

Effective Date: 08/01/2019
Expiration Date: 08/01/2024

Hanford Air Operating Permit
Permit No. 00-05-006
Renewal 3

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**STATEMENT OF BASIS
HANFORD SITE AIR OPERATING PERMIT
NO. 00-05-006
RENEWAL 3
ATTACHMENT 1: ECOLOGY PERMITS
WASHINGTON STATE DEPARTMENT OF ECOLOGY**

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The Statement of Basis (Statement) is issued by Washington State Department of Ecology (Ecology) as a separate supporting reference document to the Hanford Air Operating Permit (AOP) Attachment 1. This Statement sets forth the legal and factual basis for the AOP Attachment 1 conditions, and is not intended for enforcement purposes. The Statement includes references to the applicable statutory or regulatory provisions, technical supporting information on specific emission units, and clarifications of specific requirements. The Statement of Basis is non-enforceable, but is a supporting reference document that provides a rationale for the development of the permit and offers clarification where deemed necessary.

[Washington Administrative Code (WAC) 173-401-700(8)]

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1 **1.0 EMISSION STANDARDS AND LIMITATIONS**

2 The purpose of this section is to identify emission standards and limitations for all non-radioactive
3 emission units, including insignificant emission units (IEUs) on the Hanford Site.

4 **1.1 General Standards for Maximum Emissions**

5 WAC 173-401-605(1) requires each operating permit to comply with general emission standards and
6 limitations. A set of general standards for maximum emissions for all sources and emission units are
7 listed in WAC 173-400-040. The general standards for maximum emissions in Table 1.1 of AOP
8 Attachment 1 apply to all emission units on the Hanford Site.

9 Table 1.1 of AOP Attachment 1, “General Standards for Maximum Emissions,” requires that the permittee
10 use good practice and procedures to reduce odorous emissions to a reasonable minimum. Based on
11 process knowledge and the lack of odor complaints filed with the regulatory agencies, Ecology has
12 determined that the Hanford Site is not a source of odorous emissions to the surrounding public. For
13 these reasons, the complaint response program for odor control described in Table 1.1 of AOP Attachment
14 1 is considered adequate to maintain odorous emissions at a reasonable minimum.

15 Table 1.1 also requires that the permittee use reasonable precautions to control fugitive emissions and
16 fugitive dust. The Hanford Site generally is not a source of fugitive dust and emissions, except during
17 construction and demolition activities. Most of the construction activities occur in areas of the Hanford
18 Site remote from the Hanford Site boundaries. The Hanford Site uses a system of pre-job planning and
19 job safety analysis to reasonably control these emissions. Emissions that pass through a stack are not
20 sources of fugitive emissions.

21 WAC 173-401-605(3) requires each operating permit to consider reasonably available control technology
22 (RACT). Per RCW 70.94.154 requirement, RACT is required for existing sources. In addition, source-
23 specific RACT determinations may be performed when required by the Federal Clean Air Act. All
24 limitations and conditions established within the Washington State Implementation Plan (SIP) are
25 federally enforceable.

26 [WAC 173-400-030(32)] or fugitive dust [WAC 173-400-030(38)].

27 **1.2 Insignificant Emission Units**

28 Insignificant emission units (IEUs) are small, minor pollution sources at industrial facilities that are
29 subject to the operating permit regulation (specific IEU criteria are defined in WAC 173-401-530).
30 Examples of IEUs include bathroom vents, lubricating-oil storage tanks, plastic pipe welding, and wet
31 sand-and-gravel screening. IEUs can also be emission sources which have emissions below established
32 thresholds.

33 In compliance with WAC 173-401-530 the IEUs and insignificant emission activities have been listed in
34 the permit application. The AOP regulations do not require that each IEU be listed in the AOP. The types
35 of units and activities determined to be insignificant based on their size or production rate are summarized
36 in the Appendices of this Statement of Basis for Attachment 1.

37 WAC 173-401-530 establishes several criteria for determining if an emission unit is insignificant.
38 Following AOP issuance, no emission unit that qualifies as an IEU based on actual emissions can exceed
39 the emission thresholds in WAC 173-401-530 and -531 without first obtaining a permit modification.

40 In the fall of 1993, Ecology developed Washington’s original air operating permits regulation [WAC 173-
41 401] to comply with federal regulation [40 CFR 70, or Title 5 of the Clean Air Act, as amended (CAA)].
42 At the same time, Ecology applied to the EPA for program approval. In November 1994, EPA granted
43 Ecology interim approval for the air operating permits program. However, EPA also directed the state to
44 correct several issues in order to be granted full approval for the program.

45 Ecology made the changes requested by EPA, with the exception of the requested change related to IEUs.

1 IEUs are small, minor pollution sources at industrial facilities that are subject to the operating permit
2 regulation. They include such emissions as bathroom vents, lubricating-oil storage tanks, plastic pipe
3 welding, and wet sand-and-gravel screening. Ecology disagreed with EPA about requiring IEUs to meet
4 monitoring, record-keeping, and reporting (MRR) requirements of Title 5 of the CAA. Washington's
5 state rule exempted IEUs from these requirements in order to focus on the larger sources of pollution,
6 where the most important air quality gains can be made. Ecology believed that subjecting the
7 insignificant units and activities to the same level of rigorous MRR would place more attention than
8 necessary on small emissions.

9 As a result of the disagreement with EPA about IEUs, Ecology sued EPA in the 9th Circuit Court of
10 Appeals in the spring of 1995. The lawsuit had two main points. The first was that, since EPA's rules
11 were silent on the issue of MRR for IEUs, Washington's approach should be acceptable to EPA. The
12 second was that EPA was treating permitting authorities inconsistently by approving similar provisions in
13 other states, while not approving the same kinds of provisions in Washington's program. In June 1996,
14 the court ordered EPA to approve Washington's program with respect to IEUs.

15 In the meantime, EPA began revising the federal operating permit regulations. After a revision of this
16 type takes place, states are required to revise their regulations to reflect the federal changes.
17 Consequently, many states in the nation, including Washington, were faced with the prospect of revising
18 their programs twice in a short period of time. To address this concern, EPA extended existing interim
19 approvals of state programs for up to five years. However, because federal law expressly prohibits
20 extending interim approvals, EPA was sued over this issue in the fall of 2000. The resulting settlement
21 agreement provided that EPA would take comment on all 50 states' operating permit programs.

22 Just one commenter addressed Washington's operating permit program. One of the comments was that
23 Washington's rules on IEUs did not meet requirements of the federal regulations. EPA agreed with this
24 comment and issued a notice of deficiency (NOD) on December 14, 2001. Ecology then initiated a
25 compromise with EPA over the issue of IEUs, which led to an agreement on new language for Ecology's
26 regulation. Ecology proposed the new language in April 2002 for public participation and EPA review.
27 As the result of the approval of this WAC 173-401-530 revision, full approval of the Washington
28 operating program was granted on January 2, 2002.

29 The IEU evaluation process and results supporting the Hanford Site AOP renewal application are
30 documented below. The purpose of an IEU evaluation for the Hanford AOP renewal application is to
31 verify that:

- 32 • Emission units and activities identified as insignificant in the initial AOP (i.e., DOE/RL 95-07)
33 have remained insignificant, and
- 34 • Emission units or activities not included in the initial application (because they commenced
35 during the permit term) are appropriately permitted.

