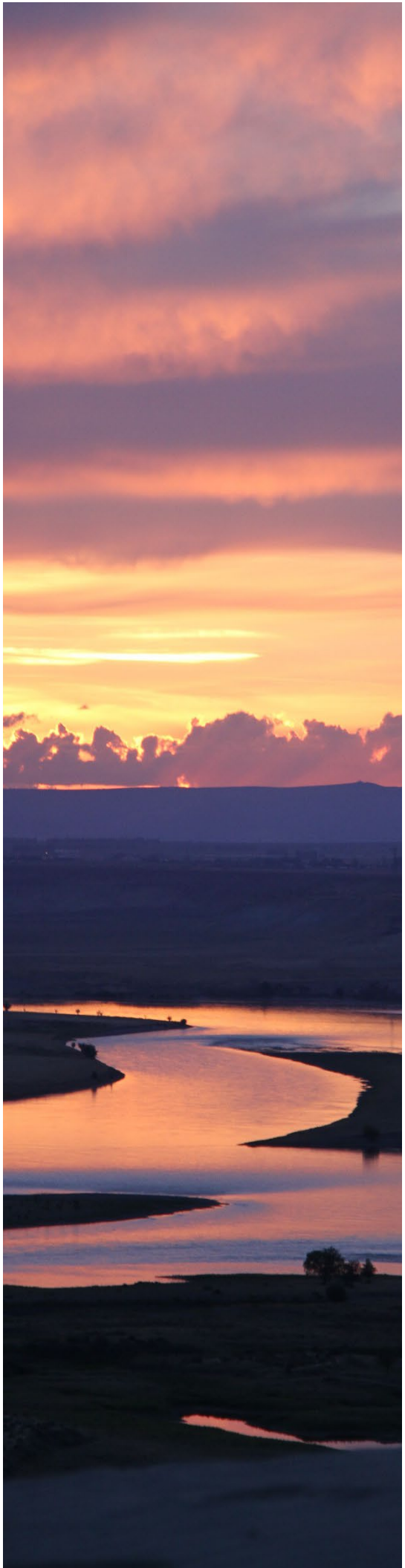

DEPARTMENT OF ECOLOGY
State of Washington

Response to Comments

AW Stack – Notice of Construction

July 15 – August 16, 2019

Summary of a public comment period and responses to comments

November 2019
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Nuclear Waste Program
Washington State Department of Ecology
Richland, Washington

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Introduction

The Washington State Department of Ecology's Nuclear Waste Program (Ecology) regulates air pollution sources at the Hanford Site. In particular, Ecology is the permitting authority for new or modified sources requiring new source review under WAC 173-400-110 on the Hanford Site.

When a new order or modification to an existing order is proposed we may hold a public comment period to allow the public to review the change and provide formal feedback. (See WAC 173-400-171 for Public Notice and Opportunity for Public Comment requirements for approval of a notice of construction application.)

The Response to Comments is the last step before issuing the final order, and its purpose is to:

- Specify which provisions, if any, of a permit will become effective upon issuance of the final order, providing reasons for those changes.
- Describe and document public involvement actions.
- List and respond to all significant comments received during the public comment period and any related public hearings.

This Response to Comments is prepared for:

Comment period:	AW Stack – Notice of Construction
Order:	Non-Radioactive Air Emissions Notice of Construction Approval Order Conditions and Restrictions DE18NWP-001
Permittee(s):	United States Department of Energy
Original issuance date:	December 20, 2019
Draft effective date:	December 20, 2019

To see more information related to the Hanford Site and nuclear waste in Washington, please visit our website: https://www.ecology.wa.gov/Hanford.

Reasons for issuing the order

The original project was permitted under Approval Order DE05NWP-001. The permittee submitted a new Notice of Construction modification application to increase the stack height of the 241-AW Tank Farm exhausters from an existing height of 28 feet to 60 feet above grade. The new Approval Order for that change is DE18NWP-001.

A separate modification was initiated to remove the 241-AW Tank Farm from Approval Order DE05NWP-001.

Concentrations of dimethyl mercury and hexavalent chromium were found to be above the Acceptable Source Impact Levels (ASILs) of Washington Administrative Code (WAC) 173-460-150. A Second Tier analysis (RPP-ENV-59016, Rev. 01) was provided for dimethyl mercury. That analysis indicated emissions were permissible, as they fall within the risk defined in WAC 173-460-090(7). Abated emissions of chromium hexavalent were found to be below the ASIL. Emission limits were placed on visible emissions, toxic air pollutants, dimethyl mercury, hexavalent chromium, and ammonia. Sampling and analysis plans were requested for review of proposed sampling methodology.

Best Available Control Technology for Toxics (tBACT) for the project was found to be operation of the tank ventilation system with a moisture de-entrainer, heater, pre-filters, and two-stage High Efficiency Particulate Air filtration system. Operational limits were placed on tBACT controls, flow rate, and the number of tanks allowed to be disturbed at a given time.

Public involvement actions

Ecology encouraged public comment on the AW Stack – Notice of Construction during a 30-day public comment period held July 15 through August 16, 2019.

The following actions were taken to notify the public:

- Emailed a notice announcing the start of the comment period to the Hanford-Info email list, which has 1360 recipients.
- Posted the comment period as an event on the Washington Department of Ecology – Hanford Facebook page

The following public notices for this comment period are in Appendix A of this document:

- Notice sent to the Hanford-Info email list
- Event posted on the Washington Department of Ecology – Hanford Facebook page

List of Commenters

The table below lists the names of organizations or individuals who submitted a comment on the AW Stack – Notice of Construction. The comments and responses are in Attachment 1.

Michael Luzzo	Citizen
Mike Conlan	Citizen
Anonymous Citizen	Citizen
Bill Green	Citizen
Washington River Protection Solutions	Washington River Protection Solutions
Hanford Challenge	Hanford Challenge

Attachment 1: Comments and responses

Description of comments:

Ecology accepted comments from July 15 through August 16, 2019. This section provides a summary of comments we received during the public comment period and our responses, in accordance with WAC 173-400-171(7)(c). Comments are grouped by individual and each comment is addressed separately.

I-1: MICHAEL LUZZO

Comment I-1-1

For the stack height adjustment to work, the following must happen. The height must be outside a intake breathing/return zone. Secondly, maintain aggressive stack sampling procedures. maintain contact with ACGIH or equivalent.

Response to I-1-1

Thank you for your comment.

Ecology does not have authority under Washington Administrative Code (WAC) 173-400 to mandate how the permittee conducts operations with regards to worker safety. Conditions for emission assessments are outlined in Section 3.2 of DE18NWP-001. The Department of Ecology (Ecology) conducts routine inspections and requires the permittee to report any exceedance of Approval Conditions within 7 days of identification.

No change to the permit is required.

I-2: MIKE CONLAN

Comment I-2-1

1) Remove all nuclear waste,

2) Do not allow anymore nuclear waste into the facility,

3) Replace all single storage tanks,

4) Stop all the nuclear leakage from entering the Columbia River

Response to I-2-1

Thank you for your comment.

Ecology is only responding to comments associated with DE18NWP-001 at this time. Approval Order DE18NWP-001 covers emissions from the AW tank farm to the atmosphere. It is not a permitting mechanism to remove nuclear waste, control the allowance of nuclear waste on Hanford, require replacement of single shell storage tanks, or control groundwater contamination. Associated comments related to dangerous and mixed waste should be made at the appropriate Dangerous Waste permitting stages.

No change to the permit is required.

I-3: ANONYMOUS CITIZEN

Comment I-3-1

I am writing in response to the 30 day public comment period on the AW Stack Notice of Construction, which was announced on July 15, 2019.

According to the draft technical support document, the purpose of the project modification is to reduce potential odors at near field ground level by extending the exhaust stack discharge height from 28 feet to 60 feet above grade. I appreciate this effort, which implements a design hierarchy that prefers an engineered solution first before administrative controls, and represents an improvement in managing tank waste vapor hazards.

Are additional stack height adjustments planned in the tank farms to reduce potential odors? For example, the Hanford Air Emissions License Number: RAEL-FF-01 1, indicates that passive radial breather filters are installed with stack heights of only 4.75 feet on single shell tanks.

Dozens of stacks are below 5 feet in height, which is near the height of the work force. These filters vent to the atmosphere and release gases depending on changes in atmospheric pressure, temperature, and wind speed. As a result the odor emissions are fleeting puffs and eddies that could reach workers and are not amenable to being detected by area air monitors. In addition, the puffs are more concentrated than gases exhausted through a stack where it has been diluted by fan-induced air in-leakage.

If these stacks were raised, or otherwise controlled for odors at the source, it would provide an engineered improvement similar to that proposed for AW Farm Ventilation. It would help if Ecology can describe the stack height policies across the Hanford site regarding odors. Was an odor analysis performed when the original single shell tank active ventilation stacks were taken out of service and replaced with the shorter breather filter stacks?

Response to I-3-1

Thank you for your comment.

Ecology is unaware of the permittee's intentions regarding stack height adjustments to other tank farms.

Ecology only has authority to regulate off-site odors under WAC 173-400. Ecology has not received any complaints regarding off-site odors originating from the tank farms.

No change to the permit is required.

I-4: BILL GREEN

Comment I-4-1

Enclosure 1 contains my comments on the referenced draft order. Enclosure 2 is a copy of a report titled: Review and Comments on Washington State Department of Ecology Requirements for the Measurement and Control of Emissions from Hanford's Nuclear Waste Storage Tanks, which was authored by Henry S. Cole, Ph.D., of Henry S. Cole & Associates, Inc. Several of the comments in Enclosure 1 reference portions of Dr. Cole's report. I hope you find my comments useful in crafting a final version of DE18NWP-001 that complies with all appropriate regulatory requirements.

Response to I-4-1

Thank you for your comments.

Individual comments in Enclosure 1 are addressed herein. Comments in Enclosure 2 are not addressed unless specifically mentioned in Enclosure 1.

Comment I-4-2

Comment 1: A new public comment period will be required before conditions in this NOC Order (DE18NWP-00 I) can be added to Hanford's Air Operating Permit (AOP), because the current public review conducted under WAC 173-400 does not meet the minimum requirements for public review pursuant to WAC 173-401, The Operating Permit Regulation. The specific deficiencies include:

• failure to publish a public notice in the Permit Register [WAC 173-401-800 (2)(b)(iii)]; and

• failure to provide notice via Ecology's mailing list as required by WAC 173-401-800 (2)(c).

That portion of Washington's SIP codified at WAC 173-400-111(2) requires that a notice of construction application designated for incorporation into the source's AOP must be processed in accordance with the operating permit program procedures and deadlines• Such procedures and deadlines are codified at WAC 173-40 I. It is apparent from the bulleted items above that the application is not being processed in accordance with the procedures required to revise an AOP. Therefore, a new public review compatible with requirements in WAC 173-401 will be required before conditions in this regulatory order can be incorporated into Hanford's AOP. Under the administrative amend process codified in WAC 173-401 an administrative amendment is allowed when such amendment "[i]ncorporates into the chapter 401 permit the terms, conditions, and provisions from orders approving notice of construction applications processed under an EPAapproved program, provided that such a program meets procedural requirements substantially equivalent to the requirements of WAC 173-401-700, 173-401-725, and 173-401-800 that would be applicable to the change if it were subject to review as a permit modification, and compliance requirements substantially equivalent to those contained in WAC 173-401-600 through 173-401-650." WAC l 73-401-720 (1)(e). See also 40 C.F.R. 70.7 (d)(l)(v). Please note, failing to publish a public notice in the Permit Register is not substantially equivalent to publishing a notice in the Permit Register as required by WAC 17340 l-800 (2)(b)(iii); and failing to provide notice via Ecology's mailing list is not substantially equivalent to providing notification via Ecology's mailing list as required by WAC 173-40 l-800 (2)(c).

Response to I-4-2

Thank you for your comment.

The Approval Order DE18NWP-001 was issued with the mandatory 30-day public comment period per WAC 173-400-171(3). WAC 173-401 public comment period requirements are applicable to Title V Air Operating Permits. Approval Order DE18NWP-001 will be incorporated into the Hanford Site Air Operating Permit upon the next revision and will be available made available for public comment per WAC 173-401-800 at that time.

No change to the permit is required.

Comment I-4-3

Comment 2: The statement "An administrative amendment will be initiated to remove the AW Tank Farm from Approval Order DE05NWP-001 ..." contained in the public comment period announcement, may prove problematic if the referenced "administrative amendment" is to Hanford's Air Operating Permit (AOP). Because this public review is not compatible with requirements of WAC 173-401, the operating permit rule (see Comment I above), removing AW Stack related activities from regulation under Hanford's AOP and 40 C.F.R. 70 while the AW Stack is still an active emissions unit is not permissible. DE18NWP-001 will need to be added to Hanford's AOP concurrent with or before AW Stack-related activities can be removed from DE05NWP-001. To do otherwise would be akin to vacating requirements of WAC 173-40 I and Part 70 as they now apply to AW Stack activities through AOP requirements in order DE05NWP-00I.

Response to I-4-3

Thank you for your comment.

An administrative permit amendment has been initiated to remove AW Tank Farm from Approval Order DE05NWP-001 since the AW Tank Farm is being modified in a separate permit under Approval Order DE18NWP-001. The proposed permit modification to Approval Order DE05NWP-001 is a separate action and will follow applicable public notice requirements per WAC 173-400-171. The two Approval Orders (DE05NWP-001 and DE18NWP-001) will be issued simultaneously to avoid conflicting permit conditions. The two Approval Orders will be incorporated into the Hanford Air Operating Permit upon the next revision.

No change to the permit is required.

