LB# 3687

AIR 13-707
NOC 901

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
OFFICE OF RADIATION PROTECTION
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July 25, 2013

Mr. Kevin W. Smith, Manager
United States Department of Energy
Office of River Protection
P.O. Box 450, MSIN: H6-60
Richland, Washington 99352

Dear Mr. Smith:

Pursuant to Chapter 246-247 of the Washington Administrative Code (WAC), the modification of Emission Unit (EU) 93 is hereby approved according to the enclosed License for:

License to Operate Ventilation of the 241 AY/AZ Tank Farm (Replaced NOC ID 840) (NOC 901, EU 93)

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

This license approval replaces and obsoletes:

License to Operate Ventilation of the 241 AY/AZ Tank Farm (Replaced NOC ID 782) (NOC 840, EU 93)

If you have any questions regarding this approval, please contact Ernest McCormick at (509) 946-0624.

Sincerely,

John Martell, Manager
Radioactive Air Emissions Section

Enclosure: Applicable Portion of License

cc: (see next page)

cc: Robert Anderson, MSA
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Michael Peloquin, WRPS
Lucinda Penn, WRPS
Crystal Rau, Ecology
John Schmidt WDOH
Maria Skorska, Ecology
Jeff Voogd, WRPS
Davis Zhen, EPA
Environmental Portal
RAES Tracking: NOC 901, EU 93

Emission Unit ID: 93

200E P-296A042-001

296-A-42

This is a MAJOR, ACTIVELY ventilated emission unit.

241-AY/AZ TANK FARM

Emission Unit Information

Stack Height: 55.00 ft. 16.76 m. Stack Diameter 0.83 ft. 0.25 m.

Average Stack Effluent Temperature: 75 degrees Fahrenheit. 24 degrees Celsius.

Average Stack ExhaustVelocity: 30.56 ft/second. 9.31 m/second.

Abatement Technology BARCT WAC 246-247-040(3), 040(4)

state only enforceable: WAC 246-247-010(4), 040(5), 060(5)

Zone or Area	Abatement Technology	Required # of Units	Additional Description
	Condenser	1	(In the common exhaust train) At common header. Downtime to be reported by the Tank Farm air emissions notification procedure.
	Water Chiller	1	(In the common exhaust train) Downtime to be reported by the Tank Farm air emissions notification procedure.
	HEME	1	(In the common exhaust train) Downtime to be reported by the Tank Farm air emissions notification procedure.
	Heater	1	(In the common exhaust train) 2 parallel flow paths with 1 operational. Downtime to be reported by the Tank Farm air emissions notification procedure.
	HEPA	2	(In the common exhaust train) 2 parallel flow paths. Downtime to be reported by the Tank Farm air emissions notification procedure.
	Chiller Pump	1	(In the common exhaust train) Downtime to be reported by the Tank Farm air emissions notification procedure.
	Fan	1	(In the common exhaust train) 2 parallel flow paths. Downtime to be negotiated with the department.

Monitoring Requirements

state enforceable: WAC 246-247-040(5), 060(5), and federally enforceable: 40 CFR 61 subpart H

Federal and State Regulatory	Monitoring and Testing Requirements	Radionuclides Requiring Measurement	Sampling Frequency
40 CFR 61.93(b)(4)(i) & WAC 246-247-075(2)	40 CFR 61, Appendix B Method 114	Sr-90, Cs-137, and Am-241	Continuous

Sampling Requirements Record Sample

Additional Requirements

Additional monitoring or sampling requirements established by this License will be listed in the Conditions and Limitations section, if applicable.

Operational Status This emission unit is a primary exhauster used to support tank farm operations by ventilating the DSTs in 241 AY/AZ Tank Farm during storage, maintenance, and normal operations. Any activity other than storage, maintenance, and normal operations will be regulated and/or permitted under the appropriate regulations and/or permits for the activity being performed and the emission units associated with the activity. The emission unit is a primary exhauster ventilation system that operates intermittently.

This Emission Unit has 1 active Notice(s) of Construction.

