



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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December 20, 2019

19-NWP-209

Brian T. Vance, Manager
Office of River Protection
United States Department of Energy
PO Box 450, MSIN: H6-60
Richland, Washington 99352

Re: Approval Order DE05NWP-001, Revision 2, for the 241-AN Tank Farm

References: See Page 2

Dear Brian T. Vance:

The Department of Ecology (Ecology) has issued Approval Order DE05NWP-001, Revision 2, with an effective date of December 20, 2019. The Approval Order is enclosed and authorizes continued operation of the primary ventilation system for the 241-AN double-shelled tank farm.

In accordance with Washington Administrative Code (WAC) 173-400-171(2), a notice of this action was placed on the Ecology website from September 5 through September 20, 2019. No comments or requests for a public comment period under WAC 173-400-171(2)(d) were received by Ecology during this period.

Approval Order DE05NWP-001, Revision 2, no longer authorizes emissions from the primary ventilation system for the 241-AW tank farm. Approval Order DE18NWP-001, issued concurrently, now authorizes emissions from the 241-AW tank farm. Additionally, the updated emission rate and limit for 1,3-dichloropropene (previously identified as dichloropropene) is included in the list of authorized toxic air pollutant emissions for the 241-AN tank farm.

If there are any questions, please contact me at matt.williams@ecy.wa.gov or (509) 372-7910 or Lilyann Murphy at lilyann.murphy@ecy.wa.gov or (509) 372-7951.

Sincerely,

Matt Williams, P.E.
Environmental Engineer
Nuclear Waste Program

mw/jlg
Enclosure

cc: See Page 2



References:

1. Letter 19-ECD-0012, dated March 6, 2019, "U.S. Department of Energy, Office of River Protection Submits Notification of Administrative Permit Amendment to Remove the AW Tank Farm Ventilation System from the Hanford Site Air Operating Permit DE05NWP-001"
2. 19-ECD-0068, dated August 26, 2019, "U.S. Department of Energy, Office of River Protection Submits Supplemental Information to Notification of Administrative Permit Amendment to Remove the AW Tank Farm Ventilation System from the Hanford Site Air Operating Permit DE05NWP-001"

cc electronic/enc:

Dave Einan, USEPA
Jim McAuley, USEPA Region 10
Kelly McFadden, USEPA Region 10
Chris Kemp, USDOE-ORP
Bryan Trimberger, USDOE-ORP
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Reed Kaldor, MSA
James Hamilton, WRPS
Douglas Hendrickson, WRPS
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Ken Niles, ODOE
John Martell, WDOH
Daniel Heuston, Ecology
Theresa Howell, Ecology
Lilyann Murphy, Ecology
Matt Williams, Ecology
Environmental Portal
MSA Correspondence Control
USDOE-ORP Correspondence Control
USDOE-RL Correspondence Control
USEPA Region 10 Hanford Field Office Correspondence Control
WRPS Correspondence Control

cc w/enc:

Susan Leckband, HAB
Administrative Record: AIR Permits
NWP Central File

cc: Mason Murphy, CTUIR
Jack Bell, NTP
Rex Buck, Jr., Wanapum
Laurene Contreras, YN

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**NON-RADIOACTIVE AIR EMISSIONS
NOTICE OF CONSTRUCTION APPROVAL ORDER
CONDITIONS AND RESTRICTIONS
DE05NWP-001, REVISION 2**

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**NON-RADIOACTIVE AIR EMISSIONS
NOTICE OF CONSTRUCTION APPROVAL ORDER
CONDITIONS AND RESTRICTIONS
DE05NWP-001, REVISION 2**

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REGULATORY AUTHORITY

Pursuant to the Washington State Department of Ecology General Regulations for Air Pollution Sources, Chapter 173-400 Washington Administrative Code (WAC), and Controls for New Sources of Toxic Air Pollutants, Chapter 173-460 WAC, Ecology now finds the following:

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FINDINGS:

1. The United States Department of Energy (USDOE) proposes to modify their existing facility (Hanford) located in Richland, Washington.
2. DE05NWP-001, issued February 18, 2005, authorized construction and operation of new ventilation systems for the existing 241-AW and 241-AN double-shell tank farms. The ventilation system for each farm can function in single train exhauster operation at a maximum of 2,000 cubic feet per minute (cfm) or dual train exhauster operation at a maximum combined 4,000 cfm.
3. DE05NWP-001, Revision 1, issued July 31, 2007, authorized modifications to 241-AN and 241-AW double-shell tank farm ventilation systems to authorize emissions of newly identified toxic air pollutants (TAPs).
4. DE05NWP-001, Revision 1, Amendment A, issued March 26, 2013, authorized an increase in maximum ammonia emissions from 0.22 to 2.9 pounds per hour.
5. A Notice of Construction (NOC) modification application (Letter 19-ECD-0012) was submitted March 6, 2019, requesting that the ventilation system for the 241-AW tank farm be removed from Approval Order DE05NWP-001, Revision 1 and Amendment A.
6. The 241-AW tank farm ventilation system has been modified and authorized under Approval Order DE18NWP-001, issued concurrently with this Approval Order.
7. A revision to the NOC modification application (Letter 19-ECD-0068) was submitted August 26, 2019, requesting the addition of 1,3-dichloropropene, to the list of authorized TAP emissions for the 241-AN tank farm. 1,3-dichloropropene was already authorized in Table 2 as dichloropropene at a lower emissions estimate.
8. The incorporation of 1,3-dichloropropene within this permit is based upon potential receipt of this contaminant with waste transfers from the 241-AP tank farm.
9. The requested increase in emissions of 1,3-dichloropropene will result in emissions less than the Small Quantity Emission Rate (SQER) specified in WAC 173-460-150.
10. The previously identified Best Available Control Technology for toxics (tBACT) for the 241-AN tank farm will continue to satisfy tBACT after addition of 1,3-dichloropropene.
11. Emissions of criteria pollutants from the proposed project are below the Prevention of Significant Deterioration Significant Emission Rates and the WAC 173-400-110(5) exemption levels, with the exception of TAPs under WAC 173-460-150.
12. Hanford is an existing major stationary source that emits more than 250 tons of a regulated pollutant per year.
13. Hanford is located in a Class II Area for the Prevention of Significant Deterioration program and Benton County is designated as "attainment" for the purpose of NOC permitting for all pollutants.