Comment I-4-4

Comment 3: Ecology makes several oversights in determining the "worst-case tank headspace concentrations" and worst-case "operating scenarios in regard to permitting purposes", that if left unconsidered, will result in greatly underestimating actual emissions and will further impact the measurements required to determine continuous compliance with the specified emission limits. Specifically, Ecology: • overlooks radionuclides, a class of hazardous air pollutants (HAPs) regulated under section 112 of the Clear.Air Act (CAA), and at Hanford, under 40 C.F.R. 61 subpart H. As a point of fact, the purpose of the Tank Farm tanks is to store radioactive waste resulting from the Manhattan Project and Cold War. It is a consequence of this highly radiogenic emission-generating environment within the tanks that is"... continually generat[es] gases and known and unknown chemical products that are continuously created and destroyed via chemical, thermal, radiocatalytic and radiolytic processes in all layers." This concern is irrespective of which regulatory agency regulates radionuclides at Hanford. An emission-generating environment in constant flux impacts ALL emissions and should be considered when regulating ALL emissions. After all, the public is exposed to ALL emissions contemplated by this order, not just the non-radioactive emissions;

-overlooks that because the emission-generating environment is in constant flux it is a practical impossibility that sampling results are accurate for any significant period of time before or after the samples were taken;

-overlooks that the emission-generating environment where "gases and known and unknown chemical products that are continuously created and destroyed" will never be homogenous and

will never be in steady-state (or in equilibrium). Thus, it is not possible for any particular sample or series of samples to be representative, or for any particular sample or series of samples to be sufficient to demonstrate continuous compliance with any emission limit;

-overlooks the impact on all regulated air pollutants from the huge increases in emissions attributable only to a different "way that [the permittee] estimated potential emissions". For example, the emission limit for ammonia in order DE05NWP-00 I for 241-A W Tank Farm is 2.9 lbs/hr. (Condition approval date 3/26/2013.) The ammonia emission limit in this NOC (DE18NWP-001) is 4.68E+2 lbs/24 hours, or 19.5 lbs/hr. Thus, order DE18NWP-001 increases the ammonia emission limit by 16.6 lbs/hr. or by 672% over the emission limit established under the previous order, DE05NWP-00I. Ecology makes the statement: "It is important to note that the permittee is not modifying their process to where they will be emitting more ammonia, but, instead, the way that they estimated potential emissions is different." Ecology thus attributes the increased ammonia emissions limit of 672% solely to inaccurate past estimates. Ecology can provide no assurance that even this new assumption-based (i.e. ignorance-based) estimated limit is accurate. Emission limits and any resultant monitoring requirements need to be based upon actual emission measurements and not upon past estimates that Ecology acknowledges underestimates emissions of one regulated air pollutant by 672%. Such huge underestimates almost certainly impact all emission limits for all regulated air pollutants.

-overlooks that vaporization rates increase exponentially with temperature, and the rates of increase are different for different HAPs and TAPs. For example, during waste disturbing activities in Tank C-101, mercury emissions increased by more than 900% of the occupational exposure limit (OEL); emissions of n-nitrosodimethylamine (NDMA) increased by more than 2,900% of the OEL; formaldehyde emissions increased by slightly more than 64% of the OEL, and ammonia emissions increased more than 18% of the OEL3. During waste-disturbing activities, it is nearly impossible, if not impossible, that monitoring once per year, or once every 6 months, or once every month will coincide with the maximum vaporization rate for any specific pollutant. Such limited monitoring is not sufficient to ensure continuous compliance with the emission limits. It is also highly unlikely that sampling results contained in the TWINS and SWIHD databases capture the maximum vaporization concentration for any specific chemical or that any multiplier applied to a TWINS or SWIHD datapoint accurately reflects a maximum release rate (maximum vapor pressure) for all pollutants of concern. In his report, Dr. Cole states: "Emission rates are linearly proportional to vapor pressures...at temperatures at or above the boiling point, emissions increase extremely rapidly." Thus, even a miniscule underestimation of any emission will result in a huge increase in the actual emission when tank waste is disturbed. Emission limits and any resultant monitoring requirements need to be based upon actual emission measurements and not upon assumptions (ignorance); and

-overlooks that required abatement technology (BACT or tBACT or BARCT) consisting of a moisture de-entrainer, pre-heater, pre-filters, and a dual HEPA filtration (in-series) system in the treatment train, allows toxic and hazardous vapors and gases to pass through, unabated. There is a trade-off between abatement effectiveness and sampling frequency needed to ensure continuous compliance with the emission limits. With abatement technology that provides zero reduction of vapors and gases (i.e. allows vapors and gasses to freely pass through) continuous monitoring is required to ensure continuous compliance. With more effective control technology, continuous compliance can be demonstrated with something less than continuous monitoring.

Ecology also may have overlooked that 2 of the pollutants of concem (dimethyl mercury and chromium 6) regulated under this NOC (Order DE18NWP-00 1) should be regulated under DE05NWP-001, Rev. 1, as also applicable to AN tank emissions. DE05NWP-001, Rev. 1 (Rev. 1), regulates emissions from the primary tank ventilation exhaust system for each of the 241-AN and 241-A W tank farms. Rev 1 is also an applicable requirement in the most recent renewal of Hanford's AOP. Because Ecology deemed the application for the subject Order complete on January 29, 2019, because Ecology determined there is a need to also specifically regulate emissions of dimethyl mercury and emissions of chromium VI from AW-Tank Farms exhaust stack, because Renewal 3 of Hanford's AOP was not issued until July 15, 2019, and because the previous version of Hanford's AOP did not expire until Renewal 3 was issued, Ecology should have re-opened this AOP to include the 2 additional pollutants of concern. Both WAC 173-401 and 40 C.F .R. 70 provide that a permit shall be re-opened for cause when there is a material mistake "A permit shall be reopened and revised under any of the following circumstances: ... (iii) The permitting authority ... determines that the permit contains a material mistake". [See also 40 C.F.R. 70.7 (f)(iv) and WAC 173-401-730 (l)(d).]

Response to I-4-4

Thank you for your comment.

The Approval Order DE18NWP-001 issued by the Ecology addresses only non-radioactive toxic and criteria pollutants. The Department of Health (DOH) is designated as the state's radiation control agency and has responsibility for administration of the regulatory, licensing, and radiation control provisions as provided in Revised Code of Washington (RCW) 70.98.050(1). DOH has the all the enforcement powers as provided in RCW 70.94.332, 70.94.425, 70.94.430, 70.94.431(1)-(7), and 70.94.235 with respect to emissions of radionuclides, but does not preclude Ecology from exercising its authority under chapter 70.94 (RCW 70.94.422). The Environmental Protection Agency (EPA) has granted DOH partial delegation authority to implement and enforce Subparts A, B, H, I, K, Q, R, T, and W of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) for radionuclide air emissions under the Clean Air Act (EPA-R10-OAR-2006-0001 FRL-8177-2). Ecology has set ambient and general emissions standards for radionuclides under WAC 173-480 and has the authority to issue civil penalties under WAC 173-400-230 and criminal penalties under WAC 173-400-240. WAC 246-247-060 outlines DOH's notice of construction (aka radioactive air emissions licenses [RAELs]) permitting/licensing requirements. WAC 246-247-035 adopts Federal NESHAPs Subparts A, B, H, I, K, Q, R, T, and W by reference. The DOH's licenses for Hanford are contained in RAEL FF-01 which contains all applicable state and federal regulations. The Hanford Air Operating Permit (AOP) incorporates RAEL FF-01, as Attachment 2 per WAC 246-247-060(6), (7), and (8) upon subsequent revisions and renewals to the AOP. DOH has revised the RAEL for emission unit #855 and #856 (296-A-46 and 296-A-47) to address radionuclides emissions related to the new stack height modification from the AW Tank Farm, which will be incorporated into the Hanford AOP Renewal 3 upon a revision.

The source term or potential-to-emit for this discharge point was determined based on highest per tank sample concentration of each pollutant from the double-shell tank and single-shell tank systems located in the 200 West and 200 East available from the Tank Waste Information (TWINS) and Sitewide Industrial Hygiene Database (SWIHD). The source term data submitted for this application consists of samples collected during waste disturbing or non-waste disturbing activities, with the emission rate estimated based upon the highest tank sample

concentration of each pollutant from double-shell tank (DST) and single-shell tank systems located in the 200 West and 200 East Areas. The emission estimate assumes the tank farm is continuously ventilated at maximum capacity, 3,000 cubic feet per minute, at the highest concentration observed from the data per pollutant. Ecology has determined the source term estimate to be an acceptable and conservative approach to determine the potential-to-emit.

The Hanford tank waste is not always in homogeneous form. It can consist as a mixture of solids, sludge's, liquids, organics, radioactive isotopes, and metals. The chemical nature of the tank waste is expected to change with the addition of water, with tank retrievals (mixing of tank waste), with time (through radiolysis), and as water evaporates (PNNL-13781, Rev. 3). As tank waste chemistry changes with the above listed, the tank headspace composition is also expected to change. Likewise, Sections 3.1 will be modified to specify baseline assessment be performed for the following waste disturbing activities 1) operation of a mixing pump, operation of the feed pump to the 242-A-Evaporator, 2) operation of the air lift circulator(s), 3) transfer of tank waste, 4) addition of chemicals for pH adjustment, 5) sluicing, and 6) water additions greater than 72,000 gallons. If the baseline assessment results for a particular waste disturbing activity are under the established emission limit, then it could be reasonably assumed that emissions from that particular activity will meet the established emission limits in the future. Section 3.2 of Approval Order DE18NWP-001 mandates that sampling be conducted during all waste disturbing activities defined in 1.2.3.1, which are thought to be under non-steady state or non-homogeneous conditions and representative of the worst-case scenario. Section 3.2 provides for emissions assessments to be conducted a various compliance intervals. Section 3.2.1 of the Approval Order is modified to increase TAP emissions from annually to quarterly as described below. Ecology feels the appropriate level of emissions monitoring is now provided for in Approval Order DE18NWP-001.

Ecology does not consider the current or previous estimate of potential emissions to be inaccurate or underestimated. Previous source term estimates (potential-to-emit) were based on data available at the time of permit processing. Since the original Approval Order DE05NWP-001 was issued, more data surrounding the source term has become available which is reflected in the new emission estimates under Approval Order DE18NWP-001. Ecology has determined the methodology used to determine the source term to be an acceptable and conservative approach to determine the potential-to-emit. The permittee is not modifying their process to where they will be emitting more pollutants, but, instead, the way that they estimated potential emissions is different.

The permittee submitted a Best Available Control Technology for Toxics (tBACT) analysis which followed the EPA's top down method. The evaluation determined the only cost effective controls are the operation of tank ventilation exhauster system with a moisture de-entrainer, pre-heater, pre-filters, and a two-stage High Efficiency Particulate Air (HEPA) filtration system in service in the treatment train. The tBACT for this project also provides Best Available Radionuclide Control Technology (BARCT) which was determined by DOH to meet WAC 246-247-060(2)(b).

As can be seen in Antoine's equation below, the vapor pressure (P_v) is exponentially related to temperature.

$$P_V = 10^{\left(A - \frac{B}{T_W + C}\right)}$$

where: T_W = the temperature of the tank waste

A, B, and C = constants

As can be seen in the mass balance equation below, the emission rate (W) is linearly proportional to the vapor pressure.

$$W = K_L * A * P_V * \left[\frac{MW}{R * T_H}\right]$$

where: K_L = overall mass transfer coefficient

A = cross sectional area of the tank

MW = molecular weight of toluene

R = universal gas constant

T_H =temperature of the tank headspace

Antoine's equation is substituted in for the vapor pressure in the equation above and presented below.

$$W = K_L * A * 10^{\left(A - \frac{B}{T_W + C}\right)} * \left[\frac{MW}{R * T_H}\right]$$

The resultant effects that the minimum and maximum tank waste and headspace temperatures has on the emission rate can be compared through the percent change in emission rate which is presented below. Where W_1 and W_2 are the respective emission rates at minimum and maximum headspace and tank waste temperatures presented in Table 2 below.

$$\%\ change\ in\ emission\ rate = \left[\frac{W_2 - W_1}{W_1}\right] * 100\%$$

The above equation reduces to the equation below, when substituting and cancelling out like terms for the overall mass transfer coefficient, cross sectional area (assuming the cross-sectional area in a specific farm is identical), universal gas constant, and molecular weight.

$$\%\ change\ in\ emission\ rate = \left[\frac{\left(\left(\frac{1}{T_{H2}}\right) * 10^{\left(A-\frac{B}{T_{W2}+C}\right)} - \left(\frac{1}{T_{H1}}\right) * 10^{\left(A-\frac{B}{T_{W1}+C}\right)}\right)}{\left(\frac{1}{T_{H2}}\right) * 10^{\left(A-\frac{B}{T_{W2}+C}\right)}}\right] * 100\%$$

where: T_{H2} = maximum tank headspace temperature

T_{H1} = minimum tank headspace temperature

T_{W2} = maximum tank waste temperature

T_{W1} = minimum tank waste temperature

The ten year (2008-2019) data presented in the Tank Farm Explorer (from SWIHDS Database) indicates the respective AW tank's waste and headspace temperatures fluctuated (sinusoidally) between minimum and maximum values provided in Table 2 below. As an example, the resultant effect these temperature ranges has on the emission rate was calculated for Toluene using the equation above, for which the percent change in the emission rate is also presented in Table 2 below. The constants (A, B, and C) used for Toluene are presented below in Table 1 (https://webbook.nist.gov/cgi/cbook.cgi?ID=C108883&Mask=4&Type=ANTOINE&Plot=on).

Table 1.

