



**OFFICE OF RIVER PROTECTION**

P.O. Box 450, MSIN H6-60  
 Richland, Washington 99352

**JUN 10 2015**

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**JUN 15 2015**

WA Dept of Health  
 Radioactive Air Emissions Section

15-ECD-0027

Mr. John Martell, Manager  
 Radioactive Air Emissions Section  
 Washington State Department of Health  
 309 Bradley Blvd., Suite 201  
 Richland, Washington 99352  
 (Hanford Mailstop: B1-42)

Mr. Martell:

LICENSE REVISION REQUEST FOR NOTICE OF CONSTRUCTION IDENTIFICATION NUMBER 825 CONTAINED IN THE HANFORD SITE AIR OPERATING PERMIT, PERMIT NUMBER 00-05-006, "HANFORD SITE RADIOACTIVE AIR EMISSIONS LICENSE NUMBER FF-01"

The U.S. Department of Energy, Office of River Protection hereby submits to the Washington State Department of Health for your review and approval, the License/As-Low As Reasonably Achievable Control Technology (ALARACT) Revision Request for Notice of Construction Identification Number 825 (NOC\_ID 825), Categorical Tank Farm Facility Waste Retrieval and Closure: Phase II Waste Retrieval Operations Update FF-01 License to support AY-102 retrieval using EU 886 (POR 127) (Attachment 1). NOC\_ID 825 requires modification to allow for the retrieval of waste from Double-Shell Tank 241-AY-102. NOC\_ID 825 is currently in the Hanford Site Air Operating Permit, Number 00-05-006, "Hanford Site Radioactive Air Emissions License Number FF-01."

The License/ALARACT Revision Request proposes changes to Conditions 2 and 3, and proposes new Condition 4. These changes will allow for use of portable exhauster POR 127 during the retrieval of waste from Double-Shell Tank 241-AY-102. The draft License/ALARACT Revision Request has received tentative approval from the Washington State Department of Health during recent routine technical meetings.

The "Notification of Change Not Requiring Permit Revision" form (Attachment 2), is needed by the Washington State Department of Ecology to process an Air Operating Permit revision.

\* LINE 15-53

NOC 825  
 -all EIS

Mr. John Martelli  
15-ECD-0027

-2-

JUN 10 2015

If you have any questions, please contact Dennis W. Bowser, Environmental Compliance Division, (509) 373-2566.



Kevin W. Smith  
Manager

ECD:DWB

Attachments: (2)

cc w/attachs:


P.M. Gent, Ecology  
R.A. Kaldor, MSA  
R.J. Utley, WDOH  
Environmental Portal, LMSI  
WRPS Correspondence

cc w/o attachs:

B.G. Erlandson, BNI  
J. Cox, CTUIR  
S. Harris, CTUIR  
S.L. Dahl, Ecology  
D. Zhen, EPA (Region 10, Seattle)  
G. Bohnee, NPT  
K. Niles, Oregon Energy  
D.E. Jackson, RL  
J.W. Schmidt, WDOH  
J.A. Joyner, WRPS  
R. Jim, YN

Attachment 1  
15-ECD-0027  
(5 Pages)

License/As Low As Reasonably Achievable Control Technology  
Revision Request

A handwritten signature in black ink, appearing to read "Dennis W. Bowser", written over a horizontal line.

Dennis W. Bowser

## License/ALARACT Revision Request

NOTE: Any increase to abated or unabated PTE requires a full NOC modification.

Submittal Date: 06/10/2015

License Revision

WDOH Condition Number: 2 and 3

ALARACT Revision

New ALARACT Rev. #: \_\_\_\_\_

Report of Closure

### PROJECT IDENTIFICATION

Project Title: Update FF-01 License to support AY-102 retrieval using EU 886 (POR 127)

Current NOC Application Number: N/A

WDOH EU ID Number: EU 50, 57, 58, 486, 498, 749, 885, 886, 996, 1293, 1334, 1343

Current WDOH Approval Letter Number(s): AIR-12-307

WDOH NOC ID Number: 825

### DESCRIPTION OF CHANGE

Number of Attachments: 0

*WDOH will provide a new approval letter containing any new or modified conditions that result from the following proposed change.*

**Enter original and proposed wording here:**

**Condition 2 and Condition 3 of NOC\_ID 825 are proposed for change as follows:**

- 2) This approval applies only to those activities described below. No additional activities or variations on the approved activities that constitute a "modification" to the emission unit, as defined in (WAC 246-247-030(16)), may be conducted.

The operation of the waste retrieval system(s) for the removal of radioactive wastes from all ~~149 Single Shell Tanks (SST)~~ at the Hanford Site.