- 1 14. Criteria air pollutant emissions from the proposed project are below the *de minimus* levels in
2 WAC 173-400-110(5).
- 3 15. Screening levels were previously developed to serve in lieu of Acceptable Source Impact Levels
4 (ASILs) for the 241-AN tank farm, as issued in Approval Orders DE05NWP-001 and DE05NWP-
5 001, Revision 1. Therefore, these screening levels are retained for this permitting action and are
6 contained in Table 1.

1 1.1.1

Table 1: Development of Screening Levels

Toxic Air Pollutant	Chemical Abstracts Service #	Screening Level [$\mu\text{g}/\text{m}^3$]	Basis for Screening Level (S.L.)
Propionaldehyde	123-38-6	160 (24-hr average)	The current ACGIH Threshold Limit Value (TLV) for this material is 20 ppm (TWA). At 25°C and one atmosphere this TLV is 47,477.6 $\mu\text{g}/\text{m}^3$. Application of WAC 173-460-110(2)(b) divides the TLV by 300 resulting in a value of 158.26 $\mu\text{g}/\text{m}^3$ (24 hr average). Assessment rounded to two significant digits.
Acetophenone	98-86-2	350 (24-hr average)	Applying, under WAC 173-460-110(3)(a), IRIS general toxicity data of this material with RfD of 100 $\mu\text{g}/\text{Kg}\cdot\text{day}$, for average adult of 70 Kg weight and inhaled air of 20 m^3 , results in a value of: $S.L. = \frac{100\mu\text{g}}{\text{Kg}\cdot\text{day}} \cdot \frac{\text{day}}{20\text{m}^3\text{ air}} \cdot 70\text{Kg} = \frac{350\mu\text{g}}{\text{m}^3} \text{ (24 hr average)}$
4-Nitrophenol	100-02-7	6.3 (24-hr average)	Applying, under WAC 173-460-110(3)(a), Toxics release toxicity data of this material with RfD of 1.8 $\mu\text{g}/\text{Kg}\cdot\text{day}$, for average adult of 70 Kg weight and inhaled air of 20 m^3 , results in a value of: $S.L. = \frac{1.8\mu\text{g}}{\text{Kg}\cdot\text{day}} \cdot \frac{\text{day}}{20\text{m}^3\text{ air}} \cdot 70\text{Kg} = \frac{6.3\mu\text{g}}{\text{m}^3} \text{ (24 hr average)}$
Carbonyl Sulfide	463-58-1	10 (24-hr average)	Based upon carbonyl sulfide metabolism to hydrogen sulfide and carbon dioxide, the chronic reference exposure level (REL) of hydrogen sulfide is established as the basis for exposure to carbonyl sulfide: $S.L. = REL_{\text{H}_2\text{S}} = \frac{10\mu\text{g}}{\text{m}^3} \text{ (24 hr average)}$
n-Nitrosomethylethylamine	10595-95-6	1.6E-04 (Annual average)	Unit cancer unit risk factor of 6.3E-03/ $\mu\text{g}/\text{m}^3$ with estimated continuous inhalation exposure resulting in excess lifetime cancer risk by 1/1,000,000 results in a value of: $S.L. = \frac{1}{1\text{E} + 06} \bigg/ \frac{6.3\text{E} - 03}{\mu\text{g}} = \frac{1.587\text{E} - 04}{\text{m}^3} \text{ (Annual average)}$ Assessment rounded to two significant digits.

Table 1: Development of Screening Levels

Toxic Air Pollutant	Chemical Abstracts Service #	Screening Level [$\mu\text{g}/\text{m}^3$]	Basis for Screening Level (S.L.)
n-Nitrosodi-n-propylamine	621-64-7	5 E-04 (Annual average)	Unit cancer unit risk factor of $2\text{E}-03/\mu\text{g}/\text{m}^3$ with estimated continuous inhalation exposure resulting in excess lifetime cancer risk by 1/1,000,000 results in a value of: $S.L. = \frac{1}{1\text{E}+06} \bigg/ \frac{2\text{E}-03 \text{ m}^3}{\mu\text{g}} = \frac{5.0\text{E}-04 \mu\text{g}}{\text{m}^3} \text{ (Annual average)}$ Assessment limited to one significant digit.