Temperature Range (K)		A	B	C
273.13	297.89	4.23679	1426.448	-45.957
303	343	4.08245	1346.382	-53.508
420	580	4.54436	1738.123	0.394
308	384	4.14157	1377.578	-50.507

Table 2

Tank	Tank Waste Temperature (F)		Tank Headspace Temperature (F)		Percent change in emission rate
	Min (T_{W1})	Max (T_{W2})	Min (T_{H1})	Max (T_{H2})	
AW-101	70	98	65	108	101 %
AW-102	57	104	45	102	240 %
AW-103	57	76	53	78	69 %
AW-104	67	80	30	162	15 %
AW-105	55	83	42	88	110 %
AW-106	64	114	61	94	**268 %**

As can be seen the resultant effect the temperature has on the emission rate could vary depending on inherent tank waste and headspace temperatures with the largest percent change emission rate being 268%.

Likewise, as another example, the minimum and maximum AW Tank Farm headspace and source concentrations from the SWIHDS database for Toluene are presented below in Table 3. The percent change in concentration is calculated using the equation below for which the results is also presented in Table 3.

$$percent\ change\ in\ concentration = \left[\frac{C_{Max} - C_{Min}}{C_{Min}}\right] * 100\%$$

Table 3.

AW Tank Farm Concentration (ppm)		Percent change in concentration
Min, (C_{Min})	Max, (C_{Max})	
0.000562	0.002765	**392 %**

As can be seen, the toluene concentration is also variable (392%). It is important to note, the variability is on the same order of magnitude as would what would be expected in from any fluctuations in the emission rate (268%) due to temperature variations which affect the vapor pressure as described above. Therefore, Ecology believes the worst case tank headspace concentrations used for the source term captures this variability and considers this to be an acceptable and conservative approach to determine the potential-to-emit. Tank headspace concentrations would also see some variation depending on the volume of the tanks and at the time of respective sampling.

As 'waste disturbing activities' are thought to potentially increase the potential to emit, Sections 3.2.1, 3.2.2, 3.2.3, and 3.2.4 of the Approval Order specifies that emission assessments be performed during waste disturbing activities, which are defined in the Approval Order, when possible. Also, Section 3.1 specifies a baseline assessment be conducted within 90 days of commencement of operations to verify the emissions estimate submitted in the application, which is to be performed during defined waste disturbing activities, when possible.

Additional language will also be added to the final DE18NWP-001 Approval Order, under Section 3.1 Baseline Assessment, to specify that a one-time baseline assessment shall also be conducted for each of the following waste disturbing activities: 1) operation of a mixing pump, operation of the feed pump to the 242-A-Evaporator, 2) operation of the air lift circulator(s), 3) transfer of tank waste, 4) addition of chemicals for pH adjustment, 5) sluicing, and 6) water additions greater than 72,000 gallons. This additional sampling will help verify that any fluctuations in emissions from these activities are within permitted emission limits. Section 3.1 will be modified accordingly as follows:

3.1 Baseline Assessment

An initial baseline assessment shall be conducted within ninety (90) days after commencement of operations of the AW Tank Farm exhauster at the new stack height. Additional baseline assessments shall be conducted upon the respective commencement of

the on the following waste disturbing activities: 1) operation of a mixing pump, operation of the feed pump to the 242-A-Evaporator, 2) operation of the air lift circulator(s), 3) transfer of tank waste, 4) addition of chemicals for pH adjustment, 5) sluicing, and 6) water additions greater than 72,000 gallons, until a baseline assessment has been conducted for every above listed waste disturbing activity. When reporting baseline assessment results, it shall be required to report under which tank waste conditions or waste disturbing activity for which the samples were obtained. Analytical methods for the analyses shall be the Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), or National Institute for Occupational Safety and Health (NIOSH) approved, or by an Ecology approved equivalent method. The analytical results along with the percent difference to Table 1 concentrations [(Sampled Baseline Concentration – Table 1 Concentration)/Table 1 Concentration] shall be reported.

3.1.1 TAP Baseline

Baseline assessments shall be conducted on the three TAPs identified from Table 1 with the highest potential ambient concentration relative to their ASILs of WAC 173-460-150, in addition to Chromium Hexavalent, Dimethyl Mercury, and Ammonia. The selection of TAPs shall be based upon best engineering judgement and most current tank data. For each assessment, three samples of the vapor/gas shall be taken and analyzed for each of the three TAPs selected.

3.1.2 Dimethyl Mercury

Baseline assessments shall be conducted on Dimethyl Mercury. For the each assessment, three samples of the vapor/gas shall be taken and analyzed.

3.1.3 Chromium Hexavalent Baseline

Baseline assessment shall be conducted on Chromium Hexavalent. For the each assessment, three samples of the vapor/gas shall be taken and analyzed.

3.1.4 Ammonia

Baseline assessment shall be conducted on Ammonia. For the each assessment, three samples of the vapor/gas shall be taken and analyzed. The use of Draeger tubes or Direct Reading Instrument (DRI) is allowed for the baseline assessment.

Section 3.2.1 will also be modified to increase TAP emission assessments from annually to quarterly.

3.2.1 TAPs Emissions Assessment

TAP emissions assessments shall be performed quarterly from the AW Tank Farm exhaust system. The permittee shall develop and implement a SAP that addresses quaterly sampling of TAPs from the AW Tank Farm exhauster system on a calendar year basis. A calendar year runs from January 1 to December 31. The SAP shall address the emissions of a minimum of three TAPs with the highest potential ambient concentration relative to their ASILs of WAC 173-460-150, in addition to Dimethyl Mercury, Chromium Hexavalent, and Ammonia. The TAPs addressed shall be identified from Table 1 and based upon best engineering judgement and most current tank content data. The SAP must be submitted to Ecology before sampling occurs and also upon subsequent revisions. Ecology reserves the right to provide comments or corrections to the SAP. Analytical methods for the analysis

shall be Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), or National Institute for Occupational Safety and Health (NIOSH) approved, or by an Ecology approved equivalent method. Contemporaneous stack flow rate and temperature will be applied with the stack gas concentration to report TAP emissions in terms of pounds per averaging period as listed in WAC 173-460-150. These values/measurements shall be assessed and compared against their respective ASIL to demonstrate compliance with Approval Condition 1.1.2.

Quarterly sampling for TAPs shall be collected during waste disturbing activities. If waste disturbing activities do not occur during the sampling timeframes, the quarterly sampling for TAPs shall then be collected during quiescent tank conditions and justification shall be provided. When reporting results, it shall be required to report tank waste conditions (quiescent or disturbed) at the time sampling of exhaust emissions was conducted.

The permit will be modified as outlined above.

Ecology feels the above sampling protocol will allow for reasonable assurance of compliance with the established emission limits and regulations.

Based on the above explanations, Ecology's feels that the data used in the source term is valid, the assumptions used to estimate the emission rate are conservative, and the emission limits and conditions provided in the final determination (Approval Order) will maintain levels of air quality that protect human health and safety per RCW 70.94.011 and will allow for reasonable assurance of compliance with the established emission limits and regulations.

The Approval Order conditions will be incorporated the Hanford AOP at the next revision or renewal in accordance with WAC 173-401.

References

Stewart, C.W., Huckaby, J.L., Meyer, P.A., (2002). Effects of Globally Waste-Disturbing Activities on Gas Generation, Retention and Release in Hanford Waste Tanks. PNNL-13781 Rev. 1, Pacific Northwest National Laboratory, Richland, WA.

https://webbook.nist.gov/cgi/cbook.cgi?ID=C108883&Mask=4&Type=ANTOINE&Plot=on

Comment I-4-5

Comment 4: There is no question the federal radionuclide air emission requirements of 40 C.F.R. 61 subpart H apply to activities contemplated by this NOC Order (DE18NWP-001); yet, the application offered to the public for review doesn't address this federal requirement. Washington Administrative Code (WAC) 173-400 doesn't allow the permittee to overlook emissions to be emitted by the proposed modification in its application, independent of whether Ecology chooses to enforce the federal radionuclide air emission requirements. "At a minimum, the application must provide information on the nature and amounts of emissions ... increased as part of a modification..." (emphasis is mine) WAC 173-400-111 (l)(b) An increase in emissions of radionuclides cannot be avoided during activities covered by this NOC Order, yet the permittee's application offered to the public for review overlooks radionuclides. WAC 173-400-1 l l (l)(b), which defines a complete application, has been incorporated into Washington State's State Implementation Plan (SIP). (See 79 Fed. Reg. 59,653, 59,654-655 (Oct. 3, 2014)) Washington's SIP is an "applicable requirement" as defined under 40 C.F.R. 70.2. Because the requirement to submit a complete application containing the nature and amounts of all expected emissions

(including all expected emissions of radionuclides addressed by 40 C.F.R. 61 subpart H), has been incorporated into Washington's SIP, WAC 173400-111 (1)(b) is federally enforceable pursuant to 40 C.F .R. 70.6 (b). As a federally enforceable requirement in Washington State's SIP, any deficiencies to address relevant federally-regulated emissions in the application is challengeable at the federal level.

Response to I-4-5

Thank you for your comment.

The Approval Order DE18NWP-001 issued by Ecology addresses only criteria and toxic air pollutants. DOH is designated as the state's radiation control agency and has responsibility for administration of the regulatory, licensing, and radiation control provisions as provided in RCW 70.98.050(1). DOH has the all the enforcement powers as provided in RCW 70.94.332, 70.94.425, 70.94.430, 70.94.431(1)-(7), and 70.94.235 with respect to emissions of radionuclides, but does not preclude Ecology from exercising its authority under chapter 70.94 (RCW 70.94.422). EPA has granted DOH partial delegation authority to implement and enforce Subparts A, B, H, I, K, Q, R, T, and W of the NESHAPs for radionuclide air emissions under the Clean Air Act (EPA-R10-OAR-2006-0001 FRL-8177-2). Ecology has set ambient and general emissions standards for radionuclides under WAC 173-480 and has the authority to issue civil penalties under WAC 173-400-230 and criminal penalties under WAC 173-400-240. WAC 246-247-060 outlines the DOH's notice of construction (aka radioactive air emissions licenses [RAELs]) permitting/licensing requirements. WAC 246-247-035 adopts Federal NESHAPs Subparts A, B, H, I, K, Q, R, T, and W by reference. DOH's licenses for Hanford are contained in RAEL FF-01 which contains all applicable state and federal regulations. The Hanford Air Operating Permit (AOP) incorporates RAEL FF-01, as Attachment 2, into the AOP per WAC 246-247-060(6), (7), and (8) upon subsequent revisions and renewals to the AOP.

DOH has revised the RAEL for emission units #855 and #856 (296-A-46 and 296-A-47) to address radionuclides emissions from the AW Tank Farm at the new stack height and have determined the appropriate level of BARCT and ALARACT demonstration under WAC 246-247-060(1)(b). Therefore, Ecology has determined the requirements for radionuclides emissions under Subpart H from the AW Tank Farm have been addressed and the application complete.

No change to the permit is required.

Comment I-4-6

Comment 5: Finding 17 on page 2 ofthe draft Order states, in part: "The requirements for federally enforceable requirements of 40 Code of Federal Regulations (CFR) 61, subpart H are contained in Radiological Air Emission License(s) (RAELs) issued by the Washington State Department of Health...". There is no question radionuclides comprise part of the emissions from activities addressed by this NOC, yet the additive or synergistic impact from the combination of radionuclide and non-radionuclide emissions is not evaluated. While state law allows the regulation of radionuclide emissions and the regulation ofnon-radionuclide emissions by separate agencies under separate regulatory authorities, doing so results in underestimating the total risk to the public. For the purpose ofan accurate assessment o frisk to the public from this project, Ecology should consider the impact from all emissions expected by this project. Ecology does

have all necessary authority to regulate radionuclides under federally-enforceable paragraphs of WAC 173-400, Ecology merely chooses to defer to Health's authority.

Set conditions and limits for activities covered by this NOC order based on total expected risk from all emissions. If Ecology follows its own EPA-approved regulation, WAC 173-400111 (I)(b), then Ecology would have enough information regarding all emissions expected from this project, and therefore, all emission information needed to evaluate total risk to the public from both non-radionuclide emissions and radionuclide emissions. Which agency regulates radionuclide emissions at Hanford should be decoupled from ascertaining total risk from all anticipated emissions. An "ample margin of safety to protect public health" cannot be established absent consideration of the total risk resulting from all HAPs emitted from a source. [CAA § 112 (f)(2)]

Response to I-4-6

Thank you for your comment.

The Approval Order DE18NWP-001 issued by Ecology addresses only criteria and toxic air pollutants. DOH is designated as the state's radiation control agency and has responsibility for administration of the regulatory, licensing, and radiation control provisions as provided in RCW 70.98.050(1). DOH has revised the Radioactive Air Emission License (RAEL) for emission unit #855 and #856 (296-A-46 and 296-A-47) to address radionuclides emissions under Subpart H from the AW Tank Farm at the new stack height.

Regulating non-radioactive emissions and radioactive emissions separately has no effect in estimating the total risk in the federal or state Clean Air Acts. Neither state not federal regulations account for synergistic effects of compounds emitted together for established emission levels. Instead, individual constituents have a compound specific established emission level that is allowed and within acceptable limits. Since all non-radioactive and radioactive emissions are evaluated on an individual pollutant basis in state and federal regulation, identifying the risk separate approval orders and RAELs results in the same estimate of total risk. The Approval Orders and issued by Ecology and the RAELs issued by DOH have followed the applicable state and federal regulations to permit the emission of respective regulated pollutants.

Furthermore, radiological components in sufficient quantity to create appreciable synergistic effects with chemicals are only present together in the single shell and double shell mixed waste tanks and related tank waste streams at Hanford. The underlying requirements (e.g. notice of construction approval orders and radiological air emission licenses) for discharge locations emitting Hanford tank waste utilized tank head space samples for determining the source term. Thus, the samples collected and used in the permitting process have already accounted for these potential synergistic interactions.

