a NucFil®-containing lid and (after the container age criteria time) sample the head gas.

The time to take any given sample lasts for only a few moments; however, setting up the sampling apparatus, documentation and paperwork required will limit the number of containers that could be processed to 20 samples a day (one shift), depending on the type of sample to be collected (i.e., equipment blanks, field blanks, duplicate samples, quality assurance check samples, and calibration of sampling components).

5.5 Roll-on/Roll-off Containers

RO/RO containers are commercially-available, open-top dumpsters. Some aforementioned (Section 5) LLW generated on the Hanford Site (e.g., rags, paper, rubber gloves, disposal supplies, tools, industrial waste potentially contaminated with radioactive material) is placed in plastic on location, and the plastic is secured (e.g., taped close). The bagged waste would be transported to the CWC and stored in a RO/RO; up to four (4) RO/RO containers may be generated per year.

The containers could be located anywhere within the CWC fenced area, depending on available/appropriate space. A cover, solely for weather protection, would be used to cover the waste bags. The filled containers would be transported to ERDF for disposal; the empty containers would be returned to CWC for continued use.

6 Existing and Proposed Abatement Technology

Regulatory Requirement: *Describe the existing and proposed (as applicable) abatement technology. Describe the basis for the use of the proposed system. Include expected efficiency of each control device, and the annual average volumetric flow rate(s) in meters^3/sec for the emission unit(s). WAC 246-247-110 Appendix A(6).*

Vented drum and box containers are potential sources of fugitive emissions. TRU drum and box waste containers and some LLW containers are equipped with passive vents, either vent clips, NucFil® filters, or similar devices. (Under normal operating conditions, non-vented containers are not expected to produce radioactive emissions.) A NucFil® filter consists of a porous carbon/carbon composite of non-activated carbon fibers house in stainless shell that, as a minimum, restricts the release of 99.95 percent of particles 0.3 microns in size. Vent clips will be replaced with NucFil® filters or similar devices as containers are prepared for shipment either to the Waste Isolation Pilot Plant (WIPP) or transferred to other locations onsite. Vent clips may not be replaced if the containers are not shipped to WIPP.

The RO/RO containers also are potential sources of fugitive emissions. No emissions controls are proposed for the containers.

Many of the emission controls used during activities are administrative, based on as low as reasonably achievable (ALARA) principles and consist of ALARA techniques. It is proposed that these controls satisfy the BARCT standard for CWC. Operations would be performed in accordance with the controls specified in a radiological work permit (RWP) and/or operating procedures, available for inspection upon request.

In the event of a spill or release or contamination associated with a waste container is discovered, additional controls will be implemented. These controls, consistent with AIR 13-602 (ALARACT Approval), include the following:

- During work activities, continuous radiological control technician (RCT) coverage will be provided as specified in applicable RWPs.
- Alpha and beta-gamma contamination surveys will be performed prior to and during activities that have the potential to disturb radioactive contamination such as soil disturbance and box covering

activities. In any Contamination Area (CA) or Airborne Radioactivity Area (ARA), soil disturbance and outdoor container work will stop if average wind speeds exceed 10 mph, as determined per established procedures. Suppressants such as water, fixatives, and covers will be used as necessary to control contamination spread. Hand-held and/or over-head atomized misting will be performed during work activities where a potential exists to generate airborne radioactivity. Atomized misters and fixative sprayers shall be function-checked at the work site prior to commencing work activities.

- When removable contamination is detected, the contamination will be secured or contained prior to continuing work activities in accordance with the RWP. Removable contamination will be maintained less than a maximum level of 2,200,000 dpm/100 cm^2 alpha and/or less than 4 rad/hr/100 cm^2 beta-gamma. Exceeding these contamination limits requires work to stop, and notification to Operation and RadCon management in accordance with the applicable RWP.
- WDOH will be notified when the following contamination levels are found:
  a. Direct contamination on soil, container, or adjacent surfaces is detected greater than 500,000 dpm/100 cm^2 alpha and/or 1 rad/hr/100 cm^2 alpha are encountered.
  b. Removable contamination levels above 2,000 dpm/100 cm^2 alpha are encountered.
  c. Additional controls, in accordance with the latest revision of the CH2M HILL Plateau Remediation Company (CHPRC) Radiological Control Manual, CHPRC Radiological Control procedures, facility/activity-specific technical work documents, and applicable RWPs, will be agreed upon before work resumes.
- Appropriate controls such as water, fixatives, covers, containment tents, or windscreens would be applied, if needed, as determined by the Radiological Control organization. If soil is to be removed such as during excavation activities, it would be fixed or covered until excavated or otherwise dispositioned.
- If a truck-mounted vacuum (i.e., Guzzler™) Portable/Temporary Radioactive Air Emission Units (PTRAEU), or HEPA filtered vacuum radioactive air emission unit is used, controls as described in the Hanford Site Radioactive Air Emissions License #FF-01, for the Sitewide Guzzler™ NOC (Emission Unit ID: 476), the PTRAEU NOC (Emission Unit ID: 447), and the Hanford Sitewide W-PORTEX 007 [HEPA vacuums] NOC (Emission Unit ID: 455), respectively, would be followed.
- After removal of radiologically-contaminated soil, the soil surface radiological contamination levels would be verified to be acceptable per Radiological Control organization guidelines. If contamination is present above identified levels, additional soil may be removed and containerized for disposal or covered or fixed to provide control of the contamination, consistent with radiological work procedures.

7 Drawings of Control Technology Components

Regulatory Requirement: *Provide conceptual drawings showing all applicable control technology components from the point of entry of radionuclides into the vapor space to release to the environment. WAC 246-247-110 Appendix A(7).*

Drawings of controls for the diffuse and fugitive emissions are not applicable because the emission controls to be used during these activities are defined administratively, based on ALARA principles and consisting of ALARA techniques.

8 Identification of Radionuclides

Regulatory Requirement: *Identify each radionuclide that could contribute greater than ten percent of the potential-to-emit (PTE) total effective dose equivalent (TEDE) to the maximally exposed individual (MEI), or greater than 0.1 mrem/yr PTE TEDE to the MEI. WAC 246-247-110 Appendix A(8).*

The radionuclides of concern exist as particulates. For purposes of estimating potential and actual emissions and resultant impacts to the maximally exposed individual (MEI), all alpha radionuclides are assumed to be Pu-239 and are represented in this application as dose-equivalent curies (DE-Ci). These assumptions provide a conservative PTE for emissions from containers and decontamination and soil removal activities (See Table 1). Radionuclides expected to be encountered are Sr-90, Cs-134, Cs-137, Eu-152, Eu-154, Pu-238, Pu-239, Pu-240, Pu-241, Am-241, and Cm-244 and all associated daughter products. In addition, essentially any radionuclide isotope could be encountered, though in much lower quantities.