SALTCAKE DISSOLUTION WASTE RETRIEVAL SYSTEM

The saltcake dissolution waste retrieval system may be used to retrieve soluble saltcake waste. This method retrieves the soluble portion of the waste only, resulting in very few of the solids being pumped from the tank. The saltcake dissolution waste retrieval system deployed in the SSTs is for water, chemical agent, or catalyst liquid to be added to the tank using a variety of spray nozzles or "sprinklers". The approach is to sprinkle the waste surface with water, chemical agent, or catalyst liquid. The added water, chemical agent, or catalyst liquid must stay in contact with the saltcake for a long enough period of time for the brine to become saturated. Once the brine is saturated, it is pumped from the SST to a receiver tank, staging tank, storage DST or other staging/storage vessel associated with the supplemental treatment, packaging or disposal. Salt solution will be removed using the existing saltwell pump or other pump placed into the tank.

A tank not equipped with a saltwell pump, a transfer pump (progressive cavity, vertical turbine) can be installed and operated.

Remotely directable water distribution devices will be located in risers spaced as far apart as practical. A combination of spraying water, chemical agent, or catalyst liquid to dissolve the saltcake can be used in conjunction with directing a flow of water or recirculating water at the waste to move it to the pump suction to allow the pumping of waste from the tank. Recirculated waste from the pump may be sent back to the tank as an alternative to using water to direct dissolution waste to the pump suction.

### MODIFIED SLUICING WASTE RETRIEVAL SYSTEM

Modified sluicing can be used for some SST waste retrieval. Modified sluicing is the introduction of liquid at low to moderate pressures and volumes into the waste. The liquid dissolves and breaks apart solid materials and suspends them in the waste slurry. A transfer pump installed in the tank provides the motive force to transfer the liquid slurry to a receiver tank.

Modified sluicing introduces sluice liquid in a controlled fashion using multiple sluicing nozzles at varying pressures and flows, then pumps out the resultant waste slurry. This maintains minimal liquid inventories within the tank at all times. The liquids that could be used in modified sluicing include water, recirculated supernatant/water from the receiving Double Shell Tank, recirculated supernatant/water, chemical agent or catalyst liquid.

### VACUUM WASTE RETRIEVAL SYSTEM

A vacuum waste retrieval system can be used for waste retrieval activities in the (SSTs). The vacuum waste retrieval system is introduced into the tanks SSTs by means of an articulating mast system (AMS). The AMS has a horizontal reach and rotational capabilities of 360 degrees. The AMS has a retracted position and can be extended vertically. Air is mixed at the suction end of the AMS enabling the required vertical lift for the waste to a topside receiver tank, batch vessel or a staging SST, storage DST, or other staging/storage vessels associated with supplemental treatment, packaging or disposal.

The AMS will be deployed through and attached to standard riser flanges that are available on the tanks SSTs. Cameras can also be installed in other risers for in-tank viewing and control of the AMS.

For the 200-series tanks in the 241-C, 241-U, 241-B and 241-T Tank Farms a vacuum retrieval process tank, staging tank, staging SST, storage DST or other staging/storage vessel will be deployed. The receiver tank will receive waste in batches from whichever tank is connected into the vacuum retrieval system. The vacuum pressure used to draw up the waste from the tank to the receiver tank is relieved back into the tank SST being retrieved.

### MOBILE RETRIEVAL SYSTEM

A Mobile Retrieval System (MRS) can be used to retrieve waste from some tanks SSTs. The MRS consists of two in-tank systems. The first is a robotic crawler inserted through one riser the second is an AMS inserted through a second riser. The AMS retrieves the sludge from the tank using a vacuum with assisting pneumatic conveyance. The AMS vacuum tube has a horizontal reach and can be extended to the bottom of the tank. The arm rotates 360 degrees. The vacuum will be directed through the AMS in the tank to the end effector, which is in contact with

the waste. The pneumatic conveyance-assisted vacuum retrieval system will draw the waste up through the vacuum to the waste vessel in the vessel skid in batches. The AMS is then valved out while the waste vessel is emptied and pumped out through the over ground transfer lines to a DST, a staging SST or other treatment/disposal options. When the waste vessel is nearly empty, the transfer line will be valved out and the AMS will be valved back in and another batch of waste will be removed from the tank. This process will be repeated until waste near the center of the tank is removed. The robotic crawler will be remotely controlled to move and/or wash waste toward the center of the tank.