Additionally, once toxic and radioactive emissions leave the discharge location (e.g., the stack), any appreciable contamination that releases radiation to synergistically interact with vapors is captured on the HEPA filters required by the RAEL and the Approval Order.

No change to the permit is required.

Comment I-4-7

Comment 6: Condition 1.1.2 reads, in part: "All TAPs, as found in Table l ofthis order, shall be below their respective ASlL. .." There are more than 100 TAPs listed in Table I. Condition 2.4 states, in part: "Identification of any TAP not previously identified within the NOC Application emissions estimate shall be submitted to Ecology within ninety (90) days of completion of laboratory analyses .. " Condition 3 .1.1 states, in part: "For the assessment, three samples of the vapor/gas shall be taken and analyzed for each of the three TAPs selected." Condition 3.2.1 states, in part: "The SAP shall address the emissions of a minimum of three TAPs with the highest potential ambient concentration relative to their ASILs of WAC 173-460-150 excluding Dimethyl Mercury, Chromium Hexavalent, and Ammonia."

a) From a table containing more than 100 TAPs it is not possible to comply with the requirement that "All TAPs, ... shall be below their respective ASIL" when only 3 TAPs are sampled for, in addition to "Dimethyl Mercury, Chromium Hexavalent, and Ammonia". Either revise the condition to require sampling for 3 specific TAPs in addition to Dimethyl Mercury, Chromium Hexavalent, and Ammonia, or revise the sampling requirement to assure "All TAPs in Table l are below their respective ASIL." Any sampling must be sufficient to assure continuous with the sampling condition.

b) As used in Condition 1.1.2, the term "ASIL" is a limit, i.e. a value not to be exceeded. ("All TAPs, . .. shall be below their respective ASIL.") As limits, all the ASILs in Table I and their respective values will need to be incorporated into Hanford's AOP along with other terms and conditions from DE18NWP-001 needed to ensure compliance with terms and conditions in this order. In CAA § 504(a) [42 U.S.C. 7661c (a)] Congress specified 'that each permit "shall include enforceable emissions limitations and standards" and "such other conditions as are necessary to assure compliance with the applicable requirements.' (emphasis added) CAA § 504(a) [42 U.S.C. 7661c (a)]. EPA and Ecology echo this statement in 40 C.F.R. 70.6 (a)(I) and in WAC 173-401-605 (I). Case law informs that even the courts aren't permitted to substitute their own definition of a word for one enacted by Congress.

"When Congress makes such a clear statement as to how categories are to be defined and distinguished, neither the agency nor the courts are permitted to substitute their own definition for that of Congress, regardless of how close the substitute definition may come to achieving the same result as the statutory definition, or perhaps a result that is arguably better." AK Steel Corp. v. United States, 226 F.3d 1361, 1372 (Fed. Cir. 2000). (See also, "When a word is undefined, courts regularly give that term its ordinary meaning." Whitfield v. United States, 125 S. Ct. at 691 (2005)).

It thus appears the words "shall include" used by Congress means "shall include" and not "shall reference" or "shall include by reference". Ecology's reliance on referencing other documents where emission limits can be located, is not consistent with either the clear statement of Congress or with applicable case law. It is thus incumbent upon Ecology to revise its standard template for orders issued pursuant to WAC 173-400 to be more Part 70 friendly, in part, by actually including the enforceable emission limits, as required by law.

Response to I-4-7

Thank you for your comment.

Approval Condition 1.1.2 states: "All TAPs, as found in Table 1 of this order, shall be below their respective ASIL or approved through a Second Tier review." The State of Washington provides Acceptable Source Impact Limits (ASILs) in WAC 173-460-150, which are values not to exceeded (WAC 173-460-080) except as provided by Second Tier Review (WAC 173-400-090). Therefore, Approval Condition 1.1.2 is more of a general standard in this regard. Separate and specific conditions (limits) for TAPs from WAC 173-460-150, as identified in Table 1, are provided for Dimethyl Mercury and Chromium (VI) in Approval Conditions 1.1.3 and 1.1.4 respectively as the unabated emissions are above the respective ASIL. The abated emissions of Chromium are below the ASIL and the emissions of Dimethyl Mercury are approved through Second Tier review (RPP-ENV-59016, Rev.1). Emissions of Ammonia are not above the ASIL but the compliance condition is carried over from the previous Approval Order DE05NWP-001.

Compliance demonstration for Approval Condition 1.1.2 is provided in Section 1.3.1 and 1.3.3. Compliance demonstration 1.3.3 states: "Compliance with Approval Condition 1.1.2 shall be demonstrated by stack sampling as described in Section 3.2 for TAPs and applying these concentration readings with contemporaneous stack flow rate and temperatures to determine the mass release rate of these TAPs in pounds and their respective release rate averaging times in WAC 173-460-150." Section 3.2.1 states: "TAP emissions assessments shall be performed quarterly from the AW Tank Farm exhaust system. The permittee shall develop and implement a SAP that addresses quaterly sampling of TAPs from the AW Tank Farm exhauster system on a calendar year basis. A calendar year runs from January 1 to December 31. The SAP shall address the emissions of a minimum of three TAPs with the highest potential ambient concentration relative to their ASILs of WAC 173-460-150, in addition to Dimethyl Mercury, Chromium Hexavalent, and Ammonia. The TAPs addressed shall be identified from Table 1 and based upon best engineering judgement and most current tank content data. The SAP must be submitted to Ecology before sampling occurs and also upon subsequent revisions. Ecology reserves the right to provide comments or corrections to the SAP. Analytical methods for the analysis shall be Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), or National Institute for Occupational Safety and Health (NIOSH) approved, or by an Ecology approved equivalent method. Contemporaneous stack flow rate and temperature will be applied with the stack gas concentration to report TAP emissions in terms of pounds per averaging period as listed in WAC 173-460-150. These values/measurements shall be assessed and compared against their respective ASIL to demonstrate compliance with Approval Condition 1.1.2." Section 3.2.1 allows for tracking of TAPs with the highest potential ambient concentration relative to their ASIL to ensure compliance with WAC 173-460-150, to determine if a new-new source review, as provided in WAC 173-460-040 would be necessary, and also to determine if the appropriate level of abatement control/tBACT is being provided.

Ecology only specified the sampling of 3 TAPs with the highest potential ambient concentration relative to their ASIL as it is acknowledged that developing approved methods and having analyticval standards for all TAPs listed in Table 1 would come at high cost without the added benefit. Given the nature of the tank chemistry and operations, it can reasonably be assumed that if the three TAPs selected and analyzed are below their ASIL then the other TAPs in Table 1 would also fall below. It would be the duty of Ecology inspectors when reviewing the SAP to ensure best engineering judgement is being applied in the selection of the three TAPs. The

permittee is also required to report any exceedance of TAPs above the ASIL as specified in Section 2.4. Ecology also reserves the right to perform their own independent verification sampling. Section 2.3, #9 provides the record keeping requirement for the SAPs.

No change to the permit is required.

Comment I-4-8

Comment 7: The emission limit for ammonia in order DE0SNWP-001 for 241-AW Tank Farm is 2.9 lbs/hr. (Condition approval date 3/26/2013.) The emission limit for ammonia in this NOC is 4.68E+2 lbs/24 hours, or 19.5 lbs/hr. Thus, order DE18NWP-001 increases the emission limit for ammonia by 16.6 lbs/hr. above the emission limit under the previous order, DE05NWP-00 1. Such an increase exceeds the definition of an "administrative amendment", as codified in WAC 173-401-720 (I) and 40 C.F.R. 70.7 (d)(l), given the current public review isn't substantially equivalent with the process required by either WAC 173-401 or Part 70.

Response to I-4-8

Thank you for your comment.

Emissions of ammonia are below the ASIL. Ammonia monitoring is maintained from the previous permit DE05NWP-001 but at the new established emission limit. DE18NWP-001 was not presented to the public as an administrative amendment under WAC 173-400-171(2) but was issued with the mandatory 30-day public comment period per WAC 173-400-171(3).
WAC 173-401 public comment period requirements are applicable to the Hanford Title V Air Operating Permit. DE18NWP-001 will be incorporated into the AOP upon the next revision and will be available made available for public comment per WAC 173-401-800 at that time.

No change in the permit is required.

Comment I-4-9

Comment 8: In the current version of Hanford's AOP (Renewal 3, issued on July 15, 2019) there appears to be no regulation of dimethyl mercury emissions, or chromium VI emissions from AW-Tank Farms. Only visible emissions, emissions of TAPs ("as shown in Table 2 ofApproval Order DEOSNWP-001, Rev I. and Amd A,"), and ammonia emissions are addressed in Renewal 3 for AW Tank Farm. Adding 2 (two) previously unaddressed hazardous air pollutants to the allowable emissions for AW-Tank Farm emissions seems to exceed the scope of an administrative amendment under either Part 70 or WAC 173-401.

Response to I-4-9

Thank you for your comment.

Ecology issues approval orders with the current applicable regulations established at the time of processing. Dimethyl mercury and chromium hexavalent are toxic air pollutants (TAPs) currently listed in WAC 173-460-150; likewise, they are included in Approval Order DE18NWP-001. Approval Order DE18NWP-001 was not presented to the public as an administrative amendment under WAC 173-400-171(2) but was issued with the mandatory 30-day public comment period per WAC 173-400-171(3). WAC 173-401 public comment period requirements are applicable to Title V Air Operating Permits (AOPs). Conditions from Approval Order DE18NWP-001 will be incorporated into the AOP upon the next revision and will be made available for public comment per WAC 173-401-800 at that time.

No change to the permit is required.

Comment I-4-10

Comment 9: Assessment for compliance with emission limits for TAPs is to occur annually. (Approval condition 3.2.1) Assessment for compliance with emission limits for the dimethyl mercury emission limit is to occur monthly. (Approval condition 3.2.2) Assessment for compliance with the chromium VI emission limit is to occur annually, and assessment for compliance with the ammonia emission limit is to occur every 6 months. (Approval conditions 3.2.3 & 3.2.4) Emission limits for TAPs are expressed in g/s, or lbs/hr., or lbs/24-hr, or lbs/year. (See NOC Table 1.) The emission limit for dimethyl mercury is expressed in units of g/s or lbs./24-hrs. (Approval condition 1.1.3) The emission limits for Chromium VI and ammonia are also expressed in units ofg/s or lbs./24-hrs. (Approval conditions 1.1 .4 & 1.1.5) An accurate measurement taken once per year, or once per month, or once every 6 months to accurately assess compliance with emission limits expressed in g/s, or in lbs./24-hours, or in lbs./year can only occur if the environment sampled is homogenous and in steady state (in equilibrium) at all times. Require the contents of the AW Tanks to be homogenous and in steady state along with appropriate compliance demonstration requirements. Absent a homogenous sampling environment in steady state (in equilibrium), continuous compliance with emission limits expressed in units of g/s, or in units of lbs./hr., or in units of lbs./24-hours can only be assured via continuous monitoring. Require continuous compliance with the required emission limits, in addition to appropriate compliance verification requirements.

Response to I-4-10

Thank you for your comment.

The Hanford Site tank waste is not a homogenous waste form. It is a mixture of solids, sludges, liquids, vapor pockets, solvents, radioactive isotopes, metals, and other chemicals. It is impractical for Ecology to require the permittee to alter their process to reach a homogeneous and steady-state desired effect. Instead, Ecology can set permit conditions accordingly around their existing process so that emission limits will be protective of human health and safety and allow for demonstration of continuous compliance. Likewise, Sections 3. will be modified as described in response to comment I-4-4. If the baseline assessment results for a particular waste disturbing activity are under the established emission limit, then it could be reasonably assumed that emissions from that particular activity will meet the established emission limits in the future. Section 3.2 of Approval Order DE18NWP-001 mandates that sampling be conducted during all waste disturbing activities defined in 1.2.3.1, which are thought to be under non-steady state or non-homogeneous conditions and representative of the worst-case scenario. Section 3.1 provides for a baseline assessment to be conducted for every waste disturbing activity defined in the permit. If the baseline results for a particular waste disturbing activity are under the established emission limit, then it could be reasonably assumed that emissions from that particular activity will meet the established emission limits in the future. Section 3.2 provides for emissions assessments to be conducted a various compliance intervals. Section 3.2.1 of the Approval Order is modified to increase TAP emissions from annually to quarterly as described in response to comment I-4-4. Ecology feels the appropriate level of emissions monitoring is provided for in Approval Order DE18NWP-001.

No change to the permit is required.

Comment I-4-11

Comment 10: Approval condition 1.2.3 specifies that "[a]t no time shall more than two of the six tanks in the 241-AW Tank Farm be under waste disturbing activities." However, the recordkeeping requirement in approval condition 2.3 at number 8 only requires "[o]perational records sufficient to determine the onset and cessation of waste disturbing activities ...". The required operational records should also include records showing operation start and stop times for each tank exhauster in order to verify that no more than 2 of the 6 exhausters are under waste disturbing activities. Add records showing operation start and stop times for each exhauster as a requirement to demonstrate compliance with approval condition 1.2.3.

Response to I-4-11

Thank you for your comment.

This tank farm has two exhausters in parallel connected to six tanks through a single manifold. Only one exhauster operates at a given time in the AW Tank Farm. A second exhauster is provided as a backup. The recordkeeping requirement of Approval Order DE18NWP-001, Section 2.3, item 8 provides for generation of operation records sufficient to determine the onset and cessation of waste disturbing activities for the AW Tank Farm in order to demonstrate compliance with Approval Condition 1.2.3.

The permit will be amended to include clarification that onset and cessation are stop and start times as provided below.