9 Effluent Monitoring System

Regulatory Requirement: *Describe the effluent monitoring system for the proposed control system. Describe each piece of monitoring equipment and its monitoring capability, including detection limits, for each radionuclide that could contribute greater than ten percent of the PTE TEDE to the MEI, or greater than 0.1 mrem/yr PTE TEDE to the MEI, or greater than twenty-five percent of the TEDE to the MEI, after controls. Describe the method for monitoring or calculating those radionuclide emissions. Describe the method with detail sufficient to demonstrate compliance with the applicable requirements. WAC 246-247-110 Appendix A(9).*

The potential unabated offsite dose associated with this activity for normal operation is calculated to be less than 0.1 millirem per year (mrem/yr). Therefore, in accordance with 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," Subpart H, "National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities," periodic confirmatory measurements (PCM) will be made to verify the low emissions. The existing 200 Area network system for near-field monitoring (DOE/RL-91-50, *Environmental Monitoring Plan United States Department of Energy Richland Operations Office*) will continue to be used to verify low emissions during CWC operations.

Additional monitoring for diffuse and fugitive emissions will consist of radiological surveys when soil excavation activities are being performed. The survey methods for monitoring are not a direct measurement of effluent emissions. The methods are intended to demonstrate compliance by showing that by being under the contamination levels by which work is controlled, the actual emissions inherently would be below the estimated emissions, which are based on (calculated from) the same contamination levels.

Additional activities performed to monitor performance include the following:

- Container inventory tracked (logged) in the SWITS database.
- Ambient air monitors N-449, N-457, N-964, and N-433 are maintained as monitors for CWC diffuse/fugitive emissions.
- Housekeeping (e.g., decontamination and replacing or overpacking containers in poor condition, as needed) and frequent smears throughout the CWC are used to ensure that the emission control equipment (e.g., NucFils®) is working properly. Smears that exceed 20 dpm/100 cm^2 for alpha and 1,000 dpm/100 cm^2 for beta/gamma contamination will be investigated to determine the cause of the contamination and appropriate corrective actions that will be implemented.

10 Annual Possession Quantity

Regulatory Requirement: *Indicate the annual possession quantity (APQ) for each radionuclide. WAC 246-247-110 Appendix A(10).*

On an annual basis, the contributing activities associated with the CWC diffuse/fugitive emissions are as follows:

Container storage: The annual possession quantity (APQ) for containers stored at CWC is 4.69 E+06 DE-Ci/yr (Table 1). This APQ is identified in WDOH, 2012.

Roll-on/Roll-off (RO/RO) Container Storage: The APQ of the RO/RO containers at CWC is a subset of containers stored at CWC, and is estimated to be approximately 0.12 DE-Ci/yr (Table 2). The DE-Ci for RO/RO container storage is provided for perspective only, using it for comparison to the aforementioned container storage APQ (4.96E+06 DE-Ci/yr).

Management of Potential Release of Contamination: The APQ for a potential release (i.e., contamination on the exterior of a container in a building, or on the exterior of a container in an outside storage area and/or associated soil) is a subset of containers stored at CWC. The APQ for this contamination is based on the summation of the isotopic inventory in two containers (Tables 4 and 5); one with high alpha, and the second with high beta/gamma. For conservative calculation purposes, the contamination is assumed to be a simultaneous release from both containers, of one percent of the radionuclide inventory (in the form of particulate solids) and 100 percent of the contamination would be cleaned up. The APQ is estimated to be approximately 4.00E+02 DE-Ci/yr. As noted earlier, DE-Ci are provided for perspective with routine container storage at CWC.

11 Physical Form of Each Radionuclide

Regulatory Requirement: *Indicate the physical form of each radionuclide in inventory: solid, particulate solids, liquid, or gas. WAC 246-247-110 Appendix A(11).*

The radionuclides in inventory in the diffuse/fugitive emissions are present as particulate solids at ambient conditions. Negligible amounts of radionuclides are present in gaseous form.

12 Release Form of Each Radionuclide

Regulatory Requirement: *Indicate the release form of each radionuclide in inventory: Particulate solids, vapor, or gas. Give the chemical form and the International Council for Radiation Protection (ICRP) 30 solubility class, if known. WAC 246-247-110 Appendix A(12).*

The DE-Ci listed are released as particulate solids. Negligible amounts of gaseous radionuclides are released.

13 Release Rates

Regulatory Requirement: *Release rates:*

New emission unit(s): Give predicted release rates without any emissions control equipment (the PTE) and with the proposed control equipment using the efficiencies described in subsection six (6) of this section.

Modified emission unit(s): Give predicted release rates without any emissions control equipment (the PTE) and with the existing and proposed control equipment using the efficiencies described in subsection six (6) of this section. Provide the latest year's emissions data or emissions estimates.

In all cases, indicate whether the emission unit is operating in a batch or continuous mode. WAC 246-247-110 Appendix A(13).

The PTE is defined in WAC 246-247-030(21) as the rate of release of radionuclides from an emission unit based on the actual or potential discharge of the effluent stream that would result if all abatement control equipment did not exist, but operations are otherwise normal. The PTE is determined by multiplying the APQ, discussed in Section 10.0, and applying the release factors defined in WAC 246-247-030(21)(a) for particulates. An estimate of the unabated and abated dose in mrem/yr to an MEI is determined by applying the dose-per-unit release factors as published in DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses.* Dose-per-unit release factors are presented for both the on-site and off-site individual, with consideration given for the release point (i.e., less than, or greater than or equal to, a 40-meter stack height).

It is noted that the release fraction for vented containers (using NucFils®) has been estimated conservatively to be 2.0E-09. Historically, in *Modification to the Central Waste Complex (CWC) Radioactive Air Emissions Notice of Construction (NOC)* (WDOH, 1998), dated August 24, 1998, the U.S. Department of Energy (DOE) provided information to WDOH, documenting the development of the release rate, which involved smearing the outer surface of NucFil® filters of 332 drums at CWC (approximately 10 percent of the inventory) for alpha contamination. The value of the smears were adjusted by dividing the observed counts by 0.1 based on a conservative assumption that only 10 percent of the material on the NucFil® filter attached to the smear media. The activity (disintegrations per minute [dpm]) in the container headspace was back calculated using the NucFil® filter minimum efficiency of 99.95 percent for particles with a median diameter of 0.3 microns. Based on the SWITS database, the container inventory for alpha constituents was converted from grams or curies to dpm. The release fraction for each container was then calculated by dividing the dpm of the container headspace by the radiological inventory for the container. WDOH approved the modification, with a condition that DOE provide WDOH a new release fraction (developed as negotiated with WDOH) by September 1999. Subsequently WDOH affirmed the 2.0E-09 release fraction (DOE/RL-99-60, *Request for Approval Vented Container Annual Release Fraction*; AIR 99-1006, Letter to J. Rasmussen).

14 Location of Maximally Exposed Individual

Regulatory Requirement: *Identify the MEI by distance and direction from the emission unit(s). The MEI is determined by considering distance, windrose data, presence of vegetable gardens, and meat or milk producing animals at unrestricted areas surrounding the emission unit. WAC 246-247-110 Appendix A(14).*

The onsite MEI relative to emissions from CWC is located at the Laser Interferometer Gravitational Wave Observatory (LIGO), approximately 18.3 kilometers east southeast of the Reduction Oxidation Facility (S Plant), conservatively chosen to represent 200 West Area. The offsite MEI resides near the Hanford Site, approximately 22 kilometers southeast of S Plant.