Project Title	Approval #	Date Approved	NOC_ID
License to Operate Ventilation of the 241 AY/AZ Tank Farm (Replaced NOC ID 840)	AIR 13-707	7/25/2013	901

Conditions (state only enforceable: WAC 246-247-040(5), 060(5) if not specified)

1) The total abated emission limit for this Notice of Construction is limited to 3.30E-01 mrem/year to the Maximally Exposed Individual (WAC 246-247-040(5)). The total limit on the Potential-To-Emit for this Notice of Construction is limited to 5.80E+03 mrem/year to the Maximally Exposed Individual (WAC 246-247-030(21)).

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 241-AY-101, 241-AY-102, 241-AZ-101, and 241-AZ-102 tanks are double shell tanks. The inner shell is constructed from heat treated, stress-relieved steel. The outer shell is constructed of non stress relieved steel. The two shells are separated by a 2.5 ft annulus and contained inside a concrete shell. The tanks have a usable waste volume of approximately 1,001,000 gal.

The 241 AY and 241 AZ tanks are part of a Resource Conservation and Recovery Act treatment, storage, and/or disposal unit. The tanks contain mixed waste in the form of liquids or contained solids (suspended or settled). The contents in each of the four tanks may be mixed periodically to control gas entrapment in the settled solids, to control temperature, for chemical treatment to control corrosion, or for waste retrieval. Contained solids will be mobilized, as required, as part of this process by hydraulic action of the mixer pumps or by use of air-lift circulators in each of the tanks. During such activities, as well as during storage, the ventilation system maintains the vapor space in each tank below atmospheric pressure.

Airflow is from the tank to a glycol-cooled recirculation system and to a common header. The common header is the point in the overall system at which ventilation flow is provided to the emissions control system. Also, a portion of each tank's exhaust can be recirculated to assist in maintaining temperature.

The recirculation system cools, condenses, removes vapor and some entrained particulates, further removes moisture via a separator, and returns a portion of the cooled vapor to the tank. This provides cooling for the tank while reducing air emissions. Nominal flow rates in the recirculation system vary from zero m3/sec (bypassed) to 0.25 m3/sec per tank, at standard temperature and pressure conditions. At the higher flow rate, approximately 0.05 m3/sec is provided to the emission control system with the remainder to the tank. Similar airflow from the other three tanks is combined in the common ventilation header connecting the discharges of the other recirculation coolant systems. The combined flow is discharged to the emissions control system. The recirculation system is considered part of the process because the collected material is returned to the tank.

When mixer pumps are operating in a tank, the 0.25 m^3/sec drawn from this tank may not be recirculated but may be combined with the flow from the other tanks for a total discharge to the emissions control system flow range of 0.4 to 0.5 m^3/sec. Numerous other combinations of discharge flow rates are possible but the combined annual average discharge flow rate to the emissions control system will not be greater than 0.5 m^3/sec. During system upset conditions, such as an automatic shutdown of one exhaust train and start of the opposite train, discharge flow rates could reach 0.6 m^3/sec for several seconds.

The portion of the stream discharged to atmosphere will flow through a condenser, high-efficiency mist eliminator, heater, and two high-efficiency particulate air (HEPA) filters in series. For purposes of calculating abated emissions, only the HEPA filter control efficiencies are used.

The central pump pits on the 241-AY and 241-AZ Tank Farm tanks are approximately 14 ft long x 10 ft wide x 10 ft depth (outside dimensions). Sluice pits and annulus pump pits are somewhat smaller with outside dimensions of

7 ft x 7 ft x 10 ft deep and 5 ft x 5 ft x 10 ft deep.

With the previous NOC revision, modifications to all four tanks and associated equipment were permitted to allow for installation of waste retrieval systems and equipment, through issuance of letter AIR-05-708, including the following major components.

New In Tank Equipment
•Two mixer pumps each in tanks 241-AZ-102, 241-AY-101, and 241-AY-102 for mobilizing the settled solids. Two mixer pumps were installed in tank 241-AZ-101 and permitted previously by WDOH through issuance of AIR-98-708. All of the pumps will be capable of pumping waste through each of two horizontally opposed discharge nozzles.