36 The IEU evaluation process focuses on criteria/hazardous air pollutant emission units or activities subject
37 to regulation under the Federal Clean Air Act with a potential to emit, but where operations have not
38 increased, consistent with the regulatory definition of modification. The following areas/activities on the
39 Hanford Site were excluded from the WAC 173-401-530 evaluation process effort:

- 40 • Areas regulated under the *Comprehensive Environmental Response, Compensation, and Liability*
41 *Act (CERCLA)*. This includes sources and activities at a CERCLA Operable Unit(s).
- 42 • Areas regulated by the *Resource Conservation and Recovery Act, Subparts AA, BB, and CC*.
- 43 • Emission units that have been closed (e.g., power plants or package boilers) since the original
44 application. This exclusion category generally has closure documentation in previous years'
45 annual submittal report, pursuant to WAC 173-400-105, and/or in a previously transmitted AOP
46 modification(s).

- 1 • Emission units and activities in an active Ecology notice of construction (NOC) approval (i.e.,
2 approval order) and/or listed in AOP Attachment 1.
- 3 • Emission units, activities, or portions of the Hanford Site: (1) that were evaluated in the IEU
4 effort included in the initial AOP application and (2) where current operations of such units,
5 activities, or portions results in no increased potential to emit criteria/hazardous air pollutants
6 (e.g., Fuel and Materials Examination Facility).
- 7 • Emission units, activities, or portions of the Hanford Site that are in surveillance and maintenance
8 modes of operation (e.g., S Plant, U Plant, PUREX, B Plant, etc.).

9 Emission units or activities remaining after applying the above exclusion criteria were then evaluated for
10 IEU status per the five categories below:

- 11 1. Emission units or activities listed as categorically exempt in WAC 173-401-532.
- 12 2. Fugitive emission sources, pursuant to WAC 173-401-530(1)(d), that are subject to no applicable
13 requirement other than generally applicable requirements of the state implementation plan.
- 14 3. Emission units or activities defined as insignificant based on size and production rates are listed
15 in WAC 173-401-533. Appendix B provides a table of WAC 173-401-533(2)(a)-(bb) activities; a
16 "yes" or "no" response indicates whether or not that unit exists on the Hanford Site major
17 stationary source.
- 18 4. Emission units or activities not addressed in items 1 through 3, above, and for which a chemical
19 inventory is readily available, were screened against the criteria/hazardous air pollutant thresholds
20 listed in WAC 173-401-530(4) and WAC 173-401-531. Candidates above these thresholds were
21 considered as significant and included in AOP Attachment 1, Section 1.4 No additional Hanford
22 Site IEUs with emissions below the threshold levels of WAC 173-401-530(4) and WAC 173-401-
23 531 were identified. IEUs which likely have emissions below the referenced thresholds were
24 determined to fit into at least one of the IEU categories in Appendix B.
- 25 5. Any remaining emission units or activities not addressed in items 1 through 4, above, that are
26 insignificant are listed by category type in Appendix B of this Statement of Basis.

27 As a result of the above process, the IEUs included in the AOP renewal application are provided in
28 Appendix B through C of this Statement of Basis. Appendix A includes a listing of insignificant emission
29 units and activities on the Hanford Site along with applicable standards. Compliance with the standards is
30 required; however, no monitoring is required for IEUs.

31 **1.3 Emission Units and Activities Subject to Monitoring, Reporting, Recordkeeping,** 32 **and Compliance Certification**

33 All Chapter 401 permits shall contain compliance certification, testing, monitoring, reporting, and
34 recordkeeping requirements sufficient to assure compliance with the terms and conditions of the permit.
35 Any document, including reports, required by a Chapter 401 permit shall contain a certification by a
36 responsible official that meets the requirements of WAC 173-401-520. [WAC 173-401-630]

37 Any application form, report, or compliance certification submitted pursuant to this chapter shall contain
38 certification by a responsible official of truth, accuracy, and completeness. This certification and any
39 other certification required under this chapter shall state that, based on information and belief formed after
40 reasonable inquiry, the statements and information in the document are true, accurate, and complete.
41 [WAC 173-401-520]

42 **1.4 Emission Unit Specific Applicable Requirements**

43 This section contains emission unit specific requirements in addition to general standards for maximum
44 emissions.

45 Internal combustion engine stationary sources that were previously classified as IEUs but, as a result of

1 federal rule changes to 40 CFR 60 Subpart IIII, 40 CFR 60 Subpart JJJJ, and 40 CFR 63 Subpart ZZZZ,
2 are now subject to a federally enforceable rule. In accordance with WAC 173-401-530(2)(a), sources
3 subject to a federally enforceable rule cannot be classified as an IEU.

4 In Attachment 1, Section 1.4 of the AOP is intended to capture the periodic monitoring, emission limit
5 and other approval conditions for all emission units. However, Section 1.4 does not list all conditions
6 included in the approval order as "Approval Conditions." Most of the excluded conditions have been
7 captured elsewhere in the AOP as applicable requirements. The categories of excluded approval
8 conditions include the following:

- 9 • Conditions and requirements addressed in Section 4.0, Permit Provisos, of the Hanford Site AOP.
- 10 • Conditions and requirements addressed in Section 5.0, Permit Administration, of the Hanford Site
11 AOP, such as the condition to send reports to the Ecology office or the requirement to allow
12 access to the facility for inspection.
- 13 • Conditions and requirements that re-state portions of applicable codified regulations.
- 14 • The requirement to prepare and maintain an Operation and Maintenance Manual.

15 Discharge Points in Section 1.4 in Attachment 1 of the AOP derived from Approval Orders includes only
16 the emission limits and conditions identified in the "Approval Conditions" section of the regulatory
17 orders. Information included in other sections of the orders, such as "Findings," "Background,"
18 "Description," or similarly titled sections are not included in the section.

19 Certain approval orders become obsolete when the facilities cease to operate. Certain approval orders
20 contain activities that will end at activity completion, as described in the notice of construction (NOC)
21 application. The permittee is not required to continue to comply with approval order terms and conditions
22 after these become irrelevant. For example, a number of approval orders for old coal-fired boilers at 200
23 Areas are irrelevant because the boilers were demolished. Many approval orders contain the requirement
24 to conduct an initial, one time only, startup test. Once that initial startup test requirement has been
25 completed satisfactorily, that condition is deemed irrelevant, and the permittee is no longer bound by that
26 particular requirement.

27 Subpart AA of 40 CFR Part 264 and 265 applies to process vents that treat organic waste using designated
28 treatment technologies. Subpart AA requires organic emissions from all affected process vents on the
29 Hanford Site be less than 1.4 kilograms per hour and 2.8 megagrams per year, or control devices must be
30 installed to reduce organic emissions by 95%. Currently the 200 Area Effluent Treatment Facility (ETF)
31 and the 242-A Evaporator are operating treatment, storage, or disposal (TSD) units contributing to the
32 Hanford Facility volatile organic emissions under 40 CFR 264 and 265, Subpart AA. For process vents
33 emitting organic toxic air pollutants (TAPs) currently regulated under NOCs and RCRA Subpart AA,
34 Ecology is deferring regulation of the organic emissions from process vents to RCRA, Subpart AA.

35 Hanford has a long operating history since 1943. Many processes and procedures are imbedded in the
36 process knowledge. Process knowledge is knowledge of a particular process obtained from some
37 documented source or sources. The documented source or sources can include a policy, operating
38 procedure, manufacturer's recommendations or manuals, or other peer-reviewed documentation. Process
39 knowledge also can include familiarity with analytical data.

40 **2.0 COMPLIANCE AND PERIODIC MONITORING PROVISIONS**

41 The permittee is authorized to operate the non-radioactive portion of the air emission units identified in
42 Attachment 1 and all insignificant emission units not specifically identified in this permit.