References:

- Propionaldehyde: ACGIH 2004, American Conference of Government Industrial Hygienists, *2004 TLVs® and BEIs®*, Cincinnati, Ohio.
- Acetophenone: IRIS, Integrated Risk Information System, <http://www.epa.gov/iris/subst/0321.htm>
- 4-Nitrophenol: Bouwes, N. and Hassur, S., *Toxics Release Inventory Relative Risk-Based Environmental Indicators: Interim Toxicity Weighting Summary Document*. Economics, Exposure and Technology Division Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency. 401 M St., SW Washington, D.C. 20460. June 1997. (<http://www.epa.gov/oppt/rsei/docs/toxwght97.pdf>).
- Carbonyl Sulfide: California Office of Environmental Health Hazard Assessment (OEHHA), Chronic Reference Exposure Levels (http://www.oehha.ca.gov/air/chronic_rels/AllChrels.html).
- n-Nitrosomethylethylamine, and n-Nitrosodi-n-propylamine: California Office of Environmental Health Hazard Assessment (OEHHA) Toxicity Criteria Database (TCDB). (<http://www.oehha.ca.gov/risk/ChemicalDB/index.asp>)

- 1 16. TAPs from the proposed project are below the ASILs of WAC 173-460-150 and/or Screening
2 Levels of Table 1, as appropriate.
- 3 17. tBACT has been determined to be operation of the primary tank ventilation exhauster systems not
4 exceeding 4,000 cfm with moisture de-entrainment, pre-heater, and High Efficiency Particulate
5 Air (HEPA) filtration in service in the treatment train.
- 6 18. The proposed project, if constructed and operated as herein required, will provide tBACT.
- 7 19. The proposed project, if operated as herein required, will be in accordance with applicable rules
8 and regulations, as set forth in Chapter 173-400 WAC and Chapter 173-460 WAC, and the
9 operation thereof will not result in ambient air quality standards being exceeded.
- 10 20. The project will have no significant impact on air quality.

11 **THEREFORE, IT IS ORDERED** that the project as described in said Notice of Construction
12 application, and as detailed in emissions estimates and impact and control technology assessments
13 submitted to the Washington State Department of Ecology in reference thereto, is approved for
14 construction, installation, and operation, provided compliance with the conditions and restrictions
15 described below. This ORDER shall be identified as NOC ORDER **DE05NWP-001, Revision 2**.

16

1 **1.0 GENERAL APPROVAL CONDITIONS**

2 **1.1 Effective Date**

3 The effective date of this authorization shall be that as signed in Section 4.0. All references to procedures
4 or test methods shall be to those in effect as of the effective date of this ORDER.

5 **1.2 Emission Limits**

6 **1.2.1** Visible emissions from each stack shall not exceed five percent.

7 **1.2.2** Primary tank ventilation exhauster systems for the 241-AN double-shell tank (DST) farm
8 shall not exceed 4,000 cfm (standard temperature and pressure).

9 **1.2.3** All TAPs, as submitted in the Permittee's NOC Applications (Table 2), shall be below
10 their respective ASIL or Screening Level of Table 1.

11 **1.2.4** Emissions of ammonia shall not exceed 2.9 pounds per hour (3.63E-01 gram/second)
12 from the primary tank ventilation exhauster system.

13 **1.2.5** Emissions of 1,3-dichloropropene shall not exceed 1.37E-03 pounds per hour
14 (1.73E-04 gram/second) from the primary tank ventilation exhauster system.

15 **1.3 Compliance Demonstration**

16 **1.3.1** Compliance with Approval Condition 1.2.1 shall be met by Tier 3 Visible Emissions
17 Survey requirements of the Hanford Air Operating Permit.

18 **1.3.2** Should visible emissions be observed which are not solely attributable to water
19 condensation, compliance with Approval Condition 1.2.1 shall be met by performing an
20 opacity determination utilizing 40 Code of Federal Regulations (CFR) Part 60,
21 Appendix A, Method 9, providing that such determination shall not place the visible
22 emission observer in hazard greater than that identified for the general worker.

23 **1.3.3** Compliance with Approval Condition 1.2.2 shall be demonstrated by stack gas flow and
24 temperature measurement.

25 **1.3.4** Compliance with Approval Condition 1.2.3 shall be met by operating the exhauster
26 system only when in accord with tBACT emission controls found for this project.

27 **1.3.5** Compliance with Approval Condition 1.2.4 shall be demonstrated by the conduct of
28 ammonia concentration readings as described in Sections 3.1 and 3.2, and applying these
29 concentration readings with contemporaneous stack flow rate and temperatures to
30 determine instantaneous mass release rate of ammonia.

31 **1.3.6** Compliance with Approval Condition 1.2.5 shall be demonstrated by the conduct of 1,3-
32 dichloropropene concentration readings as described in Section 3.3, and applying these
33 concentration readings with contemporaneous stack flow rate and temperatures to
34 determine instantaneous mass release rate of 1,3-dichloropropene.

35 **1.4 Manuals**

36 Existing Operations and Maintenance (O&M) manuals for all equipment, procedures, and controls
37 associated with the proposed activities that have the potential to affect emissions to the atmosphere shall
38 be followed. Manufacturer's instructions may be referenced. The O&M manuals shall be updated to
39 reflect any modifications of the process or operating procedures. Copies of the O&M manuals shall be
40 available to Ecology upon request.