•A riser extension/spray wash system on top of each of the risers used for mixer pumps. The spray wash system will be used for future decontamination of the mixer pumps if they are removed from the tank.

•One transfer pump in each tank for the transfer of waste.

•New temperature probes for each tank.

•New decant pumps in the AY tanks and associated transfer piping; to include a one-time use hose-in-hose transfer line approximately 40 ft in length.

Ancillary Equipment and Buildings
•Electrical power and instrument cables and other utility tie ins and/or upgrades (e.g., sanitary and raw water, and telecommunications).
•Tie-in to the existing dilution and caustic supply system to bring waste properties into compliance with the feed specifications and to flush and preheat transfer lines. The dilution system will have the capacity of providing approximately 140 gal/minute of pH adjusted water.
•Pit cover blocks.
•Water/diluent piping to and from the process pits.
•Process jumpers.
•Miscellaneous concrete pads for electrical and mechanical equipment.
•Chain link fencing and gates.

Removal, Repair, Decontamination, and Demolition of Existing Equipment
•Removal/repair of transfer and/or mixer pumps, as necessary, during the life of the facility.
•Removal and disposal of several thermocouple probes/instrument trees.
•Removal and disposal of several existing pumps and other miscellaneous equipment (e.g., slurry distributers and process jumpers).
•Additionally, this revision includes removal of HEGA filters.

CONSTRUCTION ACTIVITIES
Construction activities with the PTE could include soil excavation, work in pump pits, pipe cutting, and removal and installation of in tank equipment. Some of these activities are described in, and will be done in accordance with, an applicable tank farm as low as reasonably achievable control technology (ALARACT) demonstration (HNF 4327, Control of Airborne Radioactive Emissions for Frequently Performed TWRS Work Activities (ALARACT Demonstrations). The specific activities and corresponding ALARACT demonstration are called out as applicable in the following sections.

If needed or chosen for use during these activities, the regulated guzzler, a portable/temporary radioactive air emission unit, and a HEPA filtered vacuum radioactive air emission unit may be used in accordance with the most current version of Guzzler DOE application,(See DOE Letter 09-ESQ-542 Dated November 30, 2009), Notice of Construction for Guzzler Evacuation and Backfill Activities in Support of the 200 East and West Tank Farm Complex or the latest WDOH approved Site wide Guzzler (See DOE Letter 99-SID-021 Dated February 1,1999) , "Radioactive Air Emissions Notice of Construction Portable/Temporary Radioactive Air Emission Units"; and DOE/RL-97-50, "Radioactive Air Emissions Notice of Construction for HEPA Filtered Vacuum Radioactive Air Emission Units," respectively].

Because of the possibility of encountering previously undetected subsurface contamination, all work will be performed in accordance with appropriate radiological controls and the River Protection Project (RPP) as low as reasonably achievable (ALARA) program. These requirements are carried out through work packages and associated Radiological Work Permits (RWP).

Soil Excavation
Soil will be excavated inside and outside the 241-AZ and 241-AY Tank Farms for the dilution piping that will tie-in to the existing AN Tank Farm caustic supply system and to remove soil in preparation for mixer pump foundations and miscellaneous equipment support structures, to remove soil around pits in preparation of core drilling, and for placement of control building foundations (as required). A total of approximately 6000 yd^3 per farm could be excavated. Backfill will be made with the original removed soil or noncontaminated controlled density fill (sand, water, and a small amount of cement).

Soil excavation activities inside the tank farm fence will be performed in accordance with ALARACT Demonstration 5, TWRS ALARACT Demonstration for Soil Excavation (Using Hand Tools). If contamination is discovered outside the tank farm fence, ALARACT 5 will be followed. Clean soil piles could be moved from one place to another within the tank farm with heavy equipment (backhoe, front-end loader, etc.). Soil excavation outside the tank farm fence in noncontaminated soil also could be performed with heavy equipment. The regulated guzzler also could be used as described in the NOC for use in the 241-A Tank Farm Complex (EPA 1998 letter).