43 Compliance and periodic monitoring provisions, including opacity monitoring requirements, are
44 described in details in this section. Specific monitoring provisions include visible emission surveys
45 (subsection 2.1), general standards complaint investigations (subsection 2.2), measures to control fugitive

1 emissions and fugitive dust (subsection 2.3), recordkeeping for boilers (subsection 2.5), steam generating
2 units source tests (subsection 2.6), SO₂ Emissions Compliance (subsection 2.7), visible emissions
3 enforceability (subsection 2.8), and SO₂ enforceability (subsection 2.9).

4 **2.1 Visible Emissions Surveys**

5 Three methods (Tier 1 through 3) are used for visible emission surveys at Hanford. Tier 1 applies
6 primarily to fossil fuel combustion units and other emission units that might be a source of visible
7 emissions. The method consists of requiring personnel observation and EPA Method 9, if visible
8 emissions are observed.

9 Tier 2 applies to “normally clean” emission units which are unlikely sources of visible emissions. This
10 category of emission sources on the Hanford Site have little or no ability to emit visible emissions. For
11 example, boilers firing natural gas and sources where particulate matter or other condensables are not
12 expected to be present. Such sources are candidates for less frequent visible emission surveys. Tier 2
13 provide progressive survey requirements, including EPA Method 9, if visible emission is observed or the
14 event is likely to re-occur.

15 Tier 3 applies to emission units with abatement control technology, such as High Efficiency Particulate
16 Air (HEPA) filters. Ecology acknowledges that the opacity monitoring requirements from mixed
17 (radioactive and non-radioactive) airborne effluent streams are not necessary due to the presence of HEPA
18 filtration abatement technology required by Health under WAC 246-247. HEPA filters control particulate
19 emissions to less than visible levels. Because of the particulate control effectiveness provided by HEPA
20 filters, no additional opacity monitoring, beyond visible emissions surveys, is required for those emission
21 units required to have HEPA filters that are listed in Attachment 2. Health imposes significant monitoring
22 requirements on HEPA filters in Enclosure 1 of Attachment 2.

23 **2.2 General Standards Complaint Investigations**

24 This subsection of Attachment 1 specifies the requirements for DOE and contractors to respond to a
25 complaint investigation. Ecology shall first assess the validity of a complaint. Once the validity is
26 established, Ecology will contact DOE for formal investigation.

27 **2.3 Measures to Control Fugitive Emissions and Fugitive Dust**

28 This subsection of Attachment 1 lists specific measures to control fugitive emissions and fugitive dust
29 through pre-job planning and job safety analysis.

30 **2.4 Reserved**

31 Reserved

32 **2.5 Recordkeeping for Boilers**

33 This subsection of Attachment 1 specifies recordkeeping for boilers.

34 **2.6 Steam Generating Units Source Tests**

35 This subsection specifies all source tests for the boilers regulated by NOC 97NM-138. The removal of
36 future 5-year follow-up AOP compliance testing and its justification is also included.

37 **2.7 SO₂ Emissions Compliance**

38 There are two tiers of SO₂ emission compliance for Hanford emission units, fuel-oil fired combustion
39 units (Tier 1) and other significant emission units (Tier 2). The calculation model for Tier 1 is described
40 in Section 3.1 (i.e., Model 1).

41 **2.8 Visible Emissions Enforceability**

42 This subsection is self-explanatory.

1 **2.9 Sulfur Dioxide Enforceability**

2 No person shall cause or permit the emission of a gas containing sulfur dioxide from any emissions unit
3 in excess of 1,000 parts per million (ppm) of sulfur dioxide on a dry basis and based on the average of any
4 period of sixty consecutive minutes, except for the limited conditions specified in WAC 173-400-40(6).

5 **3.0 RECORDKEEPING**

6 WAC 173-401-615(2) requires that the Permittee maintain records of all required monitoring data and
7 support information for five (5) years from the date of the monitoring sample, measurement, report, or
8 application. Section 3.1 documents approved emission calculation methods, which are self-explanatory.
9 In addition to these emission calculation methods, calculations methods listed in NOC approval
10 applications are acceptable to the agency for compliance demonstration. These NOC approval
11 applications should be kept as records.

12 **3.1 Emission Calculations**

13 The following section contains emission calculations for SO₂, nitrogen oxides, volatile organic
14 compounds, ammonia, gas cylinders, chemical inventory, air concentrations, and TAPs. In addition to
15 these models the NOC approval applications contains the calculation methods used to estimate SO₂,
16 nitrogen oxides, volatile organic compounds, ammonia, gas cylinders, chemical inventory, air
17 concentrations, and TAPs, as required for the discharge point or project/process being permitted.

18 **3.1.1 MODEL 1 Description: Compliance with 1000 ppm SO₂ @7% O₂ Internal
19 Combustion Engines >500 hp SO₂ Emission Calculations**

20 Stoichiometric calculations were done to show emissions for a specific diesel engine (2200 HP, with fuel
21 consumption rate of 99.4 gal/hr) were well below the 1000 ppm SO₂ standard.

22 Theoretical air required (ft³/lb) = 1710 * (C/12+ H/2 + S/32)

23 Multiply this by fuel consumption rate * fuel density to get ft³/min

24 Assumptions: diesel fuel is predominantly C₁₆H₂₄

25 Fuel density = 7.107 lb/gal

26 Heat content diesel = 140000 BTU/gal

27 Sulfur (S) concentration of 0.5% by weight (wt%)

28 AP-42 emission factors for large Internal Combustion (IC) engines

29 CO = 0.85 lb/mmBTU

30 CO₂ = 165 lb/mmBTU

31 TOC (as CH₄) = 0.09 lb/mmBTU

32 NO_x (as NO₂) = 3.2 lb/mmBTU

33 Assuming complete combustion of the fuel, emissions were shown in the calculations below to be less
34 than 250 ppm SO₂ at 7% O₂. Calculations were also done varying the fuel consumption rate. Since the
35 theoretical air required was proportional to the fuel consumption rate, theoretical SO₂ emissions were
36 independent of engine size or fuel consumption rate. Actual SO₂ emissions would be diluted by excess
37 air.

38 Therefore, as a class, these engines cannot exceed the general standard when using fuel with S
39 concentration < 0.5%.

40 Stoichiometric Calculations to Estimate SO₂ Emissions Normalized to 7% O₂ From Combustion of
41 Diesel #2 Fuel Oil using AP-42 Factors For Large Internal Combustion Engines (> 500 HP)

42 Assumptions: Diesel #2 Fuel Oil (C₁₆H₂₄), 0.5wt% Sulfur; Heat Content = 140,000 BTU/gal;

1 Case 1: 2200 HP IC Engine; Fuel consumption rate = 99.4 gal/hr.

2 $MW_C := 12.01115 \cdot \frac{\text{gm}}{\text{mole}}$ $MW_O := 15.9994 \cdot \frac{\text{gm}}{\text{mole}}$ $MW_H := 1.0079 \cdot \frac{\text{gm}}{\text{mole}}$

3 $MW_S := 32.064 \cdot \frac{\text{gm}}{\text{mole}}$ $MW_N := 14.0067 \cdot \frac{\text{gm}}{\text{mole}}$ $P := 1 \cdot \text{atm}$ $MM := 1 \cdot 10^6$

4 $MW_{\text{fuel}} := 16 \cdot MW_C + 24 \cdot MW_H$ $MW_{\text{fuel}} = 216.368 \cdot \frac{\text{gm}}{\text{mole}}$

5 $MW_{\text{SO}_2} := MW_S + 2 \cdot MW_O$ $MW_{\text{SO}_2} = 64.063 \cdot \frac{\text{gm}}{\text{mole}}$