Section 2.3, item 8 will be modified to state, "Operational records sufficient to determine the onset and cessation (start and stop times) of waste disturbing activities for the AW Tank Farm used to demonstrate compliance with Approval Condition 1.2.3."

The permit will be modified as outlined above.

O-1: WASHINGTON RIVER PROTECTION SOLUTIONS, LLC

Comment O-1-1

1. Condition 1.1 Emission Limits
a. 1.1.4 Chromium(VI) (CAS# 18540-29-9) abated emissions shall not exceed 8.73E-04 g/s or 6.06 pounds per year (lbs/year).

Comment: There is a typo in this condition. The scientific notation E+01 was dropped from the chromium(VI) lbs/year emission rate. The rate should be 6.06E+01 lbs year as listed in Table 1 of this draft permit.

Response to O-1-1

Thank you for your comment.

Condition 1.1.4 will be corrected for the typo.

The permit will be modified as follows:

> *1.1.4 Chromium (VI) (CAS#18540-29-9) abated emissions shall not exceed 8.73E-04 g/s or 6.06E+01 pounds per year.*

Comment O-1-2

2. Condition 2.4 Reporting:

a. Any failures, outages or other adverse conditions of tBACT abatement control technology used to comply with Approval Condition 1.2.1 shall be reported to Ecology within 24 hours.

Comment: WRPS is asking the proposed timeframe for reporting this condition reflect language used to notify WDOH on upset and shutdown/loss of abatement technology. This would then align with the third part of Condition 2.4, Reporting: "Any notifications being submitted to the Washington Department of Health in regards to emission units 296-A-46 and 296-A-47, as part of Radioactive Air Emissions License, shall also be submitted to Ecology." The timeframe to report similar occurrences to WDOH is to report within 24 hours or by the close of the next business day.

Response to O-1-2

Thank you for your comment.

Section 2.4 of the Approval Order will be modified as follows to reflect DOH notifications time-frames.

> *Any failures, outages, or other adverse conditions of tBACT abatement control technology used to comply with Approval Condition 1.2.1 shall be reported to Ecology within 24 hours or by the close of the next business day, whichever comes later.*

Comment O-1-3

3. Condition 3.2.2 Dimethyl Mercury Emission Assessment:

a. Dimethyl mercury emissions shall be assessed monthly from the AW Tank Farm exhaust system.

b. The permittee shall develop and implement a SAP that addresses monthly sampling of dimethyl mercury from the AW Tank Farm exhauster system.

c. Monthly sampling for dimethyl mercury shall be collected during waste disturbing activities.

d. If waste disturbing activities do not occur during the month, the monthly sampling for dimethyl mercury shall then be collected during quiescent tank conditions and justification shall be provided.

Comment: WRPS is asking for the proposed sampling frequency of dimethyl mercury to be changed from monthly to biannual (once every 182 days).

WRPS is asking for this change based on the following considerations:

• Dimethyl mercury sample media is light and moisture sensitive after sampling so it must be wrapped in aluminum foil and undergo a specific drying process on the same day of sampling, which means samples cannot be refrigerated and sent the next day. This is further complicated by the current operational approach involving the transfer of waste which seeks to minimize to the extent possible worker exposure by performing transfers on backshift or weekends

• As of mid-June, only one laboratory currently processes dimethyl mercury samples (Eurofins)

• As of mid-June, there is a 3-week waiting period from Eurofins to receive sample media

• Proposed language and changes to limits of WAC 173-460-150 are being considered for adoption by Ecology that change the limits of dimethyl mercury; the total amount of dimethyl mercury for this NOC is 2.83E-06 g/s, which is 0.0277% of the total allotted dimethyl mercury emissions allowed under the Second Tier Review (RPP-ENV-59016, Rev.1) from defined sources. The Second Tier Review concluded, "hazard indices indicate that DMM and other neurotoxin emissions from the Hanford Site should not pose any threat to the public." This conclusion was supported by the acceptance of the Second Tier Review by the Washington Department of Ecology Air Quality Program.

• Avoidance of another permitting effort upon issuance/effective date of the changes currently proposed for WAC 173-460-150; thereby making better use of government resources and public tax dollars

Response to O-1-3

Thank you for your comment.

Ecology finds the considerations for the request to decrease dimethyl mercury sampling from monthly to biannually do not provide good cause as to why dimethyl mercury emissions assessments cannot be performed monthly. Ecology issues approval orders with the current applicable regulations established at the time of processing.

No change to the permit is required.

O-2: HANFORD CHALLENGE

Comment O-2-1

Comment 1: Hanford Challenge supports raising the stack heights at all tank farm emission points in order to displace harmful toxic vapors away from workers. However, this is not a solution to the toxic vapor problem, may not protect public health and safety insofar as co-located workers and visitors could be impacted, and should not be seen as such by the State of Washington. Hanford should be required to capture and treat toxic vapor emissions from the tanks in order to guarantee protection of human health and safety. Dispersion of these toxic vapors is not a solution.

Hanford's underground storage tanks contain over 56 million gallons of mixed radioactive and chemical waste left over from plutonium production at the site beginning in the 1940s.

Wastes within the tanks consist of different phases of solids, liquids, and sludge, as well as vapors emitted from those wastes. Vapors collect in the head space of the tanks and within the liquids, solids, and sludge. In the older, single-shell tanks, the vapors are passively vented through pipes called "risers." The double-shell tanks use pumps to actively ventilate vapors through exhaust stacks. Numerous other sources and pathways exist for vapors to escape the tanks, including concrete pits with open floor drains, mounted instrumentation, and wire conduits. Occasionally, given the right atmospheric and waste and other conditions, or when the waste in the tanks is disturbed, the tanks "burp"—i.e., they emit a large volume of toxic vapors at once.

The vapors escaping from the tanks contain many toxic chemicals, including dimethyl mercury, n-nitrosodimethylamine, ammonia, volatile organic compounds, nitrous oxide, butanol, furans,

and many others. In sufficient concentrations, these toxic chemicals are known to cause cancer, liver damage, lung damage, eye and skin irritation, and even brain and neurological damage.

The chemical vapors known to be present in the tanks constitute a serious health risk to humans. Chemicals such as butanol, ammonia, n-nitrosodimethylamine, methyl vinyl ketone, and others have been measured in the tanks at levels sufficient to cause respiratory tract irritation and potentially more severe effects. As a mixture, these chemicals may be even more toxic because of an additive or synergistic effect if breathed by a worker than they are individually. Neither Energy nor its contractors know the full suite of chemicals present in the various tanks or their precise concentrations. Record keeping is not reliable. Because of the dynamic mixing of contents and chemical reactions, values measured in the past are not necessarily representative of what exists today or what may escape from the tanks under waste-disturbing or other unusual conditions in the future.

Because of a synergistic effect, the chemicals known to exist in the tanks may act in combination with each other or with the many other chemicals in the tanks to produce even greater harm.

Modeling done in 2004 by Hanford scientist, and noted by a 2014 Savannah River National Laboratory report (Tank Vapors Assessment Team), shows that, under certain conditions, toxic plumes from the tanks may travel as far as 100 meters and still retain concentrations of chemicals far above exposure limits.

Response to O-2-1

Thank you for your comment.

New Source Review does not consider effects to workers inside the ambient air boundary. New Source Review ensures that the outside air or 'ambient air' does not exceed 'ambient air quality standards.' The United States Department of Energy has a defined ambient air boundary and are responsible for restricting public access to the site. Air dispersion modeling was performed on the emissions of constituents listed in WAC 173-460-150 to determine if ASILs are exceeded. For Approval Order DE18NWP-001, only the unabated emissions of chromium hexavalent and dimethyl mercury exceeded their ASILs. Chromium hexavalent emissions are abated to below the ASIL with the required abatement technology selected from the tBACT evaluation. Unabated dimethyl mercury emissions are permissible as they fall within the risk limits defined in WAC 173-460-090(7), as demonstrated in the Health Impact Assessment. Therefore, emissions from the AW Tanks are protective of human health and safety per RCW 70.94.011. Additionally, Ecology has determined that the permittee is not using dispersion techniques as defined in WAC 173-400-200(2) to meet air quality standards.

The AW Tank Farm is actively ventilated to remove the build-up of hydrogen gas which presents a safety hazard. Under active ventilation, a negative pressure is applied to the AW Tanks' headspaces thereby not allowing emissions to escape through other parts of the tank system (breather filters, risers, etc.). However, the AW Tank Farm exhausters may be shut down for brief periods (up to 24 hours) per the limiting condition of operation 3.1 of the 'Tank Farm Technical Safety Requirements' (HNF-SD-WM-TSR-006 Rev. 08C) which states,

"A. One DST primary tank ventilation system train (the in-service train) shall be OPERABLE AND operating, expect [is this supposed to be expect or except?] for outages (where the system in not OPERABLE OR not operating) not to exceed 24 hours. AND

B. The other DST primary tank ventilation system train (the standby train) shall be OPERABLE, except for outages not to exceed 10 days."

Also, per the 'Tank Farm Documented Safety Analysis' (RPP-13033 Rev. 07G), the AW Tank Farm is inspected daily to ensure the vacuum pressures, which are used as a surrogate for verifying the primary tank ventilation system is operating, are maintained within specified limits. Approval Order DE18NWP-001 is only applicable to the active ventilation of the AW Tank Farm.

The Hanford tank waste is not a homogeneous waste form. It is mixture of solids, sludges, liquids, vapor pockets, solvents, radioactive isotopes, metals, and other chemicals. The chemical nature of the tank waste is expected to change with addition of water, with tank retrievals (mixing of two tank wastes), with time (as heat from radiation component provides catalyst for the formation of new species), and as water evaporates (PNNL-13781, Rev. 3). As tank chemistry changes, the tank headspace concentrations are also expected to change with the formation and release of gases/vapors. Likewise, Sections 3.1 will be modified to specify baseline assessment be performed for the following waste disturbing activities 1) operation of a mixing pump, operation of the feed pump to the 242-A-Evaporator, 2) operation of the air lift circulator(s), 3) transfer of tank waste, 4) addition of chemicals for pH adjustment, 5) sluicing, and 6) water additions greater than 72,000 gallons. If the baseline assessment results for a particular waste disturbing activity are under the established emission limit, then it could be reasonably assumed that emissions from that particular activity will meet the established emission limits in the future. Section 3.2 of Approval Order DE18NWP-001 mandates that sampling be conducted during all waste disturbing activities defined in 1.2.3.1, which are thought to be under non-steady state or non-homogeneous conditions and representative of the worst-case scenario. Section 3.2 provides for emissions assessments to be conducted a various compliance intervals. Section 3.2.1 of the Approval Order is modified to increase TAP emissions from annually to quarterly as described in response to comment I-4-4. Ecology feels the appropriate level of emissions monitoring is now provided for in Approval Order DE18NWP-001.

Neither state not federal regulations account for synergistic effects of compounds emitted together. Individual constituents have an established emission level that is allowed and within acceptable limits. The Approval Orders issued by Ecology followed the applicable state and federal regulations to permit the emission of regulated pollutants.

No change to the permit is required.

Comment O-2-2

Comment 2:

To the extent that Washington State relies upon Hanford to self-report data about toxic chemical concentrations, please be aware that all such data is seriously suspect. A recently unsealed legal complaint filed by a retired Industrial Hygiene technician alleges that years of data have been gathered by unqualified, untrained and uncertified inspectors, rendering this data unreliable, putting workers and the public at risk.

The October 2017 complaint alleges that Hanford contractor WRPS systematically failed to institute a reliable program to train and certify technicians whose job included monitoring, measuring and reporting the presence and levels of toxic compounds emitting from Hanford waste tanks:

(1) failing to train and certify industrial hygiene technicians as required;

(2) signing and directing employees to sign qualification and requalification cards falsely indicating that the candidate met the qualification requirements;

(3) sending industrial hygiene technicians into the Hanford Site's nuclear and chemical waste tank farms who are not trained or qualified as required;

(4) charging for the costs associated with deficient training, unqualified industrial hygiene technicians, and work that was unauthorized by virtue of the lack of qualified technicians; and

(5) applying for and receiving contract amendments and award fees to which they are not entitled.

Industrial Hygiene Technicians ("IHTs") perform a crucial role in Hanford's Tank Farms. They are responsible for inspecting, testing, and evaluating workplace environments, equipment, and practices to ensure they follow safety standards and government regulations. In Hanford's Tank Farms, IHTs often monitor for and collect samples of potentially toxic materials, evaluate programs on workplace safety and health and investigate incidents and accidents to identify what caused them and how they might be prevented in the future.

Properly trained IHTs are not only required by contract and regulations, but are also critical to a safe workplace and the effective completion of Hanford's mission.

The complaint alleged that WRPS conducted IHT qualification performance evaluations in group sessions despite implicit and explicit requirements that each IHT be individually evaluated and qualified. WRPS's evaluators coached candidates during their IHT evaluations, according to the complaint, and thereafter improperly certified unqualified candidates as qualified.

All this has led to numerous examples of inexperienced and unqualified IHTs working in the tank farms, according to the complaint.

The National Institute for Occupational Safety and Health ("NIOSH"), DOE, and various expert panels have issued reports that assert Hanford's Industrial Hygiene Program has been ineffective and underqualified, and that its training and certification programs are insufficient.

The alleged improper evaluations and falsified IHT Qualification Cards call into question all of the monitoring data collected by improperly qualified/certified IHTs. This could seriously impact the modeling and assumptions by Department of Ecology on Hanford's compliance status for Toxic Air Pollutants and Hazardous Air Pollutants.

Response to O-2-2

Thank you for your comment.