15 Total Effective Dose Equivalent to the Maximally Exposed Individual

Regulatory Requirement: *Calculate the TEDE to the MEI using an approved procedure (see WAC 246-247-085). For each radionuclide identified in subsection (8) of this section, determine the TEDE to the MEI for existing and proposed emission controls, and without any emission controls (the PTE) using the release rates from subsection (13) of this section. Provide all input data used in the calculations. WAC 246-247-110 Appendix A(15).*

Dose estimates for unit curie (Ci) releases of selected radionuclides were calculated for emissions from the 200 West Area. These dose estimates were calculated for an onsite member of the public working at

LIGO, who works within the Hanford Site boundary, and who eats food grown regionally (DOE/RL-2006-29). Similarly, dose estimates were calculated for an offsite member of the public residing near the Hanford Site (approximately 22 kilometers to the southeast of S Plant), and consuming food produced entirely at the residence location (DOE/RL-2006-29).

Using the unit dose factors, and the release rates from Section 13.0, estimated potential abated and unabated TEDEs to the offsite and onsite MEIs are shown in Tables 1 through 6.

For CWC, the currently approved unabated dose from diffuse and fugitive emissions for routine operations associated with container storage (based on DE-Ci) is 4.80E-02 mrem/yr (Table 1, WDOH, 2012). The total abated limit is 2.40E-05 mrem/yr (Table 1, WDOH, 2012). The dose consequences for the offsite and onsite MEI have been recalculated using current methodology (DOE/RL-2006-29) and are presented in Table 2. As noted therein, the calculated unabated offsite and onsite TEDE to the MEI is estimated to be 3.13E-02 mrem/yr and 5.33E-02 mrem/yr, respectively. Also in Table 2, the calculated abated offsite and onsite TEDE to the MEI are presented: 1.57E-05 mrem/yr and 2.66E-05 mrem/yr, respectively.

The calculated unabated offsite TEDE to the MEI from RO/RO fugitive emissions (4 RO/RO containers per year) is estimated to be 1.12E-03 mrem/yr (Table 3), and is based on isotopic inventory (not DE-Ci). The calculated unabated onsite TEDE to the MEI is estimated to be 7.13E-04 mrem/yr. There is no proposed abatement, so the abated dose is the same as the unabated dose.

The maximum unabated offsite dose from diffuse and fugitive emissions from contamination cleanup activities is based on the aforementioned (refer to Section 10) incredible, simultaneous release of contamination (one percent of the radionuclide inventory as particulate solids) from two containers; one with high alpha, and the other with high beta-gamma contamination. It is assumed that 100 percent of the contamination would be cleaned up. The offsite TEDE to the MEI is estimated to be 6.51E-02 mrem/yr (summation of Tables 5 and 6). The estimated onsite TEDE to the MEI is estimated to be 2.84E-02-mrem/yr. Since no credit is taken for controls, the maximum abated doses from contamination cleanup would be the same as the unabated doses.

Table 4 is provided for perspective, as the approved ALARACT TEDE to the onsite MEI is 9.75E-03 mrem/yr.

The TEDE to the Hanford Site MEI from all calendar year 2012 DOE Hanford Site air emissions (point sources and diffuse and fugitive sources) was approximately 0.0056 mrem (0.056 microsievert) (DOE/RL-2013-18, *Hanford Site Environmental Report for Calendar Year 2012*).

16 BARCT/ALARACT Assessment (or Cost Factors of Control Technology)

Regulatory Requirement: *Provide cost factors for construction, operation, and maintenance of the proposed control technology components and system, if a BARCT or as low as reasonably achievable control technology (ALARACT) demonstration is not submitted with the NOC. WAC 246-247-110 Appendix A(16).*

Cost factor inclusion is not applicable because the controls are defined administratively and consist of ALARA techniques.

17 Lifetime of the Facility Process

Regulatory Requirement: *Provide an estimate of the lifetime for the facility process with the emission rates provided in this application. WAC 246-247-110 Appendix A(17).*

Activities covered by this NOC will take place through 2030. It is assumed that the CWC facilities will be available using the limits established by the estimates in this NOC annually for as long as needed to support storage until final closure of the Hanford Site.

18 Control Technology Standards

Indicate which of the following control technology standards have been considered and will be complied with in the design and operation of the emission unit(s) described in this application: ASME AG-1; ASME N509; ASME N510; ASME NQA-1; 40 CFR 60, Appendix A, Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17; and ANSI N13.1. For each standard not indicated, give reason(s) to support adequacy of the design and operation of the emission unit(s) as proposed.

The technology standards listed in WAC 246-247-110(18) are not applicable to NucFil® and vent clip emission systems. The ASME/ANSI codes provided are applicable to forced ventilation systems and HEPA filters. Within the scope of this NOC, the CWC does not use forced ventilation systems and HEPA filtration. The remaining codes are applicable to ventilation systems that contain sampling systems, which the CWC does not utilize.

19 References

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40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," Subpart H, "National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities," *Code of Federal Regulations*. Available at: http://www.gpo.gov/fdsys/pkg/CFR-2010-title40-vol8/xml/CFR-2010-title40-vol8-part61-subpartH.xml.

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Table 1. Unabated and Abated CWC Container Fugitive Emissions, Current License[1]

	PTE for Container Fugitive Emissions								
Assumed Isotope	Average DE-Ci/ Container[a]	Vented (Non-closed) Container/yr	Estimated APQ (DE-Ci/yr)	Release Factor[b]	Unabated Estimated PTE (DE-Ci/yr)	Abated Estimated PTE (DE-CI/yr)	Unit Dose Factor[c] (mrem/Ci)	Unabated Dose (mrem/yr)	Onsite Abated Dose (mrem/yr)
Pu-239/Pu-240	53	88,500	4.69E+06	2.00E-09	9.38E-03	4.69E-06	5.15	4.80E-02	2.40E-05

1. Refer to WDOH, 2012, *Radioactive Air Emissions License For The Department of Energy Richland Office Hanford Site License*, License Number *FF-01*.

a. DE-Ci is a method of normalizing the exposure risk of various isotopes (HNF-EP-0063, *Hanford Site Solid Waste Acceptance Criteria*).

b. DOE/RL-99-60, *Request for Approval Vented Container Annual Release Fraction*.

c. Assumptions used to calculate the TEDE to the MEI in the current license include the use of 5.15 mrem/Ci for Pu-239 (WHC-EP-0498, *Unit Dose Calculation Methods and Summary of Facility Effluent Monitoring Plan Determinations*), and a NucFil® filter efficiency of 99.95.

Table 2. Recalculated Unabated and Abated CWC Container Fugitive Emissions

PTE for Container Fugitive Emissions								
Assumed Isotope	Unabated PTE (DE-Ci/yr)[a]	Abated PTE (DE-Ci/yr)[a]	Offsite MEI Dose Factor (mrem/yr)[b]	Unabated Offsite TEDE to the MEI (mrem/yr)	Abated Offsite TEDE to the MEI (mrem/yr)	Onsite MEI Dose Factor (mrem/yr)[b]	Unabated Onsite TEDE to the MEI (mrem/yr)	Abated Onsite TEDE to the MEI (mrem/yr)
Pu-239/Pu-240	9.38E-03	4.69E-06	3.34E+00	3.13E-02	1.57E-05	5.68E+00	5.33E-02	2.66E-05

a. Refer to Table 1.

b. Dose factor source: DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses*, Table 4.8.