6 $MW_{\text{Air}} := 2 \cdot (.21 \cdot MW_O + .79 \cdot MW_N)$ $MW_{\text{Air}} = 28.85 \cdot \frac{\text{gm}}{\text{mole}}$

7 $MW_{\text{CO}} := MW_C + MW_O$ $MW_{\text{CO}} = 28.011 \cdot \frac{\text{gm}}{\text{mole}}$

8 $MW_{\text{CO}_2} := MW_C + 2 \cdot MW_O$ $MW_{\text{CO}_2} = 44.01 \cdot \frac{\text{gm}}{\text{mole}}$

9 $MW_{\text{CH}_4} := MW_C + 4 \cdot MW_H$ $MW_{\text{CH}_4} = 16.043 \cdot \frac{\text{gm}}{\text{mole}}$

10 $MW_{\text{NO}_2} := MW_N + 2 \cdot MW_O$ $MW_{\text{NO}_2} = 44.013 \cdot \frac{\text{gm}}{\text{mole}}$

11 $S_f := 0.005$ $C_f := 16 \cdot \frac{MW_C}{MW_{\text{fuel}}}$ $H_f := 24 \cdot \frac{MW_H}{MW_{\text{fuel}}}$

12 $V_{\text{th_air}} := \left[1710 \cdot \left(\frac{C_f}{12} + \frac{H_f}{2} + \frac{S_f}{32} \right) \right] \frac{\text{ft}^3}{\text{lb}}$ $V_{\text{th_air}} = 222.424 \cdot \frac{\text{ft}^3}{\text{lb}}$

13 $V_{\text{fuel}} := 99.4 \cdot \frac{\text{gal}}{\text{hr}}$ $T_{\text{SC}} := 527.67 \cdot \text{R}$ $T_{\text{SC}} = 293.15 \cdot \text{K}$

14 $\text{SO}_2_{\text{conc}} := \frac{71 \cdot \text{lb}}{1000 \cdot \text{gal}}$ $R_{\text{gas}} := \frac{P \cdot 22.4 \cdot \text{liter}}{\text{mole} \cdot T_{\text{SC}}}$ $R_{\text{gas}} = 0.076 \cdot \frac{\text{liter} \cdot \text{atm}}{\text{mole} \cdot \text{K}}$

15 $S_{\text{fuel}} := \text{SO}_2_{\text{conc}} \cdot \frac{MW_S}{MW_{\text{SO}_2}}$ $S_{\text{fuel}} = 0.036 \cdot \frac{\text{lb}}{\text{gal}}$

16 $\rho_{\text{fuel}} := \frac{S_{\text{fuel}}}{.005}$ $\rho_{\text{fuel}} = 7.107 \cdot \frac{\text{lb}}{\text{gal}}$

17 $\text{Fuel} := \frac{V_{\text{fuel}} \cdot \rho_{\text{fuel}}}{MW_{\text{fuel}}}$ $\text{Fuel} = 1.481 \cdot 10^3 \cdot \frac{\text{mole}}{\text{hr}}$

18 $S := \frac{V_{\text{fuel}} \cdot S_{\text{fuel}}}{MW_S}$ $S = 49.969 \cdot \frac{\text{mole}}{\text{hr}}$ $\text{SO}_2 := S$ $\text{SO}_2 = 49.969 \cdot \frac{\text{mole}}{\text{hr}}$

19 $V_{\text{air}} := V_{\text{th_air}} \cdot \rho_{\text{fuel}} \cdot V_{\text{fuel}}$ $V_{\text{air}} = 2.619 \cdot 10^3 \cdot \frac{\text{ft}^3}{\text{min}}$

1 Heat of combustion of fuel reported at 140,000 BTU/gal; however, based on AP-42 factors, results in
 2 using more fuel than supplied based on the stoichiometry for the combustion of fuel. By trial and error,
 3 adjusted the heat of combustion of the fuel so that the remaining amount of uncombusted carbon was
 4 essentially "zero."

$$5 \quad H_{c_fuel} := 138903.34 \cdot \frac{\text{BTU}}{\text{gal}} \quad H_{c_total} := H_{c_fuel} \cdot V_{fuel} \quad H_{c_total} = 1.381 \cdot 10^7 \cdot \frac{\text{BTU}}{\text{hr}}$$

$$6 \quad CO_{produced} := H_{c_total} \cdot 81 \cdot \frac{\text{lb}}{\text{MM} \cdot \text{BTU}} \quad CO_{produced} = 11.184 \cdot \frac{\text{lb}}{\text{hr}}$$

$$7 \quad CO := \frac{CO_{produced}}{MW_{CO}} \quad CO = 181.104 \cdot \frac{\text{mole}}{\text{hr}}$$

$$8 \quad CO2_{produced} := H_{c_total} \cdot 165 \cdot \frac{\text{lb}}{\text{MM} \cdot \text{BTU}} \quad CO2_{produced} = 2.278 \cdot 10^3 \cdot \frac{\text{lb}}{\text{hr}}$$

$$9 \quad CO2 := \frac{CO2_{produced}}{MW_{CO2}} \quad CO2 = 2.348 \cdot 10^4 \cdot \frac{\text{mole}}{\text{hr}}$$

$$10 \quad CH4_{produced} := H_{c_total} \cdot 09 \cdot \frac{\text{lb}}{\text{MM} \cdot \text{BTU}} \quad CH4_{produced} = 1.243 \cdot \frac{\text{lb}}{\text{hr}}$$

$$11 \quad CH4 := \frac{CH4_{produced}}{MW_{CH4}} \quad CH4 = 35.134 \cdot \frac{\text{mole}}{\text{hr}}$$

$$12 \quad NO2_{produced} := H_{c_total} \cdot 3.1 \cdot \frac{\text{lb}}{\text{MM} \cdot \text{BTU}} \quad NO2_{produced} = 42.802 \cdot \frac{\text{lb}}{\text{hr}}$$

$$13 \quad NO2 := \frac{NO2_{produced}}{MW_{NO2}} \quad NO2 = 441.111 \cdot \frac{\text{mole}}{\text{hr}}$$

$$14 \quad H2O := \frac{24 \cdot \text{Fuel} - 4 \cdot \text{CH4}}{2} \quad H2O = 1.77 \cdot 10^4 \cdot \frac{\text{mole}}{\text{hr}}$$

$$15 \quad Air_{actual} := \frac{P \cdot V_{air}}{R_{gas} \cdot T_{SC}} \quad Air_{actual} = 1.986 \cdot 10^5 \cdot \frac{\text{mole}}{\text{hr}}$$

$$16 \quad O_{actual} := 2.21 \cdot Air_{actual} \quad O_{actual} = 8.343 \cdot 10^4 \cdot \frac{\text{mole}}{\text{hr}}$$

$$17 \quad N_{actual} := 2.79 \cdot Air_{actual} \quad N_{actual} = 3.138 \cdot 10^5 \cdot \frac{\text{mole}}{\text{hr}}$$

$$18 \quad O_{remaining} := O_{actual} - 2 \cdot SO2 - NO2 - 2 \cdot CO2 - CO - H2O \quad O_{remaining} = 1.804 \cdot 10^4 \cdot \frac{\text{mole}}{\text{hr}}$$

$$19 \quad O_{2_remaining} := \frac{O_{remaining}}{2} \quad O_{2_remaining} = 9.022 \cdot 10^3 \cdot \frac{\text{mole}}{\text{hr}}$$

$$20 \quad N_{remaining} := N_{actual} - NO2 \quad N_{remaining} = 3.134 \cdot 10^5 \cdot \frac{\text{mole}}{\text{hr}}$$

$$21 \quad N_{2_remaining} := \frac{N_{remaining}}{2} \quad N_{2_remaining} = 1.567 \cdot 10^5 \cdot \frac{\text{mole}}{\text{hr}}$$

1 Verification that remaining carbon is essentially "zero".

2 $C_{\text{remaining}} := 16 \cdot \text{Fuel} - \text{CO} - \text{CO}_2 - \text{CH}_4$ $C_{\text{remaining}} = 3.781 \cdot 10^{-4} \frac{\text{mole}}{\text{hr}}$

3 Recalling that Mole % = Volume % (for gasses only) one can easily calculate the volume % of the
 4 constituents in the exiting gas stream.