1 **2.0 Notifications and Submittals**

2 **2.1 Addressing**

3 Any required notifications and submittals required under these Approval Conditions shall be sent to:

4 Washington State Department of Ecology
5 Nuclear Waste Program
6 3100 Port of Benton Boulevard
7 Richland, Washington 99354

8 **2.2 Schedule**

9 A schedule of installation and operation activities for the exhauster system shall be submitted within 30
10 days of issuance of this ORDER if not previously submitted.

11 **2.3 Operational Notice**

12 Notification will be made at least ten days prior to initial operation of the exhauster system covered by
13 this ORDER.

14 **2.4 Recordkeeping**

15 Specific records shall be kept on the Hanford Site by the Permittee and made available for inspection by
16 Ecology upon request. The records shall be organized in a readily accessible manner and cover a
17 minimum of the most recent 60-month period. The records to be kept shall include the following:

- 18 1. Records of calibration of stack gas flow rate and temperature measurement devices.
- 19 2. Exhauster system stack flow rates and temperatures records.
- 20 3. Baseline and biannual emission monitoring results required in Section 3.0, including alternative
21 test method approval if granted.
- 22 4. Supporting data and calculations to demonstrate compliance as detailed in Section 1.3.5.
- 23 5. All monitoring and operations records required to operate and maintain the emission control
24 equipment which implements tBACT as described in Section 1.0.
- 25 6. Laboratory analysis result summaries of any samples undertaken after the effective date of this
26 ORDER from 241-AN tank farm tank headspaces or primary tank ventilation system exhaust
27 which are examined for organic species or other TAPs.

28 **2.5 Reporting**

29 Results of emission assessments conducted pursuant to Section 3.1 shall be submitted to Ecology within
30 90 days of completion of such assessment.

31 Identification of any TAP not previously identified within the NOC Application emissions estimate shall
32 be submitted to Ecology within 90 days of completion of laboratory analyses, which verify emissions of
33 that toxic air pollutant from the project.

34 Visible emission surveys, conducted pursuant to Compliance Demonstration requirement 1.3.2, shall be
35 submitted to Ecology within 30 days of completion of the survey. An assessment of the cause of visible
36 emissions and a report of the maintenance conducted to maintain the subject exhaust system's tBACT
37 operations shall also be submitted.

1 **3.0 EMISSION MONITORING**

2 Although all toxic air pollutants from this project are estimated below their ASILs or Screening Levels,
3 the following sampling and monitoring are required in order to verify emissions estimates and compliance
4 with Section 1.3, above. The term “the exhauster system,” herein, shall mean the individual primary tank
5 ventilation exhauster system within the 241-AN Tank Farm, where an exhauster system may be operated
6 in single-train or dual-train modes.

7 **3.1 Baseline Assessment**

8 In order to assess baseline emission concentrations from the exhauster system, emission levels of
9 ammonia will be assessed:

- 10 1. **During single train exhauster operation:** Between 12 and 24 hours after initiation of single
11 train exhauster operation, ammonia stack concentrations shall be sampled a minimum of three
12 times.
- 13 2. **During dual train exhauster operation:** Between 12 and 24 hours after initiation of dual train
14 exhauster operation, ammonia stack concentrations shall be sampled a minimum of three times.

15 Ammonia sampling and analysis will be in accord with approved alternative sampling procedures
16 including the use of Draeger tubes to measure stack gas concentration of ammonia providing such devices
17 are spanned to appropriately measure the stack gas ammonia concentration. Stack flow rate and
18 temperature will be applied with the ammonia stack gas concentration to report ammonia emission in
19 terms of grams per second.

20 Baseline assessments shall be conducted within 90 days of commencement of operations. Should dual
21 exhauster train operation not be required by the Permittee during this 90-day period, assessment of dual
22 train operation emissions shall be conducted on the first occasion of dual train operation which is
23 anticipated to exceed 24 hours duration.

24
25 **3.2 Bi-Annual Emission Assessment**

26 In order to maintain reasonable assurance of continued compliance with emission limitations from these
27 exhauster systems, bi-annual assessment of ammonia stack emissions will be conducted beginning the
28 second calendar year following completion of single train exhauster operation assessment under Section
29 3.1. A minimum of three samples shall be used to assess these emissions.

30 Ammonia sampling and analysis will be in accord with approved alternative sampling procedures
31 including the use of Draeger tubes to measure stack gas concentration of ammonia providing such devices
32 are spanned to appropriately measure the stack gas ammonia concentration. Stack flow rate and
33 temperature will be applied with the ammonia stack gas concentration to report ammonia emission in
34 terms of grams per second.

35 **3.3 Source Demonstration Assessment**

36 Upon receipt of waste transfer from 241-AP into 241-AN tanks directly or through intermediate tanks, bi-
37 annual sampling and analysis for 1,3-dichloropropene will initiate within three months of such initial
38 transfer into 241-AN and occur for four sampling events provided demonstration of compliance with
39 Condition 1.2.5. A minimum of three samples shall be used to assess these emissions.

40 1,3-dichloropropene sampling and analysis will be in accordance with appropriate test method(s)
41 specified in 40 CFR Part 60, unless an alternative method has been proposed in writing by the permittee
42 and approved in writing by Ecology. Stack flow rate and temperature will be applied with the 1,3-
43 dichloropropene stack gas concentration to report 1,3-dichloropropene emission in terms of grams per
44 second.