Ecology does not have the authority under the Clean Air Act to mandate that the permittee establish a program to train and certify technicians nor does Ecology determine the risk to workers under WAC 173-400. Approval Order DE18NWP-001 requires a sampling analysis plan (SAP) for which methods for the analysis shall be EPA, OSHA, or NIOSH approved, or Ecology approved method. The permittee certified that the information provided in the application is accurate and complete per WAC 173-400-101(3). Approval Order requires additional sampling to be performed, which are reviewed by Ecology inspectors for accuracy and compliance. Noncompliance with the sampling methods, which may or may not require certified technicians, can be evaluated at that time. Ecology does reserve the right to perform independent verification

sampling. Ecology has included appropriate requirements to ensure sampling for the permit can demonstrate compliance with permitted limits. Noncompliance with these requirements is subject to enforcement.

No change to the permit is required.

Comment O-2-3

Comment 3:

Ecology fails to consider the worst-case tank headspace concentrations and worst-case "operating scenarios in regard to permitting purposes" that, if left unconsidered, will result in greatly underestimating actual emissions and will further impact the measurements required to determine continuous compliance with the specified emission limits. For instance, Ecology:

• overlooks radionuclides, a class of hazardous air pollutants (HAPs) regulated under section 112 of the Clean Air Act (CAA), and at Hanford, under 40 C.F.R. 61 subpart H (aka NESHAPS). The Tank Farm tanks store an estimated 56 million gallons of radioactive waste resulting from the Manhattan Project and Cold War. It is a consequence of this highly radiogenic emission-generating environment within the tanks that ". . . continually 4 generat[es] gases and known and unknown chemical products that are continuously created and destroyed via chemical, thermal, radiocatalytic and radiolytic processes in all layers."

This concern is irrespective of which regulatory agency regulates radionuclides at Hanford. An emission-generating environment in constant flux impacts all emissions and should be considered when regulating all emissions;

• overlooks that because the emission-generating environment is in constant flux it is a practical impossibility that sampling results are accurate for any significant period of time before or after the samples were taken;

• overlooks that the emission-generating environment where "gases and known and unknown chemical products that are continuously created and destroyed" will never be homogenous and will never be in steady-state (or in equilibrium). Thus, it is not possible for any particular sample or series of samples to be representative, or for any particular sample or series of samples to be sufficient to demonstrate continuous compliance with any emission limit;

• overlooks that vaporization rates increase exponentially with temperature, and the rates of increase are different for different HAPs and TAPs. For example, during waste disturbing activities in Tank C-101, mercury emissions increased by more than 900% of the occupational exposure limit (OEL); emissions of n-nitrosodimethylamine (NDMA) increased by more than 2,900% of the OEL; formaldehyde emissions increased by slightly more than 64% of the OEL, and ammonia emissions increased more than 18% of the OEL. During waste-disturbing activities, it is nearly impossible, if not impossible, that monitoring once per year, or once every 6 months, or once every month will coincide with the maximum vaporization rate for any specific pollutant. Such limited monitoring is not sufficient to ensure continuous compliance with the emission limits. It is also highly unlikely that sampling results contained in the TWINS database captures the maximum vaporization concentration for any specific chemical or that any multiplier applied to a TWINS data point accurately reflects a maximum release rate for all pollutants of concern. In his report, Dr. Cole states: "Emission rates are linearly proportional to vapor pressures. . . at temperatures at or above the boiling point, emissions increase extremely rapidly." Thus, even a miniscule underestimation of any emission will result in a huge

(exponential) increase in the actual emission when tank waste is disturbed. Emission limits and any resultant monitoring requirements need to be based upon actual emission measurements and not upon assumptions;

• overlooks that required abatement technology (BACT or tBACT or BARCT) consisting of a moisture de-entrainer, pre-heater, pre-filters, and a dual HEPA filtration (in-series) system in the treatment train, allows toxic and hazardous vapors and gases to pass through, unabated. There is a trade-off between abatement effectiveness and sampling frequency needed to ensure continuous compliance with the emission limits. With abatement technology that provides zero reduction of vapors and gases (i.e. allows vapors and gasses to freely pass through) continuous monitoring is required to ensure continuous compliance. 5 With more effective control technology, continuous compliance can be demonstrated with something less than continuous monitoring.

Ecology also may have overlooked that 2 of the pollutants of concern (dimethyl mercury and chromium 6) regulated under this NOC (Order DE18NWP-001) should probably be regulated under DE05NWP-001, Rev. 1 (Rev 1), as applicable to AN tank emissions. DE05NWP-001, Rev. 1, regulates emissions from the primary tank ventilation exhaust system for each of the 241-AN and 241-AW tank farms. Rev 1 is also an applicable requirement in the most recent renewal of Hanford's AOP. Because Ecology deemed the application for the subject Order complete on January 29, 2019, and because Ecology determined there is a need to also specifically regulate emissions of dimethyl mercury, and emissions of chromium VI from AW-Tank Farms exhaust stack, and because Renewal 3 of Hanford's AOP was not issued until July 15, 2019, and because the previous version of Hanford's AOP did not expire until Renewal 3 was issued, Ecology should have re-opened this AOP to include the 2 additional pollutants of concern. Both WAC 173-401 and 40 C.F.R. 70 provide that a permit shall be re-opened for cause when there is a material mistake "A permit shall be reopened and revised under any of the following circumstances: . . . (iii) The permitting authority ... determines that the permit contains a material mistake".

Response to O-2-3

Thank you for your comment.

The Approval Order DE18NWP-001 issued by the Ecology addresses only non-radioactive toxic and criteria pollutants. DOH is designated as the state's radiation control agency and has responsibility for administration of the regulatory, licensing, and radiation control provisions as provided in RCW 70.98.050(1). DOH has the all the enforcement powers as provided in RCW 70.94.332, 70.94.425, 70.94.430, 70.94.431(1)-(7), and 70.94.235 with respect to emissions of radionuclides, but does not preclude Ecology from exercising its authority under chapter 70.94 (RCW 70.94.422). EPA has granted DOH partial delegation authority to implement and enforce Subparts A, B, H, I, K, Q, R, T, and W of the NESHAPs for radionuclide air emissions under the Clean Air Act (EPA-R10-OAR-2006-0001 FRL-8177-2). Ecology has set ambient and general emissions standards for radionuclides under WAC 173-480 and has the authority to issue civil penalties under WAC 173-400-230 and criminal penalties under WAC 173-400-240. WAC 246-247-060 outlines the DOH's notice of construction (aka radioactive air emissions licenses [RAELs]) permitting/licensing requirements. WAC 246-247-035 adopts Federal NESHAPs Subparts A, B, H, I, K, Q, R, T, and W by reference. The DOH's licenses for Hanford are contained in RAEL FF-01 which contains all applicable state and federal regulations. The

Hanford Air Operating Permit (AOP) incorporates RAEL FF-01, as Attachment 2 per WAC 246-247-060(6), (7), and (8) upon subsequent revisions and renewals to the AOP. The DOH has revised the RAEL for emission unit #855 and #856 (296-A-46 and 296-A-47) to address radionuclides emissions related to the new stack height modification from the AW Tank Farm, which will be incorporated into the Hanford AOP Renewal 3 upon a revision.

The source term or potential-to-emit for this discharge point was determined based on highest per tank sample concentration of each pollutant from the double-shell tank and single-shell tank systems located in the 200 West and 200 East available from the Tank Waste Information (TWINS) and Sitewide Industrial Hygiene Database (SWIHD). The source term data submitted for this application consists of samples collected during waste disturbing or non-waste disturbing activities, with the emission rate estimated based upon the highest tank sample concentration of each pollutant from double-shell tank (DST) and single-shell tank systems located in the 200 West and 200 East Areas. The emission estimate assumes the tank farm is continuously ventilated at maximum capacity, 3,000 cubic feet per minute, at the highest concentration observed from the data per pollutant. Ecology has determined the source term estimate to be an acceptable and conservative approach to determine the potential-to-emit.

The Hanford tank waste is not always in homogeneous form. It can consist as a mixture of solids, sludge's, liquids, organics, radioactive isotopes, and metals. The chemical nature of the tank waste is expected to change with the addition of water, with tank retrievals (mixing of tank waste), with time (through radiolysis), and as water evaporates (PNNL-13781, Rev. 3). As tank waste chemistry changes with the above listed, the tank headspace composition is also expected to change. . Likewise, Sections 3.1 will be modified to specify baseline assessment be performed for the following waste disturbing activities 1) operation of a mixing pump, operation of the feed pump to the 242-A-Evaporator, 2) operation of the air lift circulator(s), 3) transfer of tank waste, 4) addition of chemicals for pH adjustment, 5) sluicing, and 6) water additions greater than 72,000 gallons. If the baseline assessment results for a particular waste disturbing activity are under the established emission limit, then it could be reasonably assumed that emissions from that particular activity will meet the established emission limits in the future. Section 3.2 of Approval Order DE18NWP-001 mandates that sampling be conducted during all waste disturbing activities defined in 1.2.3.1, which are thought to be under non-steady state or non-homogeneous conditions and representative of the worst-case scenario. Section 3.2 provides for emissions assessments to be conducted a various compliance intervals. Section 3.2.1 of the Approval Order is modified to increase TAP emissions from annually to quarterly as described in response to comment I-4-4. Ecology feels the appropriate level of emissions monitoring is now provided for in Approval Order DE18NWP-001.

Ecology does not consider the current or previous estimate of potential emissions to be inaccurate or underestimated. Previous source term estimates (potential-to-emit) were based on data available at the time of permit processing. Since the original Approval Order DE05NWP-001 was issued, more data surrounding the source term has become available which is reflected in the new emission estimates under Approval Order DE18NWP-001. Ecology has determined the methodology used to determine the source term to be an acceptable and conservative approach to determine the potential-to-emit. The permittee is not modifying their process to where they will be emitting more pollutants, but, instead, the way that they estimated potential emissions is different.

The permittee submitted a tBACT analysis which followed the EPA's top down method. The evaluation determined the only cost effective controls are the operation of tank ventilation exhauster system with a moisture de-entrainer, pre-heater, pre-filters, and a two-stage High Efficiency Particulate Air (HEPA) filtration system in service in the treatment train. The tBACT for this project also provides Best Available Radionuclide Control Technology (BARCT) which was determined by the DOH to meet WAC 246-247-060(2)(b). As can be seen in Antoine's equation below, the vapor pressure (Pv) is exponentially related to temperature.

As can be seen in Antoine's equation below, the vapor pressure (P_v) is exponentially related to temperature.

$$P_V = 10^{\left(A-\frac{B}{T_W+C}\right)}$$

where: T_W = the temperature of the tank waste

A, B, and C = constants

As can be seen in the mass balance equation below, the emission rate (W) is linearly proportional to the vapor pressure.

$$W = K_L * A * P_V * \left[\frac{MW}{R * T_H}\right]$$

where: K_L = overall mass transfer coefficient

A = cross sectional area of the tank

MW = molecular weight of toluene

R = universal gas constant

T_H =temperature of the tank headspace

Antoine's equation is substituted in for the vapor pressure in the equation above and presented below.

$$W = K_L * A * 10^{\left(A-\frac{B}{T_W+C}\right)} * \left[\frac{MW}{R * T_H}\right]$$

The resultant effects that the minimum and maximum tank waste and headspace temperatures has on the emission rate can be compared through the percent change in emission rate which is presented below. Where W_1 and W_2 are the respective emission rates at minimum and maximum headspace and tank waste temperatures presented in Table 2 below.

$$\%\ change\ in\ emission\ rate = \left[\frac{W_2 - W_1}{W_1}\right] * 100\%$$

The above equation reduces to the equation below, when substituting and cancelling out like terms for the overall mass transfer coefficient, cross sectional area (assuming the cross-sectional area in a specific farm is identical), universal gas constant, and molecular weight.

$$\%\ change\ in\ emission\ rate = \left[\frac{\left(\left(\frac{1}{T_{H2}}\right) * 10^{\left(A-\frac{B}{T_{W2}+C}\right)} - \left(\frac{1}{T_{H1}}\right) * 10^{\left(A-\frac{B}{T_{W1}+C}\right)}\right)}{\left(\frac{1}{T_{H2}}\right) * 10^{\left(A-\frac{B}{T_{W2}+C}\right)}}\right] * 100\%$$

where: T_{H2} = maximum tank headspace temperature

T_{H1} = minimum tank headspace temperature

T_{W2} = maximum tank waste temperature

T_{W1} = minimum tank waste temperature

The ten year (2008-2019) data presented in the Tank Farm Explorer (from SWIHDS Database) indicates the respective AW tank's waste and headspace temperatures fluctuated (sinusoidally) between minimum and maximum values provided in Table 2 below. As an example, the resultant effect these temperature ranges has on the emission rate was calculated for Toluene using the equation above, for which the percent change in the emission rate is also presented in Table 2 below. The constants (A, B, and C) used for Toluene are presented below in Table 1 (https://webbook.nist.gov/cgi/cbook.cgi?ID=C108883&Mask=4&Type=ANTOINE&Plot=on).

Table 1

Temperature Range (K)		A	B	C
273.13	297.89	4.23679	1426.448	-45.957
303	343	4.08245	1346.382	-53.508
420	580	4.54436	1738.123	0.394
308	384	4.14157	1377.578	-50.507

Table 2

Tank	Tank Waste Temperature (F)		Tank Headspace Temperature (F)		Percent change in emission rate
	Min (T_{W1})	Max (T_{W2})	Min (T_{H1})	Max (T_{H2})	
AW-101	70	98	65	108	101 %
AW-102	57	104	45	102	240 %

AW-103	57	76	53	78	69 %
AW-104	67	80	30	162	15 %
AW-105	55	83	42	88	110 %
AW-106	64	114	61	94	**268 %**

As can be seen the resultant effect the temperature has on the emission rate could vary depending on inherent tank waste and headspace temperatures with the largest percent change emission rate being 268%.