5 $\text{Moles}_{\text{total}} := \text{O}_{2\text{remaining}} + \text{N}_{2\text{remaining}} + \text{CO} + \text{CO}_2 + \text{SO}_2 + \text{NO}_2 + \text{CH}_4 + \text{H}_2\text{O}$

6 $\text{Moles}_{\text{total}} = 2.076 \cdot 10^5 \frac{\text{mole}}{\text{hr}}$

7 Gas calculations are to be done on a dry basis; therefore, water contributions are subtracted.

8 $\text{Moles}_{\text{total_dry}} := \text{Moles}_{\text{total}} - \text{H}_2\text{O}$ $\text{Moles}_{\text{total_dry}} = 1.899 \cdot 10^5 \frac{\text{mole}}{\text{hr}}$

9 $\text{O}_2\% := \frac{(\text{O}_{2\text{remaining}} \cdot 100)}{\text{Moles}_{\text{total_dry}}}$ $\text{O}_2\% = 4.751$

10 $\text{N}_2\% := \frac{(\text{N}_{2\text{remaining}} \cdot 100)}{\text{Moles}_{\text{total_dry}}}$ $\text{N}_2\% = 82.513$

11 $\text{CH}_4\% := \frac{\text{CH}_4 \cdot 100}{\text{Moles}_{\text{total_dry}}}$ $\text{CH}_4\% = 0.019$

12 $\text{SO}_2\% := \frac{\text{SO}_2 \cdot 100}{\text{Moles}_{\text{total_dry}}}$ $\text{SO}_2\% = 0.026$

13 $\text{NO}_2\% := \frac{\text{NO}_2 \cdot 100}{\text{Moles}_{\text{total_dry}}}$ $\text{NO}_2\% = 0.232$

14 $\text{CO}\% := \frac{\text{CO} \cdot 100}{\text{Moles}_{\text{total_dry}}}$ $\text{CO}\% = 0.095$

15 $\text{CO}_2\% := \frac{\text{CO}_2 \cdot 100}{\text{Moles}_{\text{total_dry}}}$ $\text{CO}_2\% = 12.364$

16 Check to see if sum equals 100%

17 $\text{SUM}_{\text{dry}} := \text{O}_2\% + \text{N}_2\% + \text{CH}_4\% + \text{SO}_2\% + \text{NO}_2\% + \text{CO}\% + \text{CO}_2\%$ $\text{SUM}_{\text{dry}} = 100$

18 $\text{ppm} := \frac{1}{1000000}$ $\text{SO}_2\ 7\% \text{O}_2 := \text{SO}_2\% \cdot \left(\frac{14}{21 - \text{O}_2\%} \right)$ $\text{SO}_2\ 7\% \text{O}_2 = 0.023$

19 Since SO₂ concentration is already in % divide by 100 to express in ppm

20 $\text{SO}_2\ 7\% \text{O}_2 := \frac{\text{SO}_2\ 7\% \text{O}_2}{100}$ $\text{SO}_2\ 7\% \text{O}_2 = 226.694 \cdot \text{ppm}$

1 **3.1.2 MODEL 2 Nitrogen Oxides Emission Calculations**

2 MODEL 2B Description: Compliance with 75.5 lbs/hr NO_x (Engine E) or 42 lbs/hr NO_x (Engine W)

3 ER = F * AP₄₂ * CF

4 Where: ER = Emission rate for NO_x in lbs/hr

5 F = Diesel burn rate (gal/hr)

6 AP₄₂ = AP-42 factor (3.1 lbs/mmBTU)

7 CF = 0.139 mmBTU/gal

8 Assumptions: heat of combustion for diesel #2 oil = 140,000 BTU/gal

9 F = 104.7 gal/hr (Engine E, 2200 hp), manufacturer's specification

10 F = 90.8 gal/hr (Engine W, 1850 hp), manufacturer's specification

11 ER (Engine E) = 45.1 lbs/hr

12 ER (Engine W) = 39.1 lbs/hr

13 Fuel used divided by hours logged will demonstrate the average fuel
14 consumption rate is below manufacturer's specification

15 Engine E will be in continuous compliance with the NO_x emission limit of 75.5
16 lbs/hr

17 Engine W will be in continuous compliance with the NO_x emission limit of 42
18 lbs/hr.

1 **3.1.3 MODEL 4 Volatile Organic Compounds Emission Calculations**

2 MODEL 4A Description: Compliance with 50 ppm and 500 ppm VOC

3 Assumptions: A Total Organic Carbon Analyzer or similar instrument will be used to determine
4 VOC concentrations in the stack effluent using EPA method 25A or an approved alternative. The
5 VOC concentration will be determined in accordance with the frequency identified in the tables.

6 MODEL 4B Description: Compliance with 0.8 lbs VOC emitted in any hour

7
$$\text{VOC emission rate in lbs/hr} = 10 \times [\sum_{i=1 \text{ to } 3} (U_i * RF_i)]$$

8 Where i=1 for organic gases

9 i=2 for volatile organic vapors/liquids

10 i=3 for organic liquids

11 $U_i = \text{Maximum Annual Average Hourly Usage Rate (lb/hr)} =$
12 $(\text{Maximum annual usage, lbs/yr}) / (8760 \text{ hrs/yr})$

13 $RF_i = \text{Release fractions}$

14 $RF_1 = 1$ for organic gases

15 $RF_2 = 0.1$ for volatile organic vapors/liquids

16 $RF_3 = 10^{-3}$ for organic liquids

17 Assumptions:

18 Maximum emission rate in any hour is 10 times the maximum annual average hourly emissions, as stated
19 in NOC approval condition 2.

20 If usage is not available, U may be estimated by assuming the inventory is used in a year.

1 **3.1.4 MODEL 5 Ammonia Emission Calculations**

2 Description: Compliance with 0.05 lbs/hr NH₃

3 ER = C * S_f * CF

4 Where: ER = Emission rate for NH₃ in lbs/hr

5 C = Concentration of NH₃ in ppm

6 S_f = Stack flow (Vent & Balance measurements) in cfm

7 CF = 2.20 E-6 * 1.70 * 0.71 = 2.66 E-6 lb / (ppm*cfm*hr)

8 Assumptions:

9 (1) Stack exhausts at ambient temperature

10 (2) Vent & Balance measurements for average stack flow

11 (3) Draeger tube measurement for NH₃ (minimum of one per year) during operations will
12 demonstrate NH₃ levels are below the threshold which would be equal to 0.05 lbs/hr

13 (4) If measurements during peak activities are below threshold, continuous compliance is assumed.
14 For example, at 800 cfm, the concentration of NH₃ must be below 23.5 ppm.

15 **3.1.5 Reserved**

16 Reserved

17 **3.1.6 MODEL 7A – Emissions from Use of Chemical Inventory**

18 Emissions:

19 Emissions from the use of the chemical inventory in the building will be determined as follows:

20 Use rate x release fraction x (1 - control efficiency).

21 In addition to chemical use rate, chemical inventory data may be used to estimate emissions. If
22 the inventory information is used, the annual ASILs will be determined assuming the entire
23 inventory is released in a year, and the 24-hour ASILs will be determined assuming the entire
24 inventory is released during 20 days. The above methods and assumptions may be modified with
25 Ecology's concurrence.