1 **4.0 APPROVAL ORDER AND RESTRICTIONS**

2 Operation of the subject primary tank ventilation systems is intended for the storage, treatment, retrieval,
3 and disposal of waste contained in the tanks as described in the NOC application. "Retrieval" for the
4 purposes of this Authorization includes routine mixing and pumping, and lancing as necessary and
5 sufficient for instrument, airlift circulator, saltwell, pump, or mixer placement and for such mixing and
6 pumping, but shall not include aggressive waste movement actions, such as sluicing, undertaken for the
7 objective of Tank or Tank System Closure.

8

1 **YOUR RIGHT TO APPEAL**

2 You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of
3 the date of receipt of this Order. The appeal process is governed by Chapter 43.21B Revised Code of
4 Washington (RCW) and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

5 To appeal you must do all of the following within 30 days of the date of receipt of this Order:

- 6 • File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means
7 actual receipt by the PCHB during regular business hours.
- 8 • Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person (see
9 addresses below). E-mail is not accepted.

10 You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08

11 **ADDRESS AND LOCATION INFORMATION**

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel RD SW Suite 301 Tumwater, WA 98501	Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903

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1 This Authorization may be modified, suspended, or revoked in whole, or in part, for cause including, but
2 not limited to, the following:

- 3 1. Violation of any terms or conditions of this authorization;
- 4 2. Obtaining this authorization by misrepresentation, or failure to fully disclose all relevant facts.

5 The provisions of this authorization are severable and, if any provision of this authorization, or
6 application of any provisions of this authorization to any circumstance, is held invalid, the application of
7 such provision to their circumstances, and the remainder of this authorization, shall not be affected
8 thereby.

9 The New Source Review Fee has been assessed according to WAC 173-455. No approval of a permit or
10 service for any activity covered in this Order will be valid until the required fee is paid in full.

11 The effective date of this authorization shall be the signature date of the ORDER. All references to
12 procedures or test methods shall be to those in effect as of the effective date of this ORDER.

13
14 **DATED** at Richland, Washington, this 20th day of December 2019.

15
16 **REVIEWED AND PREPARED BY:**

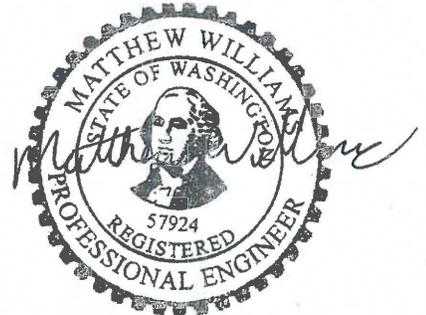


Matt Williams, P.E.

APPROVED BY:



Alexandra K. Smith, Program Manager



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Table 2: Toxic Air Pollutants for DE05NWP-001, Revision 1⁴

Material Data			ASIL/ Screening Level ¹	SQER ²	Emissions Estimate		Emissions Consequence
Chemical Name	CAS ³	Class	µg/m ³	lb/period	lb/hr	lb/yr	µg/m ³
N-Nitrosomethylethylamine	10595-95-6	A	0.0002	None	7.60E-07	6.66E-03	5.7E-09
1,4-Dichlorobenzene	106-46-7	A	1.5	500	5.30E-06	4.65E-02	4.0E-08
Ethylene dibromide (dibromethane)	106-93-4	A	0.0045	0.5	1.30E-04	1.14E+00	9.8E-07
1,3-Butadiene	106-99-0	A	0.0036	0.5	3.90E-03	3.42E+01	2.9E-05
1,2-Dichloroethane (ethylene chloride)	107-06-2	A	0.038	10	1.10E-08	9.64E-05	8.3E-11
Acrylonitrile	107-13-1	A	0.015	10	5.00E-06	4.38E-02	3.8E-08
Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7	A	2.5	500	5.80E-05	5.08E-01	4.4E-07
1,4-Dioxane	123-91-1	A	0.032	10	1.70E-02	1.49E+02	1.3E-04
Perchloroethylene (tetrachloroethylene)	127-18-4	A	1.1	500	1.00E-04	8.77E-01	7.5E-07
Polychlorinated biphenyls (PCBs)	1336-36-3	A	0.0045	0.5	2.50E-05	2.19E-01	1.9E-07
Formaldehyde	50-00-0	A	0.077	20	2.50E-05	2.19E-01	1.9E-07
Benzo(a)pyrene	50-32-8	A	0.00048	None	3.00E-05	2.63E-01	2.3E-07
Carbon tetrachloride	56-23-5	A	0.067	20	9.60E-06	8.42E-02	7.2E-08
N-Nitrosodi-n-propylamine	621-64-7	A	0.0005	None	1.91E-08	1.67E-04	1.4E-10
N-Nitrosodimethylamine	62-75-9	A	0.000071	None	2.80E-03	2.45E+01	2.1E-05
Chloroform	67-66-3	A	0.043	10	2.50E-04	2.19E+00	1.9E-06
Benzene	71-43-2	A	0.12	20	1.30E-03	1.14E+01	9.8E-06
Vinyl chloride	75-01-4	A	0.012	10	3.70E-06	3.24E-02	2.8E-08
Acetaldehyde	75-07-0	A	0.45	50	2.60E-02	2.28E+02	2.0E-04
Dichloromethane (methylene chloride)	75-09-2	A	0.56	50	2.50E-02	2.19E+02	1.9E-04
Ethylene oxide	75-21-8	A	0.01	10	3.40E-05	2.98E-01	2.6E-07
Bromoform	75-25-2	A	0.91	50	1.50E-08	1.31E-04	1.1E-10
Heptachlor	76-44-8	A	0.00077	None	7.60E-07	6.66E-03	5.7E-09
1,2-Dichloropropane	78-87-5	A	4	0.02	2.60E-08	2.28E-04	2.0E-10
Trichloroethylene	79-01-6	A	0.59	50	7.80E-04	6.84E+00	5.9E-06