Table 3. Unabated and Abated Calculations for CWC Roll-on/Roll-off Container Fugitive Emissions

Isotope[a]	Activity[a] (Ci)	DE-Ci Conversion (ICRP 71)	DE-Ci*	Release Fraction (WAC 246-247-030(21)(a)	PTE (Activity x Release Fraction) (Ci/yr)	Offsite MEI Dose Factor (mrem/yr)[b]	Unabated Offsite TEDE to the MEI (mrem/yr)	Onsite MEI Dose Factor (mrem/yr)[b]	Unabated Onsite TEDE to the MEI (mrem/yr)
C-14	1.52E-05	1.16E-04	1.76E-09	1.00E-03	1.52E-08	8.40E-04	1.28E-11	2.92E-04	4.44E-12
Ni-59	6.69E-06	3.60E-06	2.41E-11	1.00E-03	6.69E-09	2.62E-04	2.04E-12	3.89E-05	2.60E-13
Co-60	9.28E-05	2.00E-04	1.86E-08	1.00E-03	9.28E-08	3.05E-02	2.83E-09	2.80E-02	2.60E-09
Ni-63	5.62E-04	8.80E-06	4.95E-09	1.00E-03	5.62E-07	6.42E-04	3.61E-10	1.11E-04	6.24E-11
Se-79	3.11E-06	2.20E-05	6.84E-11	1.00E-03	3.11E-09	1.52E-02	4.73E-11	1.30E-03	4.04E-12
Sr-90	9.97E-01	4.80E-04	4.79E-04	1.00E-03	9.97E-04	1.58E-01	1.58E-04	1.47E-02	1.47E-05
Zr-93	1.76E-05	5.00E-04	8.80E-09	1.00E-03	1.76E-08	9.66E-04	1.70E-11	1.17E-03	2.06E-11
Tc-99	1.30E-04	5.80E-06	7.54E-10	1.00E-03	1.30E-07	2.86E-02	3.72E-09	1.34E-03	1.74E-10
Sn-126+D	5.87E-06	2.20E-04	1.29E-09	1.003-03	5.87E-09	3.08E-02	1.81E-10	2.62E-02	1.54E-10
Cs-137+D	3.18E-01	9.20E-05	2.93E-05	1.00E-03	3.18E-04	8.70E-02	2.77E-05	1.29E-02	4.10E-06
Sm-151	1.05E-02	8.00E-05	8.40E-07	1.00E-03	1.05E-05	2.89E-04	3.03E-09	4.52E-04	4.75E-09
Eu-154	4.68E-05	1.06E-03	4.96E-08	1.00E-03	4.68E-08	1.19E-02	5.57E-10	1.93E-02	9.03E-10
Eu-155	3.41E-04	1.38E-04	4.71E-08	1.00E-03	3.41E-07	8.98E-04	3.06E-10	1.38E-03	4.71E-10
U-233	3.66E-05	1.92E-01	7.03E-06	1.00E-03	3.66E-08	2.47E-01	9.04E-09	4.02E-01	1.48E-08
U-234	6.74E-03	1.88E-01	1.27E-03	1.00E-03	6.74E-06	2.42E-01	1.63E-06	3.94E-01	2.66E-06
U-235	2.70E-04	1.70E-01	4.59E-05	1.00E-03	2.70E-07	2.17E-01	5.86E-08	3.52E-01	9.50E-08
U-236	3.66E-06	1.74E-01	4.59E-05	1.00E-03	3.66E-09	2.24E-01	8.20E-10	3.63E-01	1.33E-09
Pu-238	6.84E-04	9.20E-01	6.29E-04	1.00E-03	6.84E-07	3.08E+00	2.11E-06	5.23E+00	3.58E-06

Table 3. Unabated and Abated Calculations for CWC Roll-on/Roll-off Container Fugitive Emissions

Isotope[a]	Activity[a] (Ci)	DE-Ci Conversion (ICRP 71)	DE-Ci*	Release Fraction (WAC 246-247-030(21)(a)	PTE (Activity x Release Fraction) (Ci/yr)	Offsite MEI Dose Factor (mrem/yr)[b]	Unabated Offsite TEDE to the MEI (mrem/yr)	Onsite MEI Dose Factor (mrem/yr)[b]	Unabated Onsite TEDE to the MEI (mrem/yr)
U-238	6.86E-03	1.60E-01	1.10E-03	1.00E-03	6.86E-06	2.01E-01	1.38E-06	3.26E-01	2.24E-06
Total Uranium	1.39E-02	NA	00E+00	1.00E-03	NA		00E+00		
Pu-239	1.86E-02	1.00E+00	1.86E-02	1.00E-03	1.86E-05	3.34E+00	6.21E-05	5.68E+00	1.06E-04
Pu-240	3.40E-03	1.00E+00	3.40E-03	1.00E-03	3.40E-06	3.34E+00	1.14E-05	5.68E+00	1.93E-05
Am-241	4.43E-03	8.4E-01	3.72E-03	1.00E-03	4.43E-06	2.78E+00	1.23E-05	4.73E+00	2.10E-05
Pu-241	3.56E-02	1.80E-02	6.41E-04	1.00E-03	3.56E-05	6.01E-02	2.14E-06	1.02E-01	3.63E-06
Pu-242	1.77E-08	9.60E-01	1.70E-08	1.00E-03	1.77E-11	3.17E+00	5.61E-11	5.39E+00	9.54E-11
TOTALS	1.40E+00		2.99E-02		1.40E-03		2.79E-04		1.78E-04
Multiply by 4 for four containers per year	5.60E+00		1.20E-01		5.60E-03		1.12E-03		7.13E-04

a. Data Sheet, NOC Isotopes, 9-10-13, 11m3, 1,100 kg container

b. Dose factors from DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses*, Table 4.8 (effective release height <40 meters; offsite and onsite MEIs).

* DE-Ci are provided for information only; DE-Ci are not used in calculating TEDE.

Table 4. Unabated and Abated Dose for CWC Box 231ZDR-11 ALARACT Approval[1]

PTE for Soil Removal, Container Decontamination										
Assumed Isotope	**Average Concentration (dpm/100 cm^2)**	**Estimated Soil Concentration (pCi/g)[a]**	**Soil Volume (m^3/yr)**	**5% Factor for Disturbed Soil[b]**	**Soil Density (g/m^3)**	**Release Fraction**	**Unabated Release Rate (Ci/yr)**	**Abated Release Rate (Ci/yr)**	**Onsite Unit Dose Factor (mrem/Ci)**	**Unabated and Abated Onsite Dose (mrem/yr)**
Pu-239	28,000	5.74E+05	3.81E+01	5.00E-02	1.57E+06	1.00E-03	1.72E-03	1.72E-03	5.68E+00	9.75E-03

1. Refer to AIR 13-602, 2013, *Central Waste Complex (CWC) Box 231ZDR-11 As Low As Reasonably Achievable Control Technology (ALARACT) Approval.*

a. Soil concentration calculated from HNF-2418, *Soil Contamination Standards for Protection of Personnel*, Table 4, Page 16 for Pu-239+D using an efficiency factor of 7 dpm/cpm to convert portable alpha monitor values to dpm.

pCi/gm = 28,000 dpm* 95.4 pCi/gm*240,000 dpm/28,000 dpm/(5.7 cpm* 7dpm/cpm) = 5.74E+05 pCi/gm.

b. The identified area of contamination is approximately 2 ft × 3 ft × 0.5 ft (3 ft^3) while the area of excavation is approximately 32 ft × 21 ft × 2 ft (1,344 ft^3). Less than 5% of this soil volume will be disturbed during the decontamination activities.