The robotic crawler is equipped with a plow blade at the front for pushing/pulling wastes, a screw pump to jet wastes through a small nozzle towards the center of the tank, the ability to direct hot or cold water through the same nozzle to wash wastes off of in-tank equipment, dissolve waste agglomerations in the tank, and wash waste toward the center of the tank for removal.

Any new retrieval methods or changes to processes will need to be provided to WDOH in a revised NOC prior to implementation.

## MOBILE ARM RETRIEVAL SYSTEM

The Mobile Arm Retrieval System (MARS) is a waste retrieval system used to retrieve waste from single-shell tanks (SSTs) and move the waste to the double-shell tanks (DSTs). The MARS employs two design options similar to currently permitted systems: 1) a sluicing retrieval option which is intended for retrieval of non-leaker tanks and 2) a vacuum retrieval option is intended for retrieval of assumed leaker tanks. Both options use an arm and sluicing jets and/or a high pressure water scarifier to break up the waste. The sluicer uses waste supernatant recycled from the DST to form a liquid jet using a nozzle. The scarifier uses filtered, pressurized water that comes from a high pressure water skid.

The equipment portion of the MARS includes a vertical, carbon steel mast (square cross section) as the main structural member. Attached to the vertical mast is a carbon fiber robotic arm. The arm is attached to a traveler that raises and lowers the arm relative to the vertical mast. The arm rotates 360 degrees - 380 degrees on a turntable located in the pit box. The arm also pivots up and down from an elbow at the traveler (hydraulic system) and extends and retracts (hydraulic system). The end of the arm articulates. The arm thus provides for a large range of motion such that the sluicing devices (recycle sluicer, water scarifier) located at the end of the arm can aim at most portions of the tank and from varying (e.g., short) distances.

The containment box which encloses the MARS will be ventilated by two parallel installed radial filters. The purpose of these filters is to minimize contamination from migrating up from the tank into the containment box via the open space on the large riser during retrieval operations. Minimization of contamination inside the containment box is desired should entry into the box ever be required for repairs. Inflow through these filters during retrieval is estimated to reach up to 60 cubic feet per minute (cfm). A valve will be installed between the filters and the containment box so filters can be isolated from the box. However, because the location of the valve will be approximately 12 feet above ground and difficult to reach without properly installed and inspected scaffolding, the valve will be left open at all times until retrieval of the tank is complete. Once retrieval is complete the valve will be closed.

## REMOTE WATER LANCE

The completion of tank retrieval may also be aided by a Remote Water Lance (RWL) that is a high pressure water device, or hydro laser. Alternatively, a High Pressure Mixer (HPM) may be used in the same capacity. The systems will consist of both ex-tank and in-tank components. The ex-tank components will be comprised of; high pressure systems, operating controls, cables, and hoses. The in-tank components will be comprised of; umbilical, in-tank vehicle, high pressure nozzle(s), or the high pressure mixer.

The high pressure water systems will provide the water at the desired pressure, not to exceed 37,000 psig. A conditioning system will be used to filter the raw water entering the skid to ensure that no abrasive materials are entrained in the water. The water volumetric flow rate will be on the order of 4 to 18 gpm for the HPM and from 6 to 15 gpm for the RWL. The operating controls will be located in a control trailer outside of the farm fence. The cables and hoses will connect hydraulically powered in-tank vehicle with the ex-tank controls and water skid via the umbilical. The HPM consists of an adjustable height pipe with two pairs of opposed, high pressure, low volume

water orifices located on the bottom of the pipe. The mixer is capable of being rotated 360 degrees and has an adjustable height range of approximately 7 feet. The positioning of the mixer is performed remotely using a hydraulic system. Additionally, the mixer has a single orifice on the bottom of the unit that can be used as an operational or installation aid. The in-tank vehicle will house one to four high pressure water nozzles. The RWL will be operated with the nozzle submerged to avoid aerosols in the tank. A rupture disc will be used to prevent reaching pressures above 37,000 psig.

**3) The radioactive isotopes identified for this emission unit are listed below. Annual Possession Quantities is limited to the following are specified for radionuclides (Curies/year) that could contribute >10% of the potential to emit or greater than 0.1 mrem/yr TEDE to the MEI:**