26 **3.1.7 MODEL 7B – Air Concentrations for Comparison to ASILs**

27 Total Building Emissions:

28 Calculate a building's total emissions by summing those due to the use of chemical inventory
29 from Model 7A and those from additional processes in the building whose emissions are not
30 included in Model 7A.

31 Total Building Ambient Air Concentrations

32 Calculate the air concentrations at the nearest points of unrestricted or uncontrolled public access
33 to the building using the EPA AERSCREEN or AERMOD dispersion models and compare them
34 to the ASILs.

1 **3.1.8 MODEL 7C – Emission Calculations for LERF/ETF**

2 Air Emission Concentrations for Comparison to ASILs and SQER

3 1. Emission concentrations (to compare to ASIL):

4
$$AC_i = TR_i * FC_i$$

5 AC_i : air concentration of species i, ug/m³

6 TR_i : transfer rate of species i, unitless

7 FC_i : feed concentration of species i, μg/m³

8 Transfer rates vary depending on the species. For acids, bases, and salts, a TR of 1E-12 is given in
9 DOE/RL-92-69. For other species it can be calculated using a variation of Raoult's Law:

10
$$TR_i = \left[\frac{1/MW_i}{DENSITY_i/MW_i} \right] * \left(\frac{VP_i}{760} \right) * \left[\frac{273/(T + 273)}{22.4} \right] * MW_i$$

11 TR_i : transfer rate of species i, unitless

12 MW_i : molecular weight of species i, kg/kgmol

13 $DENSITY_i$: density of pure liquid species, kg/m³

14 VP_i : vapor pressure of pure liquid species i at temperature T, mmHg

15 T : temperature, °C

16 Other values are conversion factors

17 Typical transfer rates: acetone = 1E-03

18 carbon tetrachloride = 1E-03

19 butanol = 1E-04

20 TBP = 1E-05

21 2. Hourly emission rate (to compare to SQER):

22
$$ERH_i = AC_i * FLOW * 0.02832 * 2.205 * 60 / 1,000,000$$

23 ERH_i : hourly emission rate of species i, lb/hr

24 AC_i : air concentration of species i, μg/m³

25 FLOW : ETF vessel off-gas flowrate = 27,250 ft³/min

26 Other values are conversion factors

27 3. Annual emission rate (to compare to SQER):

28
$$ERY_i = ERH_i * 24 * 365$$

29 ERY_i = annual emission rate of species i, lb/yr

30 Other values are conversion factors.

1 **3.1.9 MODEL 10C Description: VOC Emissions on a Daily Average**

2 Compliance with NSR VOC emission limit on a daily average:

3 $[2 \text{ ton} \times (2000 \text{ lb/ton})] / 365 = 24[(\text{VOC mg/m}^3) \times (339.8 \text{ m}^3/\text{hr}) \times (\text{lb} / 453,593 \text{ mg}) = \text{VOC}$
4 (lb/day)

5 Where:

6 2 tons/year = WAC 174-400-110 NSR threshold for VOCs

7 1 year = 365 days

8 1 day = 24 hours

9 339.8 m³/hr = volumetric flow rate

10 1 lb = 453,593 mg

11 VOC mg/m³ = vapor space sampling data from the TWINS database

12

1 **APPENDIX A**

2 **Excerpts from DOE/RL-95-07 Initial AOP Application (as supplemented) Insignificant**
 3 **Emission Units Summary Discussion**

4 Insignificant Emission Unit (IEU) General Requirements

5 Insignificant Emission Units (IEUs) are small, minor sources of emissions at industrial facilities that are
 6 not subject to the operating permit regulation (specific IEU criteria are defined in WAC 173-401-530).
 7 They can include types of emission sources such as bathroom vents, lubricating-oil storage tanks, plastic
 8 pipe welding, and wet sand-and-gravel screening. IEUs can also be emission sources which have
 9 potential emissions below established thresholds. The following limits or standards apply to insignificant
 10 emission units and activities on the Hanford Site. Compliance with the standards is required; however, no
 11 monitoring is required for IEUs. The applicable requirements are:

IEU Requirement	Standard	Limit	Monitoring/Compliance Method
WAC 173-400-040(2)	Opacity	20 %	None
WAC 173-400-040(3)	Fallout	^a	None
WAC 173-400-040(4)	Fugitive Emissions	^a	None
WAC 173-400-040(5)	Odor	^a	None
WAC 173-400-040(6)	Emissions Detrimental to Persons or Property	^a	None
WAC 173-400-040(7)	SO ₂	1000 ppm ^b	None
WAC 173-400-040(8)	Concealment and Masking	^a	None
WAC 173-400-040(9)	Fugitive Dust	^a	None

^a Reasonable precautions and/or best management practices, as specified in the Hanford Site AOP

^b For applicable sources; units in parts per million on a dry basis, corrected to seven percent oxygen

13
 14 Potential Hanford Site IEUs were evaluated and identified using a process developed in coordination with
 15 Ecology for the Hanford Site AOP renewal application submitted in 2005, which was an extension of the
 16 approach used in the original AOP application (DOE/RL-95-07).

17 The following types of air emission sources were specifically excluded from this IEU evaluation and
 18 identification process:

- 19 • Emission sources listed in the current AOP or with an active NOC approval order.
- 20 • Emission sources subject to federally enforceable applicable requirements.
- 21 • Emission sources regulated under the Comprehensive Environmental Response, Compensation,
 22 and Liability Act of 1980 (CERCLA), including sources and activities supporting CERCLA
 23 activities.
- 24 • Emission sources regulated under the Resource Conservation and Recovery Act of 1976 Subparts
 25 AA, Subparts BB, or Subparts CC.
- 26 • Emission sources undergoing Surveillance and Maintenance activities.

- 1 The results of this process identified Hanford Site IEUs that potentially fall into five categories.
2 The specific types and categories of IEUs are shown in Sections 2.4.1 through 2.4.5 of the AOP Renewal
3 Application (DOE/RL-2017-31). They include:
- 4 • Fugitive emission sources subject to no applicable requirement other than generally applicable
5 requirements of the state implementation plan, such as the general standards identified in Table
6 2-4. Per WAC 173-401-530(1)(d), these IEUs must be listed in the renewal application (see
7 Section 2.4.1).
 - 8 • Emission units or activities categorically exempt per WAC 173-401-532. Per WAC 173-401-
9 530(1)(b), these IEUs do not have to be listed in the renewal application. However, they have
10 been included for convenient reference and completeness (see Section 2.4.2).
 - 11 • Emission units or activities defined as insignificant based on size and production rates in WAC
12 173-401-533. Per WAC 173-401-530(1)(c), these IEUs must be listed in the renewal application
13 (see Section 2.4.3).
 - 14 • Emission units or activities meeting the description of selected miscellaneous category types
15 previously accepted by Ecology (see Section 2.4.4).
 - 16 • Emission units or activities with emissions below the thresholds listed in WAC 173-401-530(4)
17 and WAC 173-401-531. Per WAC 173-401-530(1)(a), these IEUs must be listed in the renewal
18 application (see Section 2.4.5).

19 Fugitive Source Insignificant Emission Unit Processes/Activities

20 There are numerous activities on the Hanford Site that may generate fugitive air emissions. These
21 activities are often associated with construction or facility routine maintenance activities. Specific
22 locations for sources in this category are not listed since these activities involve all areas and a majority of
23 the facilities on the Hanford Site. The activities listed below may require operation of one or more point
24 sources of regulated criteria/hazardous air pollutants in conjunction with the categories listed below.
25 Projects utilizing the functions or categories listed below will be evaluated on a case-by-case basis to
26 determine applicable general requirements, new source review, and the definition of a new source.