Pipe Cutting and Welding
Any required cuts of contaminated piping will be made inside a glove bag using appropriate equipment such as a sawzall or tri tool. To perform a cut without a glove bag, the piping will be surveyed/smeared to verify removable contamination levels are equal to or less than 10,000 disintegrations per minute (dpm) per 100 cm^2 beta gamma and 200 dpm/100 cm^2 alpha.

Welding may be necessary to join various pieces of equipment. If this is necessary, welding will commence once removable contamination levels in the weld area are reduced to ALARA. The goal will be to achieve 1000 dpm/100 cm2 beta gamma and 20 dpm/100 cm^2 alpha or less, but might not always be attainable.

If needed or chosen for use during these activities, a portable/temporary radioactive air emission unit and a HEPA filtered vacuum radioactive air emission unit could be used in accordance with the latest revisions of the NOCs (DOE/RL-96-75 and DOE/RL-97-50, respectively).

Pit Work
Work to be performed in pits may include replacing existing sets of cover blocks with newly designed cover blocks, core drilling (equivalent of one hundred 14-in. diameter holes for AZ Farm and ten 14 in. diameter holes for AY Farm), installing new nozzles, and removing existing jumpers.

Pit access and work will be performed in accordance with ALARACT Demonstrations 6 and 14, TWRS ALARACT Demonstration for Pit Access, and TWRS ALARACT Demonstration for Pit Work. Activities not covered in these ALARACTs are described in the following.

If needed or chosen for use during these activities, a portable/temporary radioactive air emission unit and HEPA filtered vacuum radioactive air emission unit could be used in accordance with the latest revisions of their NOCs (DOE/RL-96-75 and DOE/RL-97-50, respectively).

At the start of the pit work, the cover blocks will be lifted off and radiologically surveyed to determine an appropriate disposal method. New cover blocks will be installed when all work in the pits is completed.

Core drilling may be performed and will occur below grade level on the outside of the pit. The hole will be drilled from the outside to the inside, with the temporary pit cover in place. Nozzle installation generally will proceed immediately after the hole is completed. If immediate nozzle installation is not possible, the hole will be temporarily sealed with a plug, tape, or equivalent device until the nozzle can be installed.

Installation of new nozzles in existing pits will take place in an open pit. All parts of the nozzle will be assembled ahead of time and will be lowered into position as a single unit. The piping in the back of the nozzle will be threaded through the hole (from the inside of the pit to the outside) and pulled tight into place from the outside of the pit. Grout will be used to secure and seal the nozzle into place. The front opening of the nozzle, inside the pit, will be fitted with a temporary cap/seal until a jumper is connected to the nozzle. Once the nozzle(s) is/are installed, the temporary pit cover will be replaced until other work inside the pit requires pit cover removal.

Removal of In Tank Equipment
Various in-tank equipment will be removed from the tanks to make room for the waste retrieval equipment, or to be replaced with equivalent equipment built to withstand the mixer pump jet forces. Removed long-length equipment will either be packaged in long-length contaminated equipment disposal containers or size reduced for disposal in accordance with ALARACT Demonstration 15, Tank Farm ALARACT Demonstration for Size Reduction of Waste Equipment for Disposal. Equipment removal will be performed in accordance with ALARACT Demonstration 13, TWRS ALARACT Demonstration for Installation, Operation, and Removal of Tank Equipment. Activities not covered in this ALARACT are described in the following.

If needed or chosen for use during these activities, a portable/temporary radioactive air emission unit, and a HEPA filtered vacuum radioactive air emission unit may be used in accordance with the latest revisions of their NOCs (DOE/RL-96-75 and DOE/RL-97-50, respectively).

Decontamination of removed equipment is not anticipated. The fewer decontamination activities undertaken, the less exposure possibilities there are to the worker and the environment. Contingency decontamination plans, however, are in place if needed. The most likely equipment to be decontaminated would be sections of the flexible receiver. Equipment removal will be performed in accordance with TWRS ALARACT Demonstration 13, Installation, Operation, and Removal of Tank Equipment.