Table 5. Unabated Fugitive Emissions from Potential Contamination Management; High Alpha Scenario

Isotope[a]	Activity (Ci)[a]	DE-Ci Conversion (ICRP 71)	DE-Ci*	1 Percent Available from Loss of Containment (Activity x 0.01) Ci	Release Fraction (WAC 246-247 030(21)(a)	PTE (Ci/yr)	Offsite MEI Dose Factor (mrem/yr)[b]	Unabated Offsite TEDE to the MEI (mrem/yr)	Onsite MEI Dose Factor (mrem/yr)[b]	Unabated Onsite TEDE to the MEI (mrem/yr)
Total B/G[c]	5.00E-02	4.80E-04	2.40E-05	5.00E-04	1.00E-03	5.00E-07	1.58E-01	7.90E-08	1.47E-02	7.35E-09
Am-241	1.31E+02	8.40E-01	1.10E+02	1.31E+00	1.00E-03	1.31E-03	2.78E+00	3.64E-03	4.73E+00	6.20E-03
Pu-238	2.99E+01	9.20E-01	2.75E+01	2.99E-01	1.00E-03	2.99E-04	3.08E+00	9.21E-04	5.23E+00	1.56E-03
Pu-239	1.14E+02	1.00E+00	1.14E+02	1.14E+00	1.00E-03	1.14E-03	3.34E+00	3.81E-03	5.68E+00	6.48E-03
Pu-240	6.43E+01	1.00E+00	6.43E+01	6.43E-01	1.00E-03	6.43E-04	3.34E+00	2.15E-03	5.68E+00	3.65E-03
Pu-241	2.48E+03	1.80E-02	4.46E+01	2.48E+01	1.00E-03	2.48E-02	6.01E-02	1.49E-03	1.02E-01	2.53E-03
Pu-242	2.59E-03	9.60E-01	2.49E-03	2.59E-05	1.00E-03	2.59E-08	3.17E+00	8.21E-08	5.39E+00	1.40E-07
TOTAL	2.82E+03		3.60E+02			2.82E-02		1.20E-02		2.04E-02

a. Isotope/activity is based on CWC container with highest alpha inventory (package ID: SB83074); assume 1% of inventory in container is released to the exterior of container/soil, and 100% of the contamination is cleaned up.

b. Dose factors from DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses*, Table 4.8 (effective release height <40 meters; offsite and onsite MEIs).

c. Beta-gamma activity assumed to be strontium-90.

* DE-Ci are provided for information only; DE-Ci are not used in calculating TEDE.

Table 6. Unabated Fugitive Emissions from Potential Contamination Management; High Beta-Gamma Scenario

Isotope[a]	Activity[a] (Ci)	DE-Ci Conversion (ICRP 71)	DE-Ci*	1 percent Available from Loss of Containment (Activity x 0.01) Ci	Release Fraction (WAC 246-247-030(21)(a)	PTE (Ci/yr)	Offsite MEI Dose Factor (mrem/yr)[b]	Unabated Offsite TEDE to the MEI (mrem/yr)	Onsite MEI Dose Factor (mrem/yr)[b]	Unabated Onsite TEDE to the MEI (mrem/yr)
Sr-90	1.63E+04	4.80E-04	7.82E+00	1.63E+02	1.00E-03	1.63E-01	1.58E-01	2.58E-02	1.47E-02	2.40E-03
Cs-137	3.03E+04	9.20E-05	2.79E+00	3.03E+02	1.00E-03	3.03E-01	8.70E-02	2.64E-02	1.29E-02	3.91E-03
Co-60	5.08E-01	2.00E-04	1.02E-04	5.08E-03	1.00E-03	5.08E-06	3.05E-02	1.55E-07	2.80E-02	1.42E-07
Se-79	6.71E-03	2.20E-05	1.48E-07	6.71E-05	1.00E-03	6.71E-08	1.52E-02	1.02E-09	1.30E-03	8.72E-11
Tc-99	2.23E-01	5.80E-06	1.29E-06	2.23E-03	1.00E-03	2.23E-06	2.86E-02	6.38E-08	1.34E-03	2.99E-09
Am-241	1.58E+01	8.40E-01	1.33E+01	1.58E-01	1.00E-03	1.58E-04	2.78E+00	4.39E-04	4.73E+00	7.47E-04
Eu-154	1.92E+01	1.06E-03	2.04E-2	1.92E-01	1.00E-03	1.92E-04	1.19E-02	2.28E-06	1.93E-02	3.71E-06
Eu-155	3.58E+01	1.38E-04	4.94E-03	3.58E-01	1.00E-03	3.58E-04	8.98E-04	3.21E-07	1.38E-03	4.94E-07
Pu-238	6.45E+00	9.20E-01	5.93E+00	6.45E-02	1.00E-03	6.45E-05	3.08E+00	1.99E-04	5.23E+00	3.37E-04
Pu-239	1.07E+00	1.00E+00	1.07E+00	1.07E-02	1.00E-03	1.07E-05	3.34E+00	3.57E-05	5.68E+00	6.08E-05
Pu-240	1.05E+00	1.00E+00	1.05E+00	1.05E-02	1.00E-03	1.05E-05	3.34E+00	3.51E-05	5.68E+00	5.96E-05
Pu-241	5.26E+01	1.80E-02	9.47E-01	5.26E-01	1.00E-03	5.26E-04	6.01E-02	3.16E-05	1.02E-01	5.37E-05
Pu-242	1.75E-03	9.60E-01	1.68E-03	1.75E-05	1.00E-03	1.75E-08	3.17E+00	5.55E-08	5.39E+00	9.43E-08
Cm-243	1.83E-01	6.20E-01	1.14E-01	1.83E-03	1.00E-03	1.83E-06	2.10E+00	3.83E-06	3.57E+00	6.53E-06
Cm-244	1.26E+01	5.40E-01	6.80E+00	1.26E-01	1.00E-03	1.26E-04	1.77E+00	2.23E-04	3.01E+00	3.79E-04
TOTAL	4.67E+04		4.00E+01			4.67E-01		5.31E-02		7.95E-03

a. Isotope/activity is based on CWC container with highest beta-gamma inventory (package ID: 0003082); assume 1% of inventory in container is released to the exterior of the container/soil, and 100% of the contamination is cleaned up.

b. Dose factors from DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses*, Table 4.8 (effective release height <40 meters; offsite and onsite MEIs).

* DE-Ci are provided for information only; DE-Ci are not used in calculating TEDE.