Table 2: Toxic Air Pollutants for DE05NWP-001, Revision 1 ⁴

Material Data			ASIL/ Screening Level ¹	SQER ²	Emissions Estimate		Emissions Consequence
Chemical Name	CAS ³	Class	µg/m ³	lb/period	lb/hr	lb/yr	µg/m ³
N-Nitrosodi-n-butylamine	924-16-3	A	0.00063	None	2.20E-06	1.93E-02	1.7E-08
p-Nitrochlorobenzene	100-00-5	B	2	0.02	1.50E-03	1.31E+01	3.4E-04
4-Nitrophenol	100-02-7	B	6.3	0.02	2.80E-02	2.45E+02	6.4E-03
Ethyl benzene	100-41-4	B	1000	5	2.90E-03	2.54E+01	6.6E-04
Styrene	100-42-5	B	1000	5	3.60E-03	3.16E+01	8.2E-04
Nitric oxide	10102-43-9	B	100	2	1.60E-03	1.40E+01	3.7E-04
Phenyl ether	101-84-8	B	23	0.2	1.20E-04	1.05E+00	2.7E-05
Ethyl butyl ketone	106-35-4	B	780	5	5.10E-02	4.47E+02	1.2E-02
1,2-Epoxybutane	106-88-7	B	20	0.2	1.80E-04	1.58E+00	4.1E-05
Butane	106-97-8	B	6300	5	7.10E-02	6.22E+02	1.6E-02
Acrolein	107-02-8	B	0.02	0.02	1.00E-05	8.77E-02	2.3E-06
Allyl alcohol	107-18-6	B	17	0.2	6.20E-06	5.43E-02	1.4E-06
Methyl formate	107-31-3	B	820	5	1.30E-06	1.14E-02	3.0E-07
Methyl propyl ketone	107-87-9	B	2300	5	2.60E-02	2.28E+02	5.9E-03
1-Nitropropane	108-03-2	B	20	0.2	9.30E-05	8.15E-01	2.1E-05
Vinyl acetate	108-05-4	B	200	2.6	2.80E-06	2.45E-02	6.4E-07
Methyl isobutyl ketone (MIBK)	108-10-1	B	680	5	1.20E-02	1.05E+02	2.7E-03
Isopropyl ether	108-20-3	B	3500	5	2.90E-04	2.54E+00	6.6E-05
Isopropyl acetate	108-21-4	B	3500	5	2.10E-03	1.84E+01	4.8E-04
Methylcyclohexane	108-87-2	B	5400	5	1.80E-02	1.58E+02	4.1E-03
Toluene	108-88-3	B	400	5	2.50E-02	2.19E+02	5.7E-03
Chlorobenzene	108-90-7	B	150	2.6	1.10E-04	9.64E-01	2.5E-05
Cyclohexanol	108-93-0	B	690	5	1.40E-06	1.23E-02	3.2E-07
Cyclohexanone	108-94-1	B	330	5	4.40E-05	3.86E-01	1.0E-05
Phenol	108-95-2	B	63	1.2	2.60E-02	2.28E+02	5.9E-03
Pentane	109-66-0	B	6000	5	4.00E-02	3.51E+02	9.1E-03
Tetrahydrofuran	109-99-9	B	2000	5	6.50E-02	5.70E+02	1.5E-02