In Tank Equipment Installation
Equipment installation will be performed in accordance with TWRS ALARACT Demonstration 13, Installation, Operation, and Removal of Tank Equipment.

WASTE STAGING AND RETRIEVAL PROCESS OVERVIEW
Mixer pumps will be operated to maintain waste uniformity during staging and to mix the waste for a period before and during transfer. As required by operational directives, mixer pumps will be operated until waste samples verify that adequate mixing has been achieved. Waste samples will be collected in accordance with TWRS ALARACT Demonstration 7, Tank Waste Grab Sampling. If dilution/conditioning is needed, the pH and temperature of the diluents will be adjusted by means of a caustic supply system. Once the waste is verified acceptable, the transfer lines will be preheated/flushed with water, and the waste transfer to the treatment facility will follow. After the transfer, the lines will be flushed again with water.

3) **The Annual Possession Quantity is limited to the following radionuclides (Curies/year):**

Ac - 227 Contributes less than 10% of the unabated PTE	Am - 241 8.20E+04 Identified as contributing GREATER than 10% of the potential TEDE to the MEI	Am - 243 Contributes less than 10% of the unabated PTE
Ba - 137 m Contributes less than 10% of the unabated PTE	C - 14 Contributes less than 10% of the unabated PTE	Cd - 113 m Contributes less than 10% of the unabated PTE
Cm - 242 Contributes less than 10% of the unabated PTE	Cm - 243 Contributes less than 10% of the unabated PTE	Cm - 244 Contributes less than 10% of the unabated PTE
Co - 60 Contributes less than 10% of the unabated PTE	Cs - 134 Contributes less than 10% of the unabated PTE	Cs - 137 1.10E+07 Identified as contributing GREATER than 10% of the potential TEDE to the MEI
Eu - 152 Contributes less than 10% of the unabated PTE	Eu - 154 Contributes less than 10% of the unabated PTE	Eu - 155 Contributes less than 10% of the unabated PTE
H - 3		

Contributes less than 10% of the unabated PTE	I - 129 Contributes less than 10% of the unabated PTE	Nb - 93 m Contributes less than 10% of the unabated PTE
Ni - 59 Contributes less than 10% of the unabated PTE	Ni - 63 Contributes less than 10% of the unabated PTE	Np - 237 Contributes less than 10% of the unabated PTE
Pa - 231 Contributes less than 10% of the unabated PTE	Pu - 238 Contributes less than 10% of the unabated PTE	Pu - 239 Contributes less than 10% of the unabated PTE
Pu - 240 Contributes less than 10% of the unabated PTE	Pu - 241 Contributes less than 10% of the unabated PTE	Pu - 242 Contributes less than 10% of the unabated PTE
Ra - 226 Contributes less than 10% of the unabated PTE	Ra - 228 Contributes less than 10% of the unabated PTE	Ru - 106 Contributes less than 10% of the unabated PTE
Sb - 125 Contributes less than 10% of the unabated PTE	Se - 79 Contributes less than 10% of the unabated PTE	Sm - 151 Contributes less than 10% of the unabated PTE
Sn - 126 Contributes less than 10% of the unabated PTE	Sr - 90 1.80E+07 Identified as contributing GREATER than 10% of the potential TEDE to the MEI	Tc - 99 Contributes less than 10% of the unabated PTE
Th - 229 Contributes less than 10% of the unabated PTE	Th - 232 Contributes less than 10% of the unabated PTE	U - 232 Contributes less than 10% of the unabated PTE
U - 233 Contributes less than 10% of the unabated PTE	U - 234 Contributes less than 10% of the unabated PTE	U - 235 Contributes less than 10% of the unabated PTE
U - 236 Contributes less than 10% of the unabated PTE	U - 238 Contributes less than 10% of the unabated PTE	Y - 90 Contributes less than 10% of the unabated PTE
Zr - 93 Contributes less than 10% of the unabated PTE		

4) TANK VENTILATION AND EMISSIONS CONTROL SYSTEM

The existing ventilation and emissions control systems for the 241-AY/AZ Tank Farm will be used during the mixing and transferring of waste in the AY and AZ tanks. The tank farm exhaust system provides ventilation for all AZ and AY tank primary vapor spaces. The system removes heat, water vapor, and particulates, and maintains a negative pressure on the tanks. The emission point is the 296-A-42 Stack.