Background

CH2M HILL
Plateau Remediation Company
PO Box 1600
Richland, WA
99352

CH2MHILL
Plateau Remediation Company

December 30, 2013

CHPRC-1304448

Mr. J. J. Short, Contracting Officer
U.S. Department of Energy
Richland Operations Office
Post Office Box 550
Richland, Washington 99352

Dear Mr. Short:

CONTRACT NUMBER DE-AC06-08RL14788 – TRANSMITTAL OF RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION APPLICATION/OFF-PERMIT CHANGE NOTIFICATION FOR THE CENTRAL WASTE COMPLEX

Reference: Letter, P. J. Martell, WDOH, to R. J. Corey, RL, "Central Waste Complex (CWC) Box 231ZDR-11 As Low as Reasonably Achievable Control Technology (ALARACT) Approval," AIR 13-602, dated June 13, 2013.

This letter transmits a radioactive air emissions Notice of Construction (NOC) application for the Central Waste Complex (CWC). The NOC application and attendant Hanford Air Operating Permit (AOP) Off-Permit Change Notification documentation were prepared in accordance with Washington Administrative Code (WAC) 246-247 and WAC 173-401-724, respectively. The application was prepared to incorporate information from the previous Washington State Department of Health (WDOH) license approval for the CWC and from the *As Low as Reasonably Achievable Control Technology (ALARACT) Demonstration – Central Waste Complex Box 231ZDR-11* (reference, originally approved in 2012 by WDOH for contaminated soil cleanup). Additionally, the application proposes management of maintenance and inspection related radiological waste in roll-on/roll-off boxes at the CWC.

Attachment 1 (*Central Waste Complex Radioactive Air Emissions Notice of Construction Application, DOE/RL-2013-45, Revision 0*) is provided to RL for submittal to the WDOH for approval, consistent with their authority to administer and enforce the state radioactive air emissions regulations, including licensing. A copy of the NOC should be simultaneously provided to the State of Washington, Department of Ecology (Ecology).

Attachment 2 (*Notification of Off-Permit Change, Permit Number: 00-05-006, Renewal 2*) is provided to RL for submittal to Ecology, per WAC 173-401-724, to facilitate Ecology's administration of the AOP.

These matters have been discussed with G. L. Pyles of your staff.

Technical questions should be directed to R. H. Engelmann at 376-7485, and contractual questions should be directed to R. K. Corman at 372-0528.

Sincerely,

John C. Fulton
President and
Chief Executive Officer

rhe/sb

Attachment 2

RL - C. E. Clark
M. S. Collins
R. J. Corey
D. E. Jackson
E. D. MacAlister
G. L. Pyles
S. A. Sieracki

MSA - R. H. Anderson

Electronically Approved by:

UserName: Fulton, John (h0003898)
Title: President and Chief Executive Officer
Date: Monday, 30 December 2013, 11:43 AM Pacific Time
Meaning: Sign as John C. Fulton
==========

AIR 13-602

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
OFFICE OF RADIATION PROTECTION
309 Bradley Blvd., Suite 201 • Richland, Washington 99352
TDD Relay Service: 1-800-833-6388

June 13, 2013

Mr. Ray J. Corey, Assistant Manager
for Safety and Environment
United States Department of Energy
Richland Operations Office
P.O. Box 550, MSIN: A5-14
Richland, Washington 99352

Re: Central Waste Complex (CWC) Box 231ZDR-11 As Low As Reasonably Achievable Control Technology (ALARACT) Approval

Dear Mr. Corey:

Reference: Email, dated 05/22/13, to John Schmidt and Thomas Frazier from John Bates, "FW: For WDOH Approval: Revised CWC ALARACT Demonstration"

Pursuant to Chapter 246-247 of the Washington Administrative Code (WAC), your ALARACT Demonstration request is hereby approved on June 13, 2013, as negotiated:

As Low As Reasonably Achievable Control Technology (ALARACT) Demonstration – Central Waste Complex Box 231ZDR-11

The conditions, controls, monitoring requirements, and limitations of this demonstration must be observed in order for you to be in compliance with WAC 246-247. Failure to meet any provision of this demonstration may result in the revocation of approval, the issuance of Notices of Violation, or other enforcement actions under WAC 246-247-100.

This ALARACT demonstration will expire on October 31, 2013.

If you have any questions regarding this approval, please contact John Schmidt at (509) 946-3874.

Sincerely,

John Martell, Manager
Radioactive Air Emissions Section

Enclosure: As Low As Reasonably Achievable Control Technology (ALARACT) Demonstration -- Central Waste Complex Box 231ZDR-11 (Under Approval Air 08-801, NOC ID 654, for Emission Unit ID 439)

cc: (see next page)

RECEIVED
JUN 17 2013
DOE-RLCC

cc: Robert Anderson, MSA
Matthew Barnett, PNNL
John Bates, CHPRC
Tom Beam, MSA
Lee Bostic, BNI
Cliff Clark, USDOE-RL
Jack Donnelly, WRPS
Dennis Faulk, EPA
Tom Frazier, WDOH
Phil Gent, Ecology
Robert Haggard, BNI
Dale Jackson, USDOE-RL
Steven Killoy, WRPS
Felix Miera, WRPS
Valarie Peery, Ecology
Michael Peloquin, WRPS
Lucinda Penn, WRPS
James Rasmussen, USDOE-RL
Crystal Rau, Ecology
John Schmidt, WDOH
Maria Skorska, Ecology
Jeff Voogd, WRPS
Joan Woolard, WCH
Davis Zhen, EPA
Environmental Portal
RAES Tracking: Item# 642; Resp. to IM 7,672; NOC 654; EU 439

As Low As Reasonably Achievable Control Technology (ALARACT) Demonstration -- Central Waste Complex Box 231ZDR-11

(Under Approval Air 08-801, NOC ID 654, for Emission Unit ID 439)

Background and Rationale

This request is to modify the ALARACT Demonstration approved on 10/2/12. This request updates the schedule and logistics associated with covering the Central Waste Complex box 231ZDR-11 and the management of the contaminated soil that may be disturbed during this activity. The activities described below under this ALARACT Demonstration are scheduled to occur before the end of October 2013. Related activities performed after October 2013 will be addressed in a revision to the CWC NOC. The activity being proposed is in support of addressing radioactive contamination associated with the outer surfaces of the concrete box 231ZDR-11. This box contains suspect TRU waste and has been stored in the CWC west outside storage area after being exhumed from a burial trench as part of the Transuranic Waste Retrieval Project. The planned activities are not within the described activities approved for CWC (Emission Unit ID: 439) in radioactive air emissions approval AIR 08-801, dated 8/5/2008. However, this cleanup response will provide short term, one-time, temporary actions for which the combined potential-to-emit airborne emissions will be well below the approved limit in the CWC approval. For this reason it is proposed that this ALARACT Demonstration provides adequate description of the activities for WDOH concurrence to proceed. The following are key points on this topic:

- The Container 231ZDR-11 is a general purpose concrete burial box filled with general waste from the Plutonium Finishing Plant. The dimensions of the box are 10 feet 10 inches wide, 19 feet 0 inches long, and 10 feet 0 inches high. The container has been retrieved from its former burial location and is located in the outside storage area at CWC (see Attachment 1, map).
- The container dripped contaminated water to the soil below during CY2012. It is surmised that the contaminated water resulted from weather-related moisture and precipitation on the outside of the box, which then rinsed some contamination from a metal seam(s) associated with the reinforced concrete wall panels of the box to the soil. To address this, drip pans were located beneath the box to catch this contamination. Some weather-related liquid may still be experienced due to freezing, condensation, etc. and will be seen in the drip pans. It is noted that there has been no change in contamination conditions specific to the box.
- The container is currently protected from weather by a field-constructed plastic tarp and scaffold weather cover. The cover is held by ground supports in contact with the soil surface around the container, with some of the soil containing contaminants.
- Actions are planned to place the container in a configuration that will allow installation of a waterproof fabric box cover and allow management of contaminated soil disturbed during this activity, as needed. This will allow various actions, as outlined below:
    - Remove the existing scaffold and weather cover, decontaminate or apply fixatives to the soil and structure as necessary, then cut off metal guides and lifting eyes on top of the box (see Attachment 2 photo).
    - Place the waterproof fabric box cover over the box using mechanical lifting equipment (e.g., crane). Although not required, a "car-port-like" structure may also be installed after the waterproof fabric box cover is in place. It is anticipated that the structure would also be mechanically lifted into place and will be anchored using a system such as ecology blocks.