Ac - 227	<del>5.99E+00</del>	Am - 241	<u>2.3 E+04</u>	<del>8.68E+03</del>	Am - 243	<del>3.39E-01</del>
Ba - 137m	<del>4.26E+07</del>	C - 14		<del>6.25E+02</del>	Cd - 113m	<del>4.95E+03</del>
Cm - 242	<del>1.97E+01</del>	Cm - 243		<del>1.80E+00</del>	Cm - 244	<del>1.90E+01</del>
Co - 60	<del>2.52E+03</del>	Cs - 134		<del>3.44E+04</del>	Cs - 137	<u>2.1 E+06</u>
Eu - 152	<del>8.49E+02</del>	Eu - 154		<del>1.45E+04</del>	Eu - 155	<del>9.54E+03</del>
H - 3	<del>5.95E+03</del>	I - 129		<del>2.95E+01</del>	Nb - 93m	<del>1.01E+03</del>
Ni - 59	<del>1.05E+02</del>	Ni - 63		<del>9.30E+03</del>	Np - 237	<del>9.50E+01</del>
Pa - 231	<del>1.25E+01</del>	Pu - 238		<del>1.65E+02</del>	Pu - 239	<u>5.3 E+03</u>
Pu - 240	<u>1.2 E+02</u>	<del>5.36E+02</del>	Pu - 241	<del>4.80E+03</del>	Pu - 242	<del>3.34E-02</del>
Ra - 226	<del>1.27E-02</del>	Ra - 228		<del>1.15E+01</del>	Ru - 106	<del>1.22E-02</del>
Sb - 125	<del>1.73E+04</del>	Se - 79		<del>6.36E+01</del>	Sm - 151	<del>8.93E+05</del>
Sn - 126	<del>2.59E+02</del>	Sr - 90	<u>5.5 E+06</u>	<del>2.91E+06</del>	Tc - 99	<del>2.24E+04</del>
Th - 229	<del>4.20E-01</del>	Th - 232		<del>1.26E+00</del>	U - 232	<del>3.66E+00</del>
U - 233	<del>3.02E+01</del>	U - 234		<del>1.07E+01</del>	U - 235	<del>4.44E-01</del>
U - 236	<del>2.73E-01</del>	U - 238		<del>9.86E+00</del>	Y - 90	<del>2.91E+06</del>
Zr - 93	<del>1.25E+03</del>					

4. The department will be notified if radionuclides other than Cs-127, Sr-90, Pu-239/240 and Am-241 are identified that contribute greater than 10% of the PTE or greater than 0.1 mrem/yr TEDE to the MEI when a unit is deployed or redeployed. The PTE calculation shall be based on the inventory of material to be managed (tank inventory and supernatant) using the release fraction of 1.0E-03 for tank inventory and 8.0E-05 for supernatant.

The remaining conditions are renumbered due to creation of new condition #4.


**SIGNATURE**

Licensee Name: Department of Energy, Office of River Protection  
Licensee Title: Hanford Site FF-01  
Licensee: \_\_\_\_\_  
Signature: \_\_\_\_\_  
Date: \_\_\_\_\_



Attachment 2  
15-ECD-0027  
(1 Page)

**Notification of Change Not Requiring Permit Revision**

  
Dennis W. Bowser

## NOTIFICATION OF CHANGE NOT REQUIRING PERMIT REVISION

### Section 502(2)(10) Change\*

This notification is provided to the Washington State Department of Ecology, Washington State Department of Health, and the U.S. Environmental Protection Agency as notice of a change not requiring permit revision described as follows.

This change is allowed pursuant to WAC 173-401-722(1), WAC 173-401-722(2) and WAC 173-401-722(5):

1. Change is not a Title I modification.
2. Change does not result in emissions that exceed those allowable under the permit, whether expressed as a rate of emissions, or in total emissions.
3. Change does not alter permit terms that are necessary to enforce limitations on emissions from units covered by the permit;
4. Notification is provided to Ecology, WDOH, and EPA at least 7 days before making the change, and
5. Change does not violate applicable requirements or contravene enforceable permit terms and conditions that are monitoring (including test methods), recordkeeping, reporting, or compliance certification requirements.
6. A source making a change under this section shall comply with applicable preconstruction review requirements established pursuant to RCW 70.94.152.

Permit Number: 00-05-006

Provide the following information pursuant to WAC-173-401-722(2)(a):

<b>Description of the change:</b>
Modification of Notice of Construction Identification number 825 (NOC_ID 825), "Categorical Tank Farm Facility Waste Retrieval and Closure: Phase II Waste Retrieval Operations"
<b>Date of change:</b>
The date of change will be established when the State of Washington Department of Health issues a license revision.
<b>Describe the emissions resulting from the change:</b>
No change in emissions is proposed.
<b>List any permit term or condition that will no longer be applicable as a result of the change:</b>
None.

\* WAC 173-401-200(30) states that "Section 502(b)(10) changes" are changes that contravene an express permit term. Such changes do not include changes that would violate applicable requirements or contravene enforceable permit terms and conditions that are monitoring (including test methods), recordkeeping, reporting or compliance certification requirements.