27 Functions or categories associated with fugitive emissions may include but are not limited to the
28 following:

29 Site Preparation

- 30 • Vegetation clearing
- 31 • Land leveling, including preparing areas for foundations
- 32 • Excavation (e.g., power line trenching and plumbing trench activities)
- 33 • Dredging
- 34 • Dust suppression activities

35 Roofing

- 36 • Carpentry
- 37 • Concreting
- 38 • Coating
- 39 • Demolition and/or replacement
- 40 • Equipment and area cleaning
- 41 • Miscellaneous repair and/or activities

1 Concreting and Paving

- 2 • Construction of foundations, walls, floors, pads, and other structural elements
- 3 • Construction of parking areas, roads, and other vehicular areas

4 Structural Construction

- 5 • Building framing -- metal and/or wood
- 6 • Welding and cutting torch activities
- 7 • Interior construction and installations (e.g., walls, floors, ceilings, counters, and cabinets)
- 8 • Installation or removal of floor coverings

9 Electrical Work

- 10 • Interior lighting and power
- 11 • Exterior lighting and power, including excavation for wire trench
- 12 • Installation of temporary interior and exterior lighting
- 13 • Miscellaneous lighting and power activities

14 Plumbing

- 15 • Pipe threading
- 16 • Welding, brazing, soldering, or cutting torch activities supporting maintenance
- 17 • Acid etching
- 18 • Application of protective coatings
- 19 • Equipment and area cleaning

20 Metal Working Activities

- 21 • Cutting, grinding, finishing, welding, drilling, machining, and other maintenance activities
- 22 • Sheet metal application and/or repair

23 Agricultural and Landscaping Activities

- 24 • Site preparation
- 25 • Revegetation activities
- 26 • Application of agricultural and landscaping chemicals
- 27 • Application of surface coatings (e.g., rock, gravel, plastics, bark)

28 Miscellaneous Construction Activities

- 29 • Installation of miscellaneous systems or equipment
- 30 • Installation and use of portable sanitation facilities
- 31 • Equipment and area cleaning
- 32 • Fuel trucks and fuel filling operations

1 Abatement Activities

- 2 • Lead abatement positioning/repositioning
- 3 • PCB equipment management, abatement, and relocation
- 4 • Radiological contamination abatement
- 5 • Chemical contamination abatement
- 6 • Asbestos abatement methods
- 7 • Herbicide/pesticide abatement application

8 Demolition Activities

- 9 • Standard demolition practices and/or equipment

10 The activities listed above may be conducted in radiological and/or chemically contaminated areas.
11 Activities conducted in contaminated areas are assessed to determine regulatory agency approvals that
12 may be required prior to commencement or construction of activities. Certain activities conducted in
13 exhausted greenhouses may also be permitted under notice of construction approvals with the State of
14 Washington, Department of Health (WDOH).

15 The activities or equipment listed above may include the use of fuels for propelling or powering
16 equipment or the use of gasses (e.g., acetylene and oxygen for welding or cutting activities).

1 **APPENDIX B**

2 Table B-1 identifies each category of exempt IEUs listed in WAC 173-401-532 and whether or not that
 3 type of emission unit or activity is present on the Hanford Site.

4

Table B-1. Washington Administrative Code 173-401-532 Categorically Exempt Insignificant Emission Units.

IEU Description	IEU Present?	
	Yes	No
(2) Mobile transport tanks on vehicles, except for those containing asphalt.	x	
(3) Lubricating oil storage tanks.	x	
(4) Storage tanks, reservoirs, and pumping and handling equipment of any size, limited to soaps, lubricants, hydraulic fluid, vegetable oil, grease, animal fat, aqueous salt solutions, or other materials and processes using appropriate lids and covers where there is no generation of objectionable odor or airborne particulate matter.	x	
(5) Pressurized storage of oxygen, nitrogen, carbon dioxide, air, or inert gases.	x	
(6) Storage of solid material, dust-free handling.	x	
(7) Vehicle exhaust from auto maintenance and repair shops.	x	
(8) Vents from continuous emissions monitors and other analyzers.	x	
(9) Vents from rooms, buildings, and enclosures that contain permitted emissions units or activities from which local ventilation, controls, and separate exhaust are provided.	x	
(10) Internal combustion engines for propelling or powering a vehicle.	x	
(11) Recreational fireplaces including the use of barbecues, campfires, and ceremonial fires.	x	
(12) Brazing, soldering, and welding equipment and oxygen-hydrogen cutting torches for use in cutting metal where in components of the metal do not generate HAPs or HAPs precursors.	x	
(13) Atmospheric generators used in connection with metal heat treating processes.		x
(14) Metal finishing or cleaning using tumblers.		x
(15) Metal casting molds and molten metal crucibles that do not contain potential HAPs.		x
(16) Die casting.		x
(17) Metal or glass heat-treating, in absence of molten materials, oils, or VOCs.	x	
(18) Drop hammers or hydraulic presses for forging or metalworking.	x	
(19) Electrolytic deposition, used to deposit brass, bronze, copper, iron, tin, zinc, precious and other metals not listed as the parents of HAPs.		x
(20) Metal fume vapors from electrically heated foundry/forge operations wherein the components of the metal do not generate HAPs or HAP precursors. Electric arc furnaces are excluded from consideration for listing as insignificant.		x

Table B-1. Washington Administrative Code 173-401-532 Categorically Exempt Insignificant Emission Units.

IEU Description	IEU Present?	
	Yes	No
(21) Metal melting and molten metal holding equipment and operations wherein the components of the metal do not generate HAPs or HAP precursors. Electric arc furnaces are not considered for listing as insignificant.		X
(22) Inspection equipment for metal products.	X	
(23) Plastic and resin curing equipment, excluding FRP.		X
(24) Extrusion equipment, metals, minerals, plastics, grain, or wood.		X
(25) Presses and vacuum forming, for curing rubber and plastic products or for laminating plastics.	X	
(26) Roller mills and calendars, rubber, and plastics.		X
(27) Conveying and storage of plastic pellets.		X
(28) Plastic compression, injection, and transfer molding and extrusion, rotocasting, pultrusion, blowmolding, excluding acrylics, PVC, polystyrene and related copolymers and the use of plasticizer. Only oxygen, carbon dioxide, nitrogen, air, or inert gas allowed as blowing agents.		X
(29) Plastic pipe welding.	X	
(30) Nonmetallic mineral mines and screening plants except for crushing and associated activities that are not subject to 40 CFR Part 60, Subpart OOO. Quarrying of silica rock and associated activities are not considered for listing as insignificant.	X	
(31) Wet sand and gravel screening.	X	
(32) Wax application.	X	
(33) Plant upkeep including routine housekeeping, preparation for and painting of structures or equipment, retarring roofs, applying insulation to buildings in accordance with applicable environmental and health and safety requirements and paving or stripping parking lots.	X	
(34) Agricultural activities on a facility's property that are not subject to registration or new source review by the permitting authority.		X
(35) Cleaning and sweeping of streets and paved surfaces.	X	
(36) Ultraviolet curing processes.		X
(37) Hot melt adhesive application with no VOCs in the adhesive formulation.	X	
(38) Laundering, dryers, extractors, tumblers for fabrics, using water solutions of bleach and/or detergents.	X	
(39) Steam cleaning operations.	X	
(40) Steam sterilizers.	X	
(41) Food preparing for human consumption including cafeterias, kitchen facilities, and barbecues located at a source for providing food service on the premises.	X	
(42) Portable drums and totes.	X	
(43) Lawn and landscaping activities.	X	
(44) Flares used to indicate danger to the public.	X	

Table B-1. Washington Administrative Code 173-401-532 Categorically Exempt Insignificant Emission Units.