Likewise, as another example, the minimum and maximum AW Tank Farm headspace and source concentrations from the SWIHDS database for Toluene are presented below in Table 3. The percent change in concentration is calculated using the equation below for which the results is also presented in Table 3.

$$percent\ change\ in\ concentration = \left[\frac{C_{Max} - C_{Min}}{C_{Min}}\right] * 100\%$$

Table 3

AW Tank Farm Concentration (ppm)		Percent change in concentration
Min, (C_{Min})	Max, (C_{Max})	
0.000562	0.002765	**392 %**

As can be seen, the toluene concentration is also variable (392%). It is important to note, the variability is on the same order of magnitude as would what would be expected in from any fluctuations in the emission rate (268%) due to temperature variations which affect the vapor pressure as described above. Therefore, Ecology believes the worst case tank headspace concentrations used for the source term captures this variability and considers this to be an acceptable and conservative approach to determine the potential-to-emit. Tank headspace concentrations would also see some variation depending on the volume of the tanks and at the time of respective sampling.

As 'waste disturbing activities' are thought to potentially increase the potential to emit, Sections 3.2.1, 3.2.2, 3.2.3, and 3.2.4 of the Approval Order specifies that emission assessments be performed during waste disturbing activities, which are defined in the Approval Order, when possible. Also, Section 3.1 specifies a baseline assessment be conducted within 90 days of commencement of operations to verify the emissions estimate submitted in the application.

Additional language will also be added to the final DE18NWP-001 Approval Order, under Section 3.1 Baseline Assessment, to specify that a baseline assessment shall also be conducted for each of the following waste disturbing activities: 1) operation of a mixing pump, operation of the feed pump to the 242-A-Evaporator, 2) operation of the air lift circulator(s), 3) transfer of tank waste, 4) addition of chemicals for pH adjustment, 5) sluicing, and 6) water additions greater than 72,000 gallons This additional sampling will help verify that any fluctuations in emissions from these activities are within permitted emission limits.

Section 3.1 will be modified accordingly as follows:

3.1 Baseline Assessment

An initial baseline assessment shall be conducted within ninety (90) days after commencement of operations of the AW Tank Farm exhauster at the new stack height. Additional baseline assessments shall be conducted upon the respective commencement of the on the following waste disturbing activities: 1) operation of a mixing pump, operation of the feed pump to the 242-A-Evaporator, 2) operation of the air lift circulator(s), 3) transfer of tank waste, 4) addition of chemicals for pH adjustment, 5) sluicing, and 6) water additions greater than 72,000 gallons, until a baseline assessment has been conducted for every above listed waste disturbing activity. When reporting baseline assessment results, it shall be required to report under which tank waste conditions or waste disturbing activity for which the samples were obtained. Analytical methods for the analyses shall be the Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), or National Institute for Occupational Safety and Health (NIOSH) approved, or by an Ecology approved equivalent method. The analytical results along with the percent difference to Table 1 concentrations [(Sampled Baseline Concentration – Table 1 Concentration)/Table 1 Concentration] shall be reported.

3.1.1 TAP Baseline

Baseline assessments shall be conducted on the three TAPs identified from Table 1 with the highest potential ambient concentration relative to their ASILs of WAC 173-460-150, in addition to Chromium Hexavalent, Dimethyl Mercury, and Ammonia. The selection of TAPs shall be based upon best engineering judgement and most current tank data. For each assessment, three samples of the vapor/gas shall be taken and analyzed for each of the three TAPs selected.

3.1.2 Dimethyl Mercury

Baseline assessments shall be conducted on Dimethyl Mercury. For the each assessment, three samples of the vapor/gas shall be taken and analyzed.

3.1.3 Chromium Hexavalent Baseline

Baseline assessment shall be conducted on Chromium Hexavalent. For the each assessment, three samples of the vapor/gas shall be taken and analyzed.

3.1.4 Ammonia
Baseline assessment shall be conducted on Ammonia. For the each assessment, three samples of the vapor/gas shall be taken and analyzed. The use of Draeger tubes or Direct Reading Instrument (DRI) is allowed for the baseline assessment.

Section 3.2.1 will also be modified to increase TAP emission assessments from annually to quarterly.

Section 3.2.1 will be modified as follows:

3.2.1 TAPs Emissions Assessment

TAP emissions assessments shall be performed quarterly from the AW Tank Farm exhaust system. The permittee shall develop and implement a SAP that addresses quaterly sampling of TAPs from the AW Tank Farm exhauster system on a calendar year

basis. A calendar year runs from January 1 to December 31. The SAP shall address the emissions of a minimum of three TAPs with the highest potential ambient concentration relative to their ASILs of WAC 173-460-150, in addition to Dimethyl Mercury, Chromium Hexavalent, and Ammonia. The TAPs addressed shall be identified from Table 1 and based upon best engineering judgement and most current tank content data. The SAP must be submitted to Ecology before sampling occurs and also upon subsequent revisions. Ecology reserves the right to provide comments or corrections to the SAP. Analytical methods for the analysis shall be Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), or National Institute for Occupational Safety and Health (NIOSH) approved, or by an Ecology approved equivalent method. Contemporaneous stack flow rate and temperature will be applied with the stack gas concentration to report TAP emissions in terms of pounds per averaging period as listed in WAC 173-460-150. These values/measurements shall be assessed and compared against their respective ASIL to demonstrate compliance with Approval Condition 1.1.2.

Quarterly sampling for TAPs shall be collected during waste disturbing activities. If waste disturbing activities do not occur during the sampling timeframes, the quarterly sampling for TAPs shall then be collected during quiescent tank conditions and justification shall be provided. When reporting results, it shall be required to report tank waste conditions (quiescent or disturbed) at the time sampling of exhaust emissions was conducted.

The permit will be modified as outlined above.

Ecology feels the above sampling protocol will allow for reasonable assurance of compliance with the established emission limits and regulations.

Based on the above explanations, Ecology's feels that the data used in the source term is valid, the assumptions used to estimate the emission rate are conservative, and the emission limits and conditions provided in the final determination (Approval Order) will maintain levels of air quality that protect human health and safety per RCW 70.94.011 and will allow for reasonable assurance of compliance with the established emission limits and regulations.

The Approval Order conditions will be incorporated the Hanford AOP at the next revision or renewal in accordance with WAC 173-401.

References

Stewart, C.W., Huckaby, J.L., Meyer, P.A., (2002). Effects of Globally Waste-Disturbing Activities on Gas Generation, Retention and Release in Hanford Waste Tanks. PNNL-13781 Rev. 1, Pacific Northwest National Laboratory, Richland, WA.

https://webbook.nist.gov/cgi/cbook.cgi?ID=C108883&Mask=4&Type=ANTOINE&Plot=on

Comment O-2-4

Comment 4:

There is no question the federal radionuclide air emission requirements of 40 C.F.R. 61 subpart H apply to activities contemplated by this NOC Order (DE18NWP-001); yet, the application offered to the public for review doesn't address this federal requirement.Washington Administrative Code (WAC 173-400) requires –

"At a minimum, the application must provide information on the nature and amounts of emissions . . . increased as part of a modification. . ." WAC 173-400-111 (1)(b)

An increase in emissions of radionuclides cannot be avoided during activities covered by this NOC Order, yet the permittee's application offered to the public for review overlooks radionuclides. WAC 173-400-111 (1)(b), which defines a complete application, has been incorporated into Washington State's State Implementation Plan (SIP). (See 79 Fed. Reg. 59,653, 59,654-655 (Oct. 3, 2014)) Washington's SIP is an "applicable requirement" as defined under 40 C.F.R. 70.2. Because the requirement to submit a complete application containing the nature and amounts of all expected emissions (including all expected emissions of radionuclides addressed by 40 C.F.R. 61 subpart H), has been incorporated into Washington's SIP, WAC 173-400-111 (1)(b) is federally enforceable pursuant to 40 C.F.R. 70.6 (b). As federally enforceable, any deficiencies to address relevant federally-regulated emissions in the application may be challengeable under 40 C.F.R. 70.

Response to O-2-4

Thank you for your comment.

The Approval Order DE18NWP-001 issued by Ecology addresses only criteria and toxic air pollutants. DOH is designated as the state's radiation control agency and has responsibility for administration of the regulatory, licensing, and radiation control provisions as provided in RCW 70.98.050(1). DOH has the all the enforcement powers as provided in RCW 70.94.332, 70.94.425, 70.94.430, 70.94.431(1)-(7), and 70.94.235 with respect to emissions of radionuclides, but does not preclude Ecology from exercising its authority under chapter 70.94 (RCW 70.94.422). EPA has granted DOH partial delegation authority to implement and enforce Subparts A, B, H, I, K, Q, R, T, and W of the NESHAPs for radionuclide air emissions under the Clean Air Act (EPA-R10-OAR-2006-0001 FRL-8177-2). Ecology has set ambient and general emissions standards for radionuclides under WAC 173-480 and has the authority to issue civil penalties under WAC 173-400-230 and criminal penalties under WAC 173-400-240. WAC 246-247-060 outlines the DOH's notice of construction (aka radioactive air emissions licenses [RAELs]) permitting/licensing requirements. WAC 246-247-035 adopts Federal NESHAPs Subparts A, B, H, I, K, Q, R, T, and W by reference. The DOH's licenses for Hanford are contained in RAEL FF-01 which contains all applicable state and federal regulations. The Hanford Air Operating Permit (AOP) incorporates RAEL FF-01, as Attachment 2, into the AOP per WAC 246-247-060(6), (7), and (8) upon subsequent revisions and renewals to the AOP.

The DOH has revised the RAEL for emission units #855 and #856 (296-A-46 and 296-A-47) to address radionuclides emissions from the AW Tank Farm at the new stack height and have determined the appropriate level of BARCT and ALARACT demonstration under WAC 246-247-060(1)(b). Therefore, Ecology has determined the requirements for radionuclides emissions under Subpart H from the AW Tank Farm have been addressed and the application complete.

No change to the permit is required.

Comment O-2-5

Comment 5:

Finding 17 on page 2 of the draft Order states, in part: "The requirements for federally enforceable requirements of 40 Code of Federal Regulations (CFR) 61, subpart H are contained in Radiological Air Emission License(s) (RAELs) issued by the Washington State Department of

Health. . . ." There is no question radionuclides comprise part of the emissions from activities addressed by this NOC, yet the additive or synergistic impact from the combination of radionuclide and non-radionuclide emissions is not evaluated. While state law allows the regulation of radionuclide emissions and the regulation of non-radionuclide emissions by separate agencies under separate regulatory authority, doing so results in underestimating the total risk to the public. For the purpose of an accurate assessment of risk to the public from this project, Ecology should consider the impact from all emissions expected by this project. Ecology does have all necessary authority to regulate radionuclides under WAC 173-400, yet Ecology only chooses to defer to Health's authority.

Set conditions and limits for activities covered by this NOC based on total expected risk from all emissions. If Ecology follows its own regulation, WAC 173-400-111 (1)(b), then Ecology would have enough information regarding all emissions expected from this project, and therefore, all emission information needed to evaluate total risk to the public from both non-radionuclide emissions and radionuclide emissions. Which agency regulates radionuclide emissions should be decoupled from ascertaining total risk from all anticipated emissions. An "ample margin of safety to protect public health" cannot be established absent consideration of the total risk resulting from all HAPs emitted from a source. [CAA § 112 (f)(2)]

Response to O-2-5

Thank you for your comment.

The Approval Order DE18NWP-001 issued by Ecology addresses only criteria and toxic air pollutants. DOH is designated as the state's radiation control agency and has responsibility for administration of the regulatory, licensing, and radiation control provisions as provided in RCW 70.98.050(1). DOH has revised the Radioactive Air Emission License (RAEL) for emission unit #855 and #856 (296-A-46 and 296-A-47) to address radionuclides emissions under Subpart H from the AW Tank Farm at the new stack height.

Regulating non-radioactive emissions and radioactive emissions separately has no effect in estimating the total risk in the federal or state Clean Air Acts. Neither state not federal regulations account for synergistic effects of compounds emitted together for established emission levels. Instead, individual constituents have a compound specific established emission level that is allowed and within acceptable limits. Since all non-radioactive and radioactive emissions are evaluated on an individual pollutant basis in state and federal regulation, identifying the risk separate approval orders and RAELs results in the same estimate of total risk. The Approval Orders and issued by Ecology and the RAELs issued by DOH have followed the applicable state and federal regulations to permit the emission of respective regulated pollutants.

Furthermore, radiological components in sufficient quantity to create appreciable synergistic effects with chemicals are only present together in the single shell and double shell mixed waste tanks and related tank waste streams at Hanford. The underlying requirements (e.g. notice of construction approval orders and radiological air emission licenses) for discharge locations emitting Hanford tank waste utilized tank head space samples for determining the source term. Thus, the samples collected and used in the permitting process have already accounted for these potential synergistic interactions.

Additionally, once toxic and radioactive emissions leave the discharge location (e.g., the stack), any appreciable contamination that releases radiation to synergistically interact with vapors is captured on the HEPA filters required by the RAEL and the Approval Order.

No change to the permit is required.