- Package and transport contaminated wastes, including any contaminated soil that was removed during this action to the appropriate CWC location or to another DOE approved storage or disposal facility.

- The annual possession quantity (APQ) of the radiological contamination of the soil is bounded by the projected volume of affected soil conservatively estimated at approximately 32 ft. x 21 ft. x 2 ft. (1,344 ft^3).
- The maximum value for any spot within the area of contaminated soil is 240,000 dpm/100cm^2 alpha, with essentially no detectable beta-gamma/100 cm^2.
- The PTE estimated for all listed actions, including the disturbance of 5% of all contaminated soils, (to provide a bounding scenario), is 1.72E-03 Ci/yr, resulting in an estimated offsite total effective dose equivalent (TEDE) to the public maximally exposed individual (MEI) of 9.75E-03 millirem per year (mrem/yr). This would be well below the PTE limit of 4.8E-02 mrem/year currently approved for CWC under Approval AIR 08-801. Assumptions and calculations associated with these estimates are provided in Attachment 3.

Radiological Controls

Contamination monitoring, airborne radioactivity monitoring and dose rate monitoring will be conducted during all of the activities described above. At any time contaminated soil is disturbed during these activities a fixative will be applied to control contamination and at the end of each shift. In addition to radiological monitoring performed during the work activities, end of shift boundary surveys will be performed. Routine on-going contamination surveys of all Contamination Area (CA) boundaries will occur weekly. Contamination surveys within the CA will occur upon entry. It is expected that if radioactively contaminated soil is disturbed; it will be performed primarily using mechanical means (e.g., excavator) with water suppressants as necessary.

Radiological contamination and dose rate monitoring is conducted prior to transporting any waste containers or packages. All waste containers or packages will be prepared for transport per established procedures.

As applicable, the following controls will be implemented during the work activities:

a. Continuous HPT coverage will be performed as specified in applicable Radiological Work Permits (RWP).
b. Alpha and beta-gamma contamination surveys will be performed prior to and during activities that have the potential to disturb radioactive contamination such as soil disturbance and box covering activities.
c. Hand-held and/or over-head atomized misting will be performed during work activities where a potential exists to generate airborne radioactivity.
d. Atomized misters and fixative sprayers shall be function checked at the work site prior to commencing work activities.
e. Suppressants such as water, fixatives and covers will be used as necessary.
f. In any Contamination Area or Airborne Radioactivity Area (ARA), soil disturbance and outdoor container work will stop if average wind speeds exceed 10 mph, as determined per established procedures.
g. When removable contamination is detected, the contamination will be secured or contained prior to continuing work activities in accordance with the RWP.
h. WDOH will be notified if removable contamination levels above 2000 dpm/100cm^2 alpha are encountered.
i. WDOH will be notified when direct contamination on soil is detected greater than 500,000 dpm/100cm^2 alpha and/or 1 rad/hr/100cm^2 beta-gamma during soil disturbance activities. Additional controls will be agreed upon before work resumes.

j. Removable contamination will be maintained less than a maximum level of 2,200,000 dpm/100cm^2 alpha and/or less than 4 rad/100cm^2 beta-gamma. Exceeding these contamination limits requires work to stop, and notification to Operation and RadCon management in accordance with the applicable RWP. The RWP will not permit any soil disturbance work to exceed the limits of this ALARACT Demonstration. Notification to WDOH is required. Additional controls will be agreed upon before work resumes.

k. Adherence to RWP contamination limits helps ensure that occupational airborne radioactivity limits (i.e., 1.0E-09 microcuries/milliliter for ^{239}Pu/^{241}Am and 2.0E-06 microcuries/milliliter for beta emitters) are not exceeded. Downwind and boundary continuous air sampling is performed to monitor airborne radioactivity at the ARA boundary at less than 0.2 Derived Air Concentration (DAC) for alpha and beta isotopes of concern. If these levels are exceeded, WDOH will be notified and additional controls will be agreed upon before work resumes.

l. Lapel air sampling is performed on 100% of the workers within the posted HCA/ARA. The lapel air sample results provide additional data supporting evaluation of airborne radioactivity levels and assist as feedback regarding any needed adjustment in mitigation measures.

m. Continuous air sampling on all four sides of the soil disturbance locale within the ARA boundary, and downwind at the ARA boundary is required. This provides indication of potential elevated airborne radioactivity.

n. Operation First-line Manager (FLM) and Radiological Control FLM will be at the work location at all times to assure compliance with the notification criteria of this ALARACT Agreement, procedures and RWP limiting conditions.

o. RadCon will generate and retain radiological records documenting air sample results and removable contamination conditions during box movement, soil disturbance and packaging of wastes.

p. Radiological controls shall be in accordance with the latest revision of the CHPRC Radiological Control Manual, CHPRC Radiological Control procedures, facility/activity-specific technical work documents and applicable RWPs.

q. WDOH will be informed at the time of start-up of the activities to perform the scaffold removal and placement of the box cover. While it is expected that the field work will involve less than one month of effort combined, it is anticipated that the completion of all the described activities at CWC may involve a schedule extending into CY2014. Activities that are performed after October 2013 will be addressed in a revision to the CWC NOC.

Monitoring

Radiological monitoring shall be in accordance with the latest revision of the CHPRC Radiological Control Manual.

In addition to radiological air sampling performed at the work location, the 200 Area near-facility ambient air monitoring network will be used for continuous monitoring. The 200 Areas general fugitive/diffuse emission unit is already approved in the Hanford Site Radioactive Air Emissions License (FF-01) for related continuous monitoring.