IEU Description	IEU Present?	
	Yes	No
(45) General vehicle maintenance including vehicle exhaust from repair facilities.	x	
(46) Comfort air conditioning or air cooling systems, not used to remove air contaminants from specific equipment.	x	
(47) Natural draft hoods, natural draft stacks, or natural draft ventilators for sanitary and storm drains, safety valves, and storage tanks subject to size and service limitations expressed elsewhere in this section.	x	
(48) Natural and forced air vents and stacks for bathroom/toilet facilities.	x	
(49) Office activities.	x	
(50) Personal care activities.	x	
(51) Sampling connections used exclusively to withdraw materials for laboratory analyses and testing.	x	
(52) Firefighting and similar safety equipment and equipment used to train firefighters excluding fire drill pits.	x	
(53) Materials and equipment used by, and activity related to operation of infirmary; infirmary is not the source's business activity.	x	
(54) Fuel and exhaust emissions from vehicles in parking lots.	x	
(55) Carving, cutting, routing, turning, drilling, machining, sawing, surface grinding, sanding, planing, buffing, shot blasting, shot peening, sintering, or polishing: Ceramics, glass, leather, metals, plastics, rubber, concrete, paper stock, or wood provided that: (a) Activity is performed indoors (b) Particulate emission control in the immediate vicinity of the activity (c) Exhaust from the particulate control is within the building housing the activity (d) No fugitive particulate emissions enter the environment.	x	
(56) Oxygen, nitrogen, or rare gas extraction and liquefaction equipment subject to other exemption limitation, e.g., internal and external combustion equipment.		x
(57) Slaughterhouse equipment except rendering cookers.		x
(58) Ozonation equipment.		x
(59) Nonasbestos brake shoe bonding.		x
(60) Batch loading and unloading of solid phase catalysts.		x
(61) Demineralization and oxygen scavenging (deaeration) of water.	x	
(62) Pulse capacitors.		x
(63) Laser trimmers, using dust collection to prevent fugitive emissions.		x
(64) Plasma etcher, using dust collection to prevent fugitive emissions and using only oxygen, nitrogen, carbon dioxide, or inert gas.	x	
(65) Gas cabinets using only gasses that are not regulated air pollutants.	x	

Table B-1. Washington Administrative Code 173-401-532 Categorically Exempt Insignificant Emission Units.

IEU Description	IEU Present?	
	Yes	No
(66) CO2 lasers used only on metals and other materials which do not emit HAPs in the process.		X
(67) Structural changes not having air contaminant emissions.	X	
(68) Confection cooking equipment.		X
(69) Mixing, packaging, storage and handling activities of any size, limited to soaps, lubricants, vegetable oil, grease, animal fat, aqueous salt solutions.	X	
(70) Photographic process equipment by which an image is reproduced upon material sensitized to radiant energy, e.g., blueprint activity, photocopiers, mimeograph, telefax, photographic developing, and microfiche.	X	
(71) Pharmaceutical and cosmetics packaging equipment.		X
(72) Paper trimmers/binders.	X	
(73) Sample gathering, preparation, and management.	X	
(74) Repair and maintenance activities, not involving installation of an emission unit and not increasing potential emissions of a regulated air pollutant.	X	
(75) Handling equipment and associated activities for glass and aluminum which is destined for recycling, not the re-refining process itself.	X	
(76) Hydraulic and hydrostatic testing equipment.	X	
(77) Batteries and battery charging.	X	
(78) Porcelain and vitreous enameling equipment.		X
(79) Solid waste (as defined in the Washington Administrative Code) containers.	X	
(80) Salt baths using nonvolatile salts and not used in operations which result in air emissions.		X
(81) Shock chambers.		X
(82) Wire strippers.	X	
(83) Humidity chambers.	X	
(84) Solar simulators.		X
(85) Environmental chambers not using hazardous air pollutant (HAPs) gasses.	X	
(86) Totally enclosed conveyors.		X
(87) Steam vents and safety relief valves.	X	
(88) Air compressors, pneumatically operated equipment, systems, and hand tools.	X	
(89) Steam leaks.	X	
(90) Recovery boiler blow-down tank.	X	
(91) Salt cake mix tanks.		X
(92) Continuous digester chip feeders.		X
(93) Weak liquor and filter tanks.		X
(94) Process water and white water storage tanks.	X	
(95) Demineralizer tanks.	X	

Table B-1. Washington Administrative Code 173-401-532 Categorically Exempt Insignificant Emission Units.

IEU Description	IEU Present?	
	Yes	No
(96) Clean condensate tanks.	x	
(97) Alum tanks.		x
(98) Broke beaters, repulpers, pulp and repulping tanks, stock chests and pulp handling.		x
(99) Lime mud filtrate tank.		x
(100) Hydrogen peroxide tanks.		x
(101) Lime mud water.		x
(102) Lime mud filter.		x
(103) Liquor clarifiers and storage tanks and associated pumping, piping, and handling.		x
(104) Lime grits washers, filters, and handling.		x
(105) Lime silos and feed bins.		x
(106) Paper forming.		x
(107) Dryers (Yankee, after dryer, curing systems, and cooling systems).		x
(108) Vacuum systems exhausts.	x	
(109) Starch cooking.		x
(110) Stock cleaning and pressurized pulp washing.		x
(111) Winders.		x
(112) Chipping.		x
(113) Debarking.		x
(114) Sludge dewatering and handling.	x	
(115) Screw press vents.		x
(116) Pond dredging.		x
(117) Polymer tanks and storage devices and associated pumping and handling equipment, used for solids dewatering and flocculation.		x
(118) Non-PCB oil filled circuit breakers, oil filled transformers and other equipment that is analogous to, but not considered to be, a tank.	x	
(119) Electric or steam-heated drying ovens and autoclaves.	x	
(120) Sewer manholes, junction boxes, sumps, and lift stations associated with wastewater treatment systems.	x	
(121) Water cooling towers processing exclusively noncontact cooling water.		x

- 1 Table B-2 identifies each IEU size and production rate listed in WAC 173-401-533(2) and whether or not
- 2 that type of emission unit or activity is present on the Hanford Site.
- 3

Table B-2. Insignificant Emission Units Based on Washington Administrative Code 173-401-533(2) Size and Production Rates.

IEU Description	IEU Present?	
	Yes	No
(a) Operation, loading, and unloading of storage tanks and storage vessels with lids or other appropriate closure and less than two hundred sixty gallon capacity (35 cft), heated only to the minimum extent to avoid solidification if necessary.	x	
(b) Operation, loading and unloading of storage tanks, not greater than one thousand one hundred gallon capacity, with lids or other appropriate closure, not for use with hazardous air pollutants (HAPs), maximum (max.) vp 550mm Hg.	x	
(c) Operation, loading, and unloading of VOC storage tanks (including gasoline storage tanks), ten thousand gallons capacity or less, with lids or other appropriate closure, vp not greater than 80mm Hg at 21°C.	x	
(d) Operation, loading, and unloading storage of butane, propane, or liquefied petroleum gas (LPG), storage tanks, vessel capacity under forty thousand gallons.	x	
(e) Combustion source less than five million Btu/hr. exclusively using natural gas, butane, propane, and/or LPG.	x	
(f) Combustion source, less than five hundred thousand Btu/hr., using any commercial fuel containing less than 0.