Table 2: Toxic Air Pollutants for DE05NWP-001, Revision 1 ⁴

Material Data			ASIL/ Screening Level ¹	SQER ²	Emissions Estimate		Emissions Consequence
Chemical Name	CAS ³	Class	µg/m ³	lb/period	lb/hr	lb/yr	µg/m ³
Methyl isoamyl ketone	110-12-3	B	780	5	1.30E-04	1.14E+00	3.0E-05
Methyl n-amyl ketone	110-43-0	B	780	5	1.00E-02	8.77E+01	2.3E-03
Hexane (n-Hexane)	110-54-3	B	200	2.6	5.90E-02	5.17E+02	1.3E-02
n-Valeraldehyde	110-62-3	B	590	5	3.20E-03	2.81E+01	7.3E-04
Cyclohexane	110-82-7	B	3400	5	2.40E-02	2.10E+02	5.5E-03
Cyclohexene	110-83-8	B	3400	5	1.40E+00	1.23E+04	3.2E-01
Pyridine	110-86-1	B	53	0.6	4.30E-01	3.77E+03	9.8E-02
Octane	111-65-9	B	4700	5	2.30E-02	2.02E+02	5.3E-03
2-Butoxyethanol	111-76-2	B	400	5	5.50E-01	4.82E+03	1.3E-01
Nonane	111-84-2	B	3500	5	7.40E-03	6.49E+01	1.7E-03
1,2,4-Trichlorobenzene	120-82-1	B	120	2	7.80E-05	6.84E-01	1.8E-05
Diphenylamine	122-39-4	B	33	0.6	1.50E-04	1.31E+00	3.4E-05
Dipropyl ketone	123-19-3	B	780	5	2.40E-02	2.10E+02	5.5E-03
Propionaldehyde	123-38-6	B	160	2.6	6.10E-07	5.35E-03	1.4E-07
Isoamyl alcohol	123-51-3	B	1200	5	7.00E-05	6.14E-01	1.6E-05
n-Butyl acetate	123-86-4	B	2400	5	8.90E-02	7.80E+02	2.0E-02
Tributyl phosphate	126-73-8	B	7.3	0.02	4.90E-02	4.30E+02	1.1E-02
Methylacrylonitrile	126-98-7	B	9	0.02	7.20E-05	6.31E-01	1.6E-05
Dimethyl acetamide	127-19-5	B	120	2	3.30E-05	2.89E-01	7.5E-06
2,6-Ditert. butyl-p-cresol	128-37-0	B	33	0.6	2.10E-02	1.84E+02	4.8E-03
Cresol, all isomers	1319-77-3	B	73	1.2	7.80E-01	6.84E+03	1.8E-01
Xylenes (m-,o-,p-isomers)	1330-20-7	B	1500	5	1.00E-03	8.77E+00	2.3E-04
Ethyl acetate	141-78-6	B	4800	5	2.70E-01	2.37E+03	6.2E-02
Mesityl oxide	141-79-7	B	200	2.6	5.70E-05	5.00E-01	1.3E-05
Heptane (n-Heptane)	142-82-5	B	5500	5	1.60E-02	1.40E+02	3.7E-03
Cyclopentane	287-92-3	B	5700	5	4.30E-04	3.77E+00	9.8E-05
Crotonaldehyde	4170-30-3	B	20	0.2	4.70E-05	4.12E-01	1.1E-05

Table 2: Toxic Air Pollutants for DE05NWP-001, Revision 1⁴

Material Data			ASIL/ Screening Level ¹	SQER ²	Emissions Estimate		Emissions Consequence
Chemical Name	CAS ³	Class	µg/m ³	lb/period	lb/hr	lb/yr	µg/m ³
Carbonyl sulfide	463-58-1	B	10	0.2	4.60E-05	4.03E-01	1.1E-05
Dinitro-o-cresol	534-52-1	B	0.67	0.02	7.90E-06	6.92E-02	1.8E-06
1,3-Dichloropropene	542-75-6	A	0.0625	12	7.39E-4 ⁵	6.47 ⁵	- ⁵
Methyl isopropyl ketone	563-80-4	B	2300	5	3.60E-02	3.16E+02	8.2E-03
1,1-Dimethylhydrazine	57-14-7	B	4	0.02	5.40E-06	4.73E-02	1.2E-06
2-Hexanone (MBK)	591-78-6	B	67	1.2	7.60E-03	6.66E+01	1.7E-03
Methyl hydrazine	60-34-4	B	1.2	0.02	1.80E-06	1.58E-02	4.1E-07
Methyl isocyanate	624-83-9	B	0.16	0.02	3.00E-05	2.63E-01	6.9E-06
n-Propyl nitrate	627-13-4	B	360	5	2.30E-05	2.02E-01	5.3E-06
Ethyl alcohol	64-17-5	B	6300	5	4.40E-02	3.86E+02	1.0E-02
Acetic acid	64-19-7	B	83	1.2	2.20E-02	1.93E+02	5.0E-03
Methyl alcohol	67-56-1	B	870	5	1.20E-01	1.05E+03	2.7E-02
Isopropyl alcohol	67-63-0	B	3300	5	2.00E-02	1.75E+02	4.6E-03
Acetone	67-64-1	B	5900	5	1.70E-01	1.49E+03	3.9E-02
n-Propyl alcohol	71-23-8	B	1600	5	8.60E-03	7.54E+01	2.0E-03
n-Butyl alcohol	71-36-3	B	500	5	2.60E-01	2.28E+03	5.9E-02
Methyl chloroform (1,1,1-Trichloroethane)	71-55-6	B	6400	5	1.00E-04	8.77E-01	2.3E-05
Methyl bromide	74-83-9	B	5	0.02	5.70E-04	5.00E+00	1.3E-04
Methyl chloride	74-87-3	B	340	5	2.30E-04	2.02E+00	5.3E-05
Methylamine	74-89-5	B	43	0.6	2.80E-08	2.45E-04	6.4E-09
Methyl acetylene	74-99-7	B	5500	5	4.00E-04	3.51E+00	9.1E-05
Ethyl chloride	75-00-3	B	10000	5	1.80E-03	1.58E+01	4.1E-04
Ethylamine	75-04-7	B	60	1.2	1.90E-09	1.67E-05	4.3E-10
Acetonitrile	75-05-8	B	220	2.6	6.40E-02	5.61E+02	1.5E-02
Formamide	75-12-7	B	60	1.2	5.50E-06	4.82E-02	1.3E-06
Carbon disulfide	75-15-0	B	100	2	7.50E-03	6.57E+01	1.7E-03
1,1-Dichloroethane	75-34-3	B	2700	5	9.30E-09	8.15E-05	2.1E-09
Vinylidene chloride	75-35-4	B	67	1.2	5.60E-02	4.91E+02	1.3E-02
Dichlorofluoromethane	75-43-4	B	130	2.6	1.60E-04	1.40E+00	3.7E-05