Records/Documentation

- Radiological Survey Report(s) (RSR)
- Radiological Work Permit(s) (RWP)
- ALARA Management Worksheet (AMW)
- Smear Air sample Lapel Analysis Records
- Radiological Screening Form

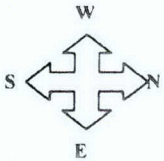
ATTACHMENT 1

(Photo Showing Location of Box 231ZDR-11)

CENTRAL WASTE COMPLEX (CWC) -- LOCATION OF CONTAINER NUMBER 231ZDR-11

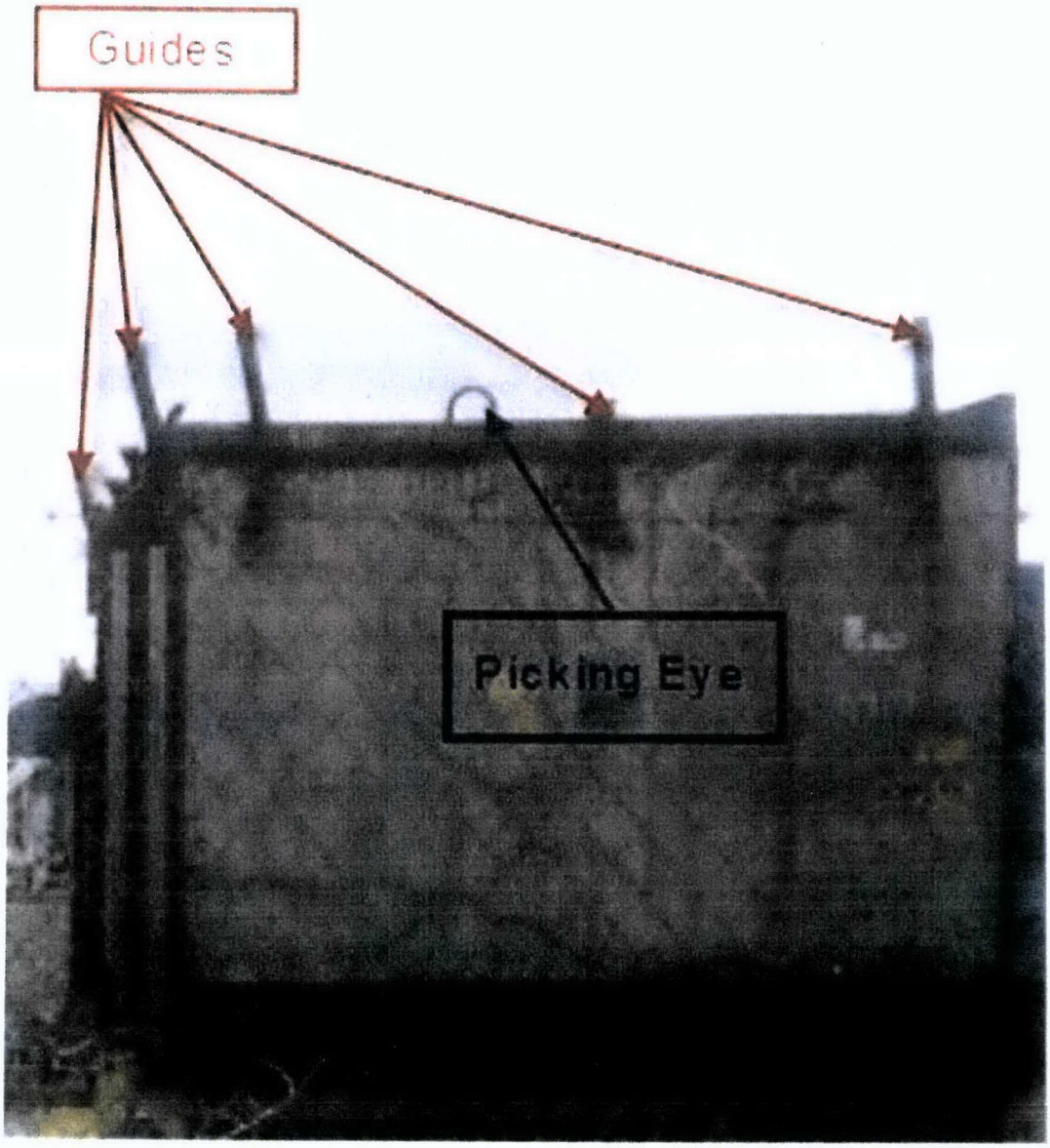
Container Number 231ZDR-11 (Gray Box)

Aerial Photograph of the Central Waste Complex



ATTACHMENT 2

(Photo Showing Guides and Eyes on Box 231ZDR-11)


Guides
Picking Eye

ATTACHMENT 3

(PTE Estimate for Diffuse/Fugitive Emissions)

PTE for Diffuse/Fugitive Emissions

Radionuclide	Assumed Isotope	Average Concentration (dpm/100 cm^2)	Estimated Soil Concentration (pCi/g)[A]	Soil Volume (m^3/yr)	5% Factor for Disturbed Soil[B]	Soil Density (g/m^3)	Release Fraction	Unabated Release Rate (Ci/yr)	Abated Release Rate (Ci/yr)	Unit Dose Factor (mrem/ci)	Unabated Dose (mrem/yr)	Abated Dose (mrem/yr)
Alpha Emitters	Pu-239+D	28,000	5.74E+05	3.81E+01	5.00E-02	1.57E+06	1.00E-03	1.72E-03	1.72E-03	5.68E+00	9.75E-03	9.75E-03

[A]Soil concentration calculated from HNF-2418 Table 4, page 16 for Pu-239+D using an efficiency factor of 7 dpm/cpm to convert PAM values to dpm.
pCi/gm = 28,000 dpm* 95.4 pCi/gm*240,000 dpm/28000 dpm/(5.7 cpm* 7dpm/cpm) = 5.74E5 pCi/gm

[B]The identified area of soil contamination is approximately 32 ft x 21 ft x 2 ft (1,344 ft^3, or 38.1 m^3). Less than 5% of this soil volume will be disturbed during the ALARACT approved activities.

NOTIFICATION OF OFF-PERMIT CHANGE
Permit Number: 00-05-006, Renewal 2

This notification is provided to the Washington State Department of Ecology, Washington State Department of Health, and the U.S. Environmental Protection Agency as a notice of an off-permit change described as follows.

The following changes are allowed pursuant to WAC 173-401-724(1), WAC 173-401-724(2), and WAC 173-401-724(6):

1. Change is not specifically addressed or prohibited by the AOP terms and conditions;
2. Change does not weaken the enforceability of the existing AOP conditions;
3. Change is not a Title I modification or subject to the acid rain requirements under Title IV of the FCAA;
4. Change meets all applicable requirements and does not violate an existing permit term or condition;
5. Change has complied with applicable preconstruction review requirements established pursuant to RCW 70.94.152.

Description of the change:

The process description is changed to provide for the routine use of roll-on/roll-off boxes at the Central Waste Complex (CWC) for the consolidation of low level waste prior to disposal, and for container and soil cleanup activities associated with potential small radiological releases from containers managed at CWC. These are processes that are additional to the existing activity of managing up to 88,500 containers of radioactive and/or mixed waste within CWC currently approved by the Washington State Department of Health (WDOH) for Emission Unit (EU) 439, approval AIR 08-801, NOC ID 654.

Emissions calculations have been updated. There are no changes in monitoring.

Date of change: (To be provided in the agency approval order.)

Describe the emissions resulting from the change:

There is a minor increase in the approved, calculated diffuse and fugitive emissions total effective dose equivalent (TEDE) from routine operations for Emission Unit 439, from 2.40E-05 mrem/year to the maximally exposed individual (MEI) to 1.12E-03 mrem/year (combined container and roll-on/roll-off box management). Additionally, should contamination cleanup be required, the calculated diffuse and fugitive TEDE to the MEI is 6.5E-02 mrem/year.

Describe the new applicable requirements that will apply as a result of the change:
(To be provided in the agency approval order.)