Inlet air for the AZ and AY tanks is provided through the inlet air filters. Air is exhausted from each tank independently through 10.5-in.-diameter exhaust ducts. The ducts connect to a 55 ft high stack (16.76 m). The exhaust station consists of two filtration subsystems and the stack. Either subsystem can collectively ventilate all the tanks together at a maximum flow rate of approximately 1000 ft^3/minute (approximately 0.42 m3/sec). Only one system operates at a time, while the other remains in standby as a backup.

Each filtration subsystem consists of a condenser, high-efficiency mist eliminator, heater, and two HEPA filters in series. Each HEPA filter is rated for 1000 ft3/minute and is equipped with fluid seals. The HEPAs are individually tested annually (in accordance with ASME N510, Testing of Nuclear Air Treatment System) to a minimum efficiency of 99.95% for the removal of particulates with a median diameter of 0.3 microns.

5) MONITORING DURING CONSTRUCTION ACTIVITIES

During soil excavation activities, periodic confirmatory monitoring (PCM) as described in ALARACT 5, will verify low emissions. If the regulated guzzler is used, PCM will be performed as required by the guzzler NOC.

During pipe cutting activities surface contamination surveys will constitute the PCM to verify low emissions. If a portable/temporary radioactive air emission unit or a HEPA filtered vacuum radioactive air emission unit is used, PCM will be performed as required by these NOCs.

During pit work activities, PCM as described in ALARACT 14 will verify low emissions. If a portable/temporary

radioactive air emission unit or a HEPA filtered vacuum radioactive air emission unit is used, PCM will be performed as required by these NOCs.

During in tank equipment removal and installation activities surface contamination surveys, as described in ALARACT Demonstration 13, TWRS ALARACT Demonstration for Installation, Operation and Removal of Tank Equipment (HNF-4327) will constitute the PCM to verify low emissions. If a portable/temporary radioactive air emission unit or a HEPA filtered vacuum radioactive air emission unit is used, PCM will be performed as required by these NOCs.

6) MONITORING DURING OPERATIONS

Continuous monitoring will be obtained through use of the 241-AZ/AY Tank Farms existing sampling and monitoring system (296-A-42 stack). Samples will be collected approximately every 2 weeks and will include representative operation of the waste retrieval systems. The samples will be analyzed, at a minimum, for 90Sr, 137Cs, and 241Am, each of which constitutes 10%, or more, of the EDE. While in operation, the 296-A-42 record sampler instrumentation will be calibrated annually in accordance with approved procedures, and system inspections will be performed daily to ensure instrumentation is operating within specified parameters.

The sampling and monitoring system consists of a continuous sampling record sampler and a continuous air monitor (CAM). The system collects samples at a variable flow rate, depending upon the stack effluent velocity. The system has been designed to match air velocities entering the sample probe with that of the duct in which it is installed. For example for stack flow rates of 400 and 1000 ft^3/minute, the sampling system will collect samples at 0.7 and 1.7 ft^3/minute, respectively. In this way, the design complies with those requirements specified in ANSI N13.1-1969, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities. There are two sample probes (one for the CAM, one for the sampler) located in the exhaust duct in compliance with the 40 CFR 60 Appendix A, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities, Method 1A requirement. The probe nozzles are configured in accordance with ANSI N13.1-1969. The sample flow totaling instruments are well within the 2.0% accuracy described by Method 2A. The record sampler's collection efficiency during normal operations ranges between 55% (for stack flows of 1000 ft^3/minute) and 63% (for stack flows of 400 ft^3/minute) for penetration of 10-micron particles (from Deposition 4.0 calculations). In addition, stack flow totalizers are installed that have been certified accurate to the requirements of 40 CFR 52, Appendix E.