Comment O-2-6

Comment 6:

Condition 1.1.2 reads, in part: "All TAPs, as found in Table 1 of this order, shall be below their respective ASIL . . . ." There are more than 100 TAPs listed in Table 1. Condition 2.4 states, in part: "Identification of any TAP not previously identified within the NOC Application emissions estimate shall be submitted to Ecology within ninety (90) days of completion of laboratory analyses . . . ." Condition 3.1.1 states, in part: "For the assessment, three samples of the vapor/gas shall be taken and analyzed for each of the three TAPs selected." Condition 3.2.1 states, in part: "The SAP shall address the emissions of a minimum of three TAPs with the highest potential ambient concentration relative to their ASILs of WAC 173-460-150 excluding Dimethyl Mercury, Chromium Hexavalent, and Ammonia."

a) From a table containing over 100 TAPs it is not possible to comply with the requirement that "All TAPs, . . . shall be below their respective ASIL" when only 3 TAPs are sampled for, in addition to "Dimethyl Mercury, Chromium Hexavalent, and Ammonia". Either revise the condition to require sampling for 3 specific TAPs in addition to Dimethyl Mercury, Chromium Hexavalent, and Ammonia, or revise the sampling requirement to assure "All TAPs in Table 1 are below their respective ASIL." Any sampling must be sufficient to assure continuous with the sampling condition.

b) As used in Condition 1.1.2, the term "ASIL" is a limit, i.e. a value not to be exceeded. ("All TAPs, . . . shall be below their respective ASIL.") As limits, all the ASILs in 7 Table 1 and their respective values will need to be incorporated into Hanford's AOP along with other terms and conditions from DE18NWP-001 needed to ensure compliance with terms and conditions in this order. In CAA § 504(a) [42 U.S.C. 7661c (a)] Congress specified 'that each permit "shall include enforceable emissions limitations and standards" and "such other conditions as are necessary to assure compliance with the applicable requirements.' (emphasis added) CAA § 504(a) [42 U.S.C. 7661c (a)]. EPA and Ecology echo this statement in 40 C.F.R. 70.6 (a)(1) and in WAC 173-401-605 (1). Case law informs that even the courts aren't permitted to substitute their own definition of a word for one enacted by Congress.

"When Congress makes such a clear statement as to how categories are to be defined and distinguished, neither the agency nor the courts are permitted to substitute their own definition for that of Congress, regardless of how close the substitute definition may come to achieving the same result as the statutory definition, or perhaps a result that is arguably better." AK Steel Corp. v. United States, 226 F.3d 1361, 1372 (Fed. Cir. 2000). (See also, "When a word is undefined, courts regularly give that term its ordinary meaning." Id. at 1371.

It thus appears the words "shall include" used by Congress means "shall include" and not "shall reference" or "shall include by reference". Ecology's reliance on referencing other documents where emission limits can be located, may not be permissible. It is appropriate for Ecology to revise its standard template for orders issued pursuant to WAC 173-400 to be more Part 70 friendly, in part, by actually including the enforceable emission limits, as required by law.

Response to O-2-6

Thank you for your comment.

Approval Condition 1.1.2 states: "All TAPs, as found in Table 1 of this order, shall be below their respective ASIL or approved through a Second Tier review." The State of Washington provides Acceptable Source Impact Limits (ASILs) in WAC 173-460-150, which are values not to exceeded (WAC 173-460-080) except as provided by Second Tier Review (WAC 173-400-090). Therefore, Approval Condition 1.1.2 is more of a general standard in this regard. Separate and specific conditions (limits) for TAPs from WAC 173-460-150, as identified in Table 1, are provided for Dimethyl Mercury and Chromium (VI) in Approval Conditions 1.1.3 and 1.1.4 respectively as the unabated emissions are above the respective ASIL. The abated emissions of Chromium are below the ASIL and the emissions of Dimethyl Mercury are approved through Second Tier review (RPP-ENV-59016, Rev.1). Emissions of Ammonia are not above the ASIL but the compliance condition is carried over from the previous Approval Order DE05NWP-001.

Compliance demonstration for Approval Condition 1.1.2 is provided in Section 1.3.1 and 1.3.3. Compliance demonstration 1.3.3 states: "Compliance with Approval Condition 1.1.2 shall be demonstrated by stack sampling as described in Section 3.2 for TAPs and applying these concentration readings with contemporaneous stack flow rate and temperatures to determine the mass release rate of these TAPs in pounds and their respective release rate averaging times in WAC 173-460-150." Section 3.2.1 states: "TAP emissions assessments shall be performed quarterly from the AW Tank Farm exhaust system. The permittee shall develop and implement a SAP that addresses quaterly sampling of TAPs from the AW Tank Farm exhauster system on a calendar year basis. A calendar year runs from January 1 to December 31. The SAP shall address the emissions of a minimum of three TAPs with the highest potential ambient concentration relative to their ASILs of WAC 173-460-150, in addition to Dimethyl Mercury, Chromium Hexavalent, and Ammonia. The TAPs addressed shall be identified from Table 1 and based upon best engineering judgement and most current tank content data. The SAP must be submitted to Ecology before sampling occurs and also upon subsequent revisions. Ecology reserves the right to provide comments or corrections to the SAP. Analytical methods for the analysis shall be Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), or National Institute for Occupational Safety and Health (NIOSH) approved, or by an Ecology approved equivalent method. Contemporaneous stack flow rate and temperature will be applied with the stack gas concentration to report TAP emissions in terms of pounds per averaging period as listed in WAC 173-460-150. These values/measurements shall be assessed and compared against their respective ASIL to demonstrate compliance with Approval Condition 1.1.2." Section 3.2.1 allows for tracking of TAPs with the highest potential ambient concentration relative to their ASIL to ensure compliance with WAC 173-460-150, to determine if a new-new source review, as provided in WAC 173-460-040 would be necessary, and also to determine if the appropriate level of abatement control/tBACT is being provided.

Ecology only specified the sampling of 3 TAPs with the highest potential ambient concentration relative to their ASIL as it is acknowledged that developing approved methods and having analyticval standards for all TAPs listed in Table 1 would come at high cost without the added benefit. Given the nature of the tank chemistry and operations, it can reasonably be assumed that if the three TAPs selected and analyzed are below their ASIL then the other TAPs in Table 1 would also fall below. It would be the duty of Ecology inspectors when reviewing the SAP to ensure best engineering judgement is being applied in the selection of the three TAPs. The

permittee is also required to report any exceedance of TAPs above the ASIL as specified in Section 2.4. Ecology also reserves the right to perform their own independent verification sampling. Section 2.3, #9 provides the record keeping requirement for the SAPs.

No change to the permit is required.

Comment O-2-7

Comment 7:

In the current version of Hanford's AOP (Renewal 3, issued on July 15, 2019) there appears to be no regulation of dimethyl mercury emissions, or chromium VI emissions from AW-Tank Farms. Only visible emissions, emissions TAPs ("as shown in Table 2 of Approval Order DE05NWP-001, Rev 1. and Amd A,") and ammonia emissions are addressed in Renewal 3 for AW Tank Farm. Adding 2 (two) previously unaddressed hazardous air pollutants to the allowable emissions for AW-Tank Farm emissions seems to exceed the scope of an administrative amendment under either Part 70 or WAC 173-401.

Response to O-2-7

Thank you for your comment.

Ecology issues approval orders with the current applicable regulations established at the time of processing. Dimethyl mercury and chromium hexavalent are toxic air pollutants (TAPs) currently listed in WAC 173-460-150; likewise, they are now included in Approval Order DE18NWP-001. Approval Order DE18NWP-001 was not presented to the public as an administrative amendment under WAC 173-400-171(2) but was issued with the mandatory 30-day public comment period per WAC 173-400-171(3). WAC 173-401 public comment period requirements are applicable to Title V Air Operating Permits (AOPs). Conditions from Approval Order DE18NWP-001 with new established emission limits for dimethyl mercury, TAPs, chromium hexavalent and ammonia will be incorporated into the Hanford AOP upon the next revision and will be available made available for public comment per WAC 173-401-800 at that time.

No change in the permit is required.

Comment O-2-8

Comment 8:

Assessment for compliance with emission limits for TAPs is to occur annually. (Approval condition 3.2.1) Assessment for compliance with emission limits for the dimethyl mercury emission limit is to occur monthly. (Approval condition 3.2.2) Assessment for compliance with the chromium VI emission limit is to occur annually and assessment for compliance with the ammonia emission limit is to occur every 6 months. (Approval conditions 3.2.3 & 3.2.4) Emission limits for TAPs are expressed in g/s, or lbs/hr., or lbs/24-hr, or lbs/year. (See NOC Table 1.) The emission limit for dimethyl mercury is in units of g/s or lbs./24-hrs. (Approval condition 1.1.3) The emission limit for Chromium VI and ammonia are also in units of g/s or lbs./24-hrs. (Approval conditions 1.1.4 & 1.1.5) An accurate measurement taken once per year, or once per month, or once every 6 months to accurately assess compliance with emission limits expressed in g/s, or lbs./24-hours, or lbs./year can only occur if the environment sampled is homogenous and in steady state at all times. Require the contents of the AW Tanks to be homogenous and in steady state along with appropriate compliance demonstration requirements.

Absent a homogenous sampling environment in steady state, continuous compliance with emission limits expressed in units of g/s, or in units of lbs./hr., or in units of lbs./24-hours can only be assured via continuous monitoring. Require continuous compliance with the required emission limits, in addition to appropriate compliance verification requirements.

Response to O-2-8

Thank you for your comment.

The Hanford Site tank waste is not a homogenous waste form. It is a mixture of solids, sludges, liquids, vapor pockets, solvents, radioactive isotopes, metals, and other chemicals. It is impractical for Ecology to require the permittee to alter their process to reach a homogeneous and steady-state desired effect. Instead, Ecology can set permit conditions accordingly around their existing process so that emission limits will be protective of human health and safety and allow for demonstration of continuous compliance. Likewise, Sections 3.1 and 3.2 of Approval Order DE18NWP-001 mandates that sampling be conducted during waste disturbing activities, which are thought to be under non-steady state or non-homogeneous conditions and representative of the worst-case scenario. Likewise, Sections 3.1 will be modified as described in response to comment I-4-4. If the baseline assessment results for a particular waste disturbing activity are under the established emission limit, then it could be reasonably assumed that emissions from that particular activity will meet the established emission limits in the future. Section 3.2 of Approval Order DE18NWP-001 mandates that sampling be conducted during all waste disturbing activities defined in 1.2.3.1, which are thought to be under non-steady state or non-homogeneous conditions and representative of the worst-case scenario. Section 3.2 provides for emissions assessments to be conducted a various compliance intervals. Section 3.2.1 of the Approval Order is modified to increase TAP emissions from annually to quarterly as described in response to comment I-4-4. Ecology feels the appropriate level of emissions monitoring is now provided for in Approval Order DE18NWP-001.

No change to the permit is required.

Appendix A: Copies of all public notices

Public notices for this comment period:

- Notice sent to the Hanford-Info email list
- Event posted on Washington Department of Ecology – Hanford's Facebook page

From: McFadden, Daina (ECY)
To: HANFORD-INFO@LISTSERV.ECOLOGY.WA.GOV
Subject: 30-day comment period starts today!
Date: Monday, July 15, 2019 8:40:17 AM

AW Stack – Notice of Construction Public Comment Period

The Washington State Department of Ecology is holding of a 30-day public comment period starting **July 15 through August 16, 2019**. This comment period will address proposed modifications to the existing Approval Order DE05NWP-001 and result in a new Notice of Construction (NOC) DE18NWP-001 for the AW Tank Farm. The AW Tank Farm is located on the Hanford Site in southeastern Washington.

What Changes are Being Proposed?

The original project was permitted under Approval Order DE05NWP-001. The permittee has submitted a new Notice of Construction to increase the stack height of the AW Tank Farm exhausters from an existing height of 28 feet to 60 feet above grade. The new Approval Order will be DE18NWP-001. An administrative amendment will be initiated to remove the AW Tank Farm from Approval Order DE05NWP-001.

Concentrations of dimethyl mercury and chromium hexavalent were found to be above the Acceptable Source Impact Level (ASIL) of WAC 173-460-150. A Second Tier analysis (RPP-ENV-59016, Rev. 01 was provided for dimethyl mercury which indicated emissions are permissible as they fall within the risk limits defined in WAC 173-460-090(7). Abated emissions of chromium hexavalent were found to be below the ASIL. Emissions limits are placed on visible emissions, toxic air pollutants (TAPs), dimethyl mercury, chromium hexavalent, and ammonia. Sampling and analysis plans were requested for review of proposed sampling methodology.

Best Available Control Technology for Toxics (tBACT) for the project was found to be operation of the tank ventilation system with a moisture de-entrainer, heater, pre-filters and two-stage High Efficiency Particulate Air (HEPA) filtration system. Operational limits were placed on tBACT controls, flow rate, and the number of tanks allowed to be disturbed at a given time.

How to Comment

Ecology invites you to review and comment on this proposed NOC. Copies of the NOC are located in the Administrative Record . In addition, the proposed modification is online on the Public Comment Period page.
Please submit comments by **August 16, 2019**.

Electronically (preferred)
Mail or hand-deliver to:
Daina McFadden
3100 Port of Benton Blvd
Richland WA 99354

Fax 509-372-7971

Public Hearing

A public hearing is not scheduled, but if there is enough interest, we will consider holding one. To request a hearing or for more information, contact:

Daina McFadden
Hanford@ecy.wa.gov
509-372-7950

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Washington Department of Ecology - Hanford

Published by Ryan Ecology Miller [?] · Just now ·

Today marks the beginning of a new public comment period held by our agency. This one involves the AW Tank Farm at the Hanford Site. The comment period will run from today to Aug. 16. Read more about the period by following the link below!

Public comment periods - Washington State Department of Ecology

Public comment periods - Was
Department of Ecology

Boost Post

Like Comment Share

Write a comment...

Ecology - Hanford @ecyHanford · 1h

Happy #MondayMorning folks! Get your #MondayMotivation on by having your voice heard and commenting on our most recent public comment period involving #Hanford, which began today! Check it out here: ecology.wa.gov/Waste-Toxics/N... @EPAnorthwest @HanfordSite @RiverProtection @EcologyWA

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