Table 2: Toxic Air Pollutants for DE05NWP-001, Revision 1⁴

Material Data			ASIL/ Screening Level ¹	SQER ²	Emissions Estimate		Emissions Consequence
Chemical Name	CAS ³	Class	µg/m ³	lb/period	lb/hr	lb/yr	µg/m ³
Chlorodifluoromethane	75-45-6	B	12000	5	4.20E-03	3.68E+01	9.6E-04
Trimethylamine	75-50-3	B	80	1.2	4.60E-03	4.03E+01	1.1E-03
Nitromethane	75-52-5	B	830	5	2.60E-08	2.28E-04	5.9E-09
Propylene imine	75-55-8	B	16	0.2	9.70E-05	8.50E-01	2.2E-05
tert-Butyl alcohol	75-65-0	B	1000	5	5.20E-03	4.56E+01	1.2E-03
Trichlorofluoromethane	75-69-4	B	19000	5	5.20E-03	4.56E+01	1.2E-03
Dichlorodifluoromethane	75-71-8	B	16000	5	5.40E-04	4.73E+00	1.2E-04
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	B	27000	5	8.30E-04	7.28E+00	1.9E-04
Dichlorotetrafluoroethane	76-14-2	B	23000	5	1.40E-05	1.23E-01	3.2E-06
Ammonia ⁶	7664-41-7	B	70.8	9.31	2.9	25,200	6.58E-01
Isobutyl alcohol	78-83-1	B	510	5	3.90E-05	3.42E-01	8.9E-06
sec-Butyl alcohol	78-92-2	B	1000	5	1.20E-04	1.05E+00	2.7E-05
Methyl ethyl ketone (MEK)	78-93-3	B	1000	5	1.50E-01	1.31E+03	3.4E-02
1,1,2-Trichloroethane	79-00-5	B	180	2.6	3.40E-04	2.98E+00	7.8E-05
Propionic acid	79-09-4	B	100	2	1.10E-05	9.64E-02	2.5E-06
Acrylic acid	79-10-7	B	0.3	0.02	1.20E-02	1.05E+02	2.7E-03
Methyl acetate	79-20-9	B	2000	5	9.30E-05	8.15E-01	2.1E-05
1,1,2,2-Tetrachloroethane	79-34-5	B	23	0.2	2.50E-05	2.19E-01	5.7E-06
Diethyl phthalate	84-66-2	B	17	0.2	4.80E-05	4.21E-01	1.1E-05
Dibutyl phthalate	84-74-2	B	17	0.2	1.30E-04	1.14E+00	3.0E-05
Hexachlorobutadiene	87-68-3	B	0.7	0.02	4.50E-03	3.94E+01	1.0E-03
Naphthalene	91-20-3	B	170	2.6	7.00E-06	6.14E-02	1.6E-06
Biphenyl	92-52-4	B	4.3	0.02	4.30E-02	3.77E+02	9.8E-03
o-Dichlorobenzene (1,2-Dichlorobenzene)	95-50-1	B	1000	5	6.10E-06	5.35E-02	1.4E-06
Diethyl ketone	96-22-0	B	2300	5	2.80E-05	2.45E-01	6.4E-06
Cumene	98-82-8	B	820	5	3.10E-04	2.72E+00	7.1E-05

Table 2: Toxic Air Pollutants for DE05NWP-001, Revision 1 ⁴

Material Data			ASIL/ Screening Level ¹	SQER ²	Emissions Estimate		Emissions Consequence
Chemical Name	CAS ³	Class	µg/m ³	lb/period	lb/hr	lb/yr	µg/m ³
a-Methyl styrene	98-83-9	B	810	5	5.20E-03	4.56E+01	1.2E-03
Acetophenone	98-86-2	B	350	5	1.10E-02	9.64E+01	2.5E-03
Nitrobenzene	98-95-3	B	1.7	0.02	1.40E-02	1.23E+02	3.2E-03
Total					8.19E+00	7.16E+04	

Notes: 1: ASILs for materials identified in Table 1 did not exist within WAC 173-460-150 or WAC 173-460-160 at the time of application submittal for DE05NWP-001, Revision 1 (See Notes 4 and 5). Table 1 establishes Screening Levels to be applied (shaded herein). Periods of exposure assessment are Annual for "A" TAPs and 24 hours for "B" TAPs.

2: Small Quantity Emission Rate (SQER) periods are Annual for "A" TAPs and 24-hours for "B" TAPs. "A" TAP 1,2-Dichloropropane is treated with "B" class periods.

3: CAS = Chemical Abstracts Service registry number.

4: DE05NWP-001, Revision 1, authorized physical modifications to exhauster design. TAPs were analyzed to the appropriate thresholds of WAC 173-460 at the time of complete application submittal. With the exception of 1,3-dichloropropene (see Note 5) and ammonia (see Note 6), emission rates and WAC 173-460 standards listed in Table 2 are those submitted and in effect for Revision 1.

5: 1,3-dichloropropene values were modified by DE05NWP-001, Revision 2. The increase in emissions was less than the SQER threshold; therefore, ambient air emissions impact was not analyzed to support issuance of DE05NWP-001, Revision 2. The emissions limit in Condition 1.2.5 is based upon the SQER at time of issuance and, therefore, is greater than the expected worst-case emission rate presented in Table 2.

6: Ammonia values were modified by DE05NWP-001, Revision 1, Amendment A. The listed WAC 173-460 thresholds in this table for ammonia were those in place upon complete application submittal for Amendment A.