



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

3100 Port of Benton Blvd • Richland, WA 99354 • (509) 372-7950

June 7, 2007

Ms. Shirley J. Olinger, Acting Manager
Office of River Protection
United States Department of Energy
P.O. Box 450, MSIN: H6-60
Richland, Washington 99352

Re: Determination of Complete Application, Double-Shell Tank Farms

Reference: USDOE-RL Letter 07-ESQ-091, *Request for Modification to Non-Radiological Air Emissions Notice of Construction (NOC) Application for Operation of New Ventilation Systems in AN and AW Tank Farms*, dated May 16, 2007

0072884

Dear Ms. Olinger:

Ecology finds the NOC modification you recently submitted complete. Your notice meets the requirements in Washington Administrative Code (WAC) Chapters 173-400 and 173-460. Enclosed is a copy of the anticipated ORDER to authorize you to proceed with the proposed project.

Your project involves the development of public exposure standards not currently established in WAC 173-460. Before we approve your Application, we will hold a 30-day public notice and comment period required by WAC 173-400-171(2)(a)(i). The public comment period will start June 25, 2007.

If you have questions, please call me at 509-372-7983.

Sincerely,

Doug Hendrickson, P.E.
Lead Air Engineer
Nuclear Waste Program

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pll
Enclosure
cc: See next page

Mr. Shirley J. Olinger

June 7, 2007

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cc: Dennis Bowser, USDOE

Mary Jarvis, USDOE

Phil Miller, CH2M

Lucinda Penn, CH2M

Stuart Harris, CTUIR

Gabriel Bohnee, NPT

Russell Jim, YN

Susan Leckband, HAB

Ken Niles, ODOE

John Martell, WDOH

Administrative Record: AIR Permits *4-0-9*
5-2-3

Environmental Portal

**NON-RADIOACTIVE AIR EMISSIONS
NOTICE OF CONSTRUCTION APPROVAL ORDER
CONDITIONS AND RESTRICTIONS**

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:

FINDINGS:

1. The United States Department of Energy proposes to modify their existing facility (Hanford) located in Richland, Washington.
2. A Notice of Construction (NOC) application was submitted on December 16, 2003. The application was found to be complete on August 11, 2004.
3. Hanford is an existing major stationary source that emits more than 250 tons of a regulated pollutant per year.
4. The proposed project consists of installing a replacement primary tank ventilation exhaust system for each of the 241-AN and 241-AW tank farms.
5. A Notice of Construction (NOC) application for modification was submitted on May 16, 2007. The application was found to be complete on June 4, 2007.
6. The proposed modification consists of including thirty-seven toxic air pollutants (TAPs) newly identified or anticipated in primary tank ventilation exhaust systems for each of the 241-AN and 241-AW tank farms.
7. Emissions of criteria pollutants from the proposed project are below the Prevention of Significant Deterioration Significant Emission Rates.
8. Hanford is located in a Class II Area designated as "attainment" for the purpose of NOC permitting for all pollutants.
9. Criteria air pollutant emissions from the proposed project are below the *de minimus* levels in WAC 173-400-110(5)(d).
10. Acceptable Source Impact Levels (ASILs) do not exist for the TAPs propionaldehyde, acetophenone, 4-nitrophenol, carbonyl sulfide, n-Nitrosomethylethylamine, and n-Nitrosodi-n-propylamine which the proposed project may emit; therefore Ecology has developed Screening Levels for these pollutants as detailed in Table 1.

Table 1: Development of Screening Levels

Toxic Air Pollutant	Chemical Abstracts Service #	Screening Level [$\mu\text{g}/\text{m}^3$, 24-hr average]	Basis for Screening Level (S.L.)
Propionaldehyde	123-38-6	160	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	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	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	19 (24-hr average)	Applying, under WAC 173-460-110(3)(a), Toxics release toxicity data of this material with RfD of 5.5 $\mu\text{g}/\text{Kg}\cdot\text{day}$, for average adult of 70 Kg weight and inhaled air of 20 m^3 , results in a value of: $S.L. = \frac{5.5\mu\text{g}}{\text{Kg}\cdot\text{day}} \cdot \frac{\text{day}}{20\text{m}^3\text{air}} \cdot 70\text{Kg} = \frac{19.3\mu\text{g}}{\text{m}^3} \text{ (24 hr average)}$ Assessment rounded to two significant digits.
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: $S.L. = \frac{1}{1\text{E} + 06} / \frac{6.3\text{E} - 03 \text{m}^3}{\mu\text{g}} = \frac{1.587\text{E} - 04\mu\text{g}}{\text{m}^3} \text{ (Annual average)}$ Assessment rounded to two significant digits.
n-Nitrosodi-n-propylamine	621-64-7	5E-04 (Annual average)	Unit cancer unit risk factor of 2E-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: $S.L. = \frac{1}{1\text{E} + 06} / \frac{2\text{E} - 03 \text{m}^3}{\mu\text{g}} = \frac{5.0\text{E} - 04\mu\text{g}}{\text{m}^3} \text{ (Annual average)}$ 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 and Carbonyl Sulfide: 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>).

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>)

11. TAPs from the proposed project are below the ASILs of WAC 173-460-150 and WAC 173-460-160 or Screening Levels of Table 1.
12. Toxics Best Available Control Technology (T-BACT) for this project has been determined to be operation of the primary tank ventilation exhausters systems not exceeding 4,000 cubic feet per minute (ft³/min) with moisture de-entrainment, pre-heater, and High Efficiency Particulate Air (HEPA) filtration in service in the treatment train.
13. The proposed project, if constructed and operated as herein required, will provide T-BACT.
14. The proposed project, if operated as herein required, will be in accordance with applicable rules and regulations, as set forth in Chapter 173-400 WAC and Chapter 173-460 WAC, and the operation thereof will not result in ambient air quality standards being exceeded.
15. The project will have no significant impact on air quality.

THEREFORE, IT IS ORDERED that the project as described in said Notice of Construction application, and as detailed in emissions estimates and impact and control technology assessments submitted to the Washington State Department of Ecology in reference thereto, is approved for construction, installation, and operation, provided compliance with the conditions and restrictions described below. This Order shall be identified as NOC Order **DE05NWP-001, Revision 1.**

1.0 GENERAL APPROVAL CONDITIONS

1.1 Effective Date

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

1.2 Emission Limits

- 1.2.1 Visible emissions from each stack shall not exceed five percent.
- 1.2.2 Primary tank ventilation exhauster systems for the 241-AN and for the 241-AW Double-Shell Tank (DST) farms shall not exceed 4,000 ft³/min (standard temperature and pressure).
- 1.2.3 All TAPs, as submitted in the Permittee's Notice of Construction Applications (Table 2), shall be below their respective ASIL or Screening Level of Table 1.
- 1.2.4 Emissions of ammonia shall not exceed 0.22 pounds per hour (2.77E-02 gram/second) from either primary tank ventilation exhauster system.

1.3 Compliance Demonstration

- 1.3.1 Compliance with Approval Condition 1.2.1 shall be met by Tier 3 Visible Emissions Survey requirements of the Hanford Air Operating Permit.
- 1.3.2 Should visible emissions be observed which are not solely attributable to water condensation, compliance with Approval Condition 1.2.1 shall be met by performing an opacity determination utilizing 40 Code of Federal Regulations (CFR) Part 60, Appendix A, Method 9, providing that such determination shall not place the visible emission observer in hazard greater than that identified for the general worker.
- 1.3.3 Compliance with Approval Condition 1.2.2 shall be demonstrated by stack gas flow and temperature measurement.
- 1.3.4 Compliance with Approval Condition 1.2.3 shall be met by operating the exhauster systems only when in accord with T-BACT emission controls found for this project.
- 1.3.5 Compliance with Approval Condition 1.2.4 shall be demonstrated by the conduct of ammonia concentration readings as described in Sections 3.1 and 3.2, and applying these concentration readings with contemporaneous stack flow rate and temperatures to determine instantaneous mass release rate of ammonia.

1.4 Manuals

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

2.0 Notifications and Submittals

2.1 Addressing

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

Washington State Department of Ecology
Nuclear Waste Program
3100 Port of Benton Boulevard
Richland, Washington 99354

2.2 Schedule

A schedule of installation and operation activities for these exhauster systems shall be submitted within 30 days of issuance of this order.

2.3 Operational Notice

Notification will be made at least ten days prior to initial operation of each of the exhauster systems covered by this Order.

2.4 Recordkeeping

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

1. Records of calibration of stack gas flow rate and temperature measurement devices.
2. Exhauster system stack flow rates and temperatures records.
3. Baseline and bi-annual emission monitoring results required in Section 3.0.
4. Supporting data and calculations to demonstrate compliance as detailed in Section 1.3.5.
5. All monitoring and operations records required to operate and maintain the emission control equipment which implements T-BACT as described in Section 1.0.
6. Laboratory analysis result summaries of any samples undertaken after the effective date of this ORDER from 241-AN or 241-AW tank farm tank headspaces or primary tank ventilation system exhaust which are examined for organic species or other TAPS.

2.5 Reporting

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

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

Visible emission surveys, conducted pursuant to Compliance Demonstration requirement 1.3.2, shall be submitted to Ecology within 30 days of completion of the survey with an assessment of the cause of visible emissions and a report of the maintenance conducted to maintain the subject exhaust system's T-BACT operations.

3.0 EMISSION MONITORING

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

3.1 Baseline Assessment

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

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

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

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

3.2 Bi-Annual Emission Assessment

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

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

4.0 APPROVAL ORDER AND RESTRICTIONS

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

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

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

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

Any person aggrieved by this ORDER may obtain review thereof by application, within 30 days of receipt of this order, to:

Pollution Control Hearings Board
P.O. Box 40903
Olympia, Washington 98504-0903

Concurrently, copies of the application must be sent to:

Washington State Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

Washington State Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

These procedures are consistent with the provisions of Chapter 43.21B RCW, and the rules and regulations adopted thereunder.

DATED at Richland, Washington, this ddth day of July 2007.

REVIEWED AND PREPARED BY:

Doug Hendrickson, P.E.

APPROVED BY:

Jane A. Hedges
Program Manager
Nuclear Waste Program
Washington State Department of Ecology

DRAFT

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

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
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

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

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
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
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
Carbonyl sulfide	463-58-1	B	19	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

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

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
Dichloropropene	542-75-6	B	20	0.2	2.20E-08	1.93E-04	5.0E-09
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
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	7664-41-7	B	100	2	2.20E-01	1.93E+03	5.0E-02
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

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

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
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
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					5.51E+00	4.83E+04	

Notes:

- 1: ASILs for materials identified in Table 1 do not exist within WAC 173-460-150 or WAC 173-460-160. 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: SQER periods are Annual for "A" TAPs and 24-hours for "B" TAPS. "A" TAP 1,2-Dichloropropane is treated with "B" class periods. SQER values do not exist within WAC 173-460-080 for ASILs or Screening Levels below 0.001 µg/m³.
- 3: CAS = Chemical Abstracts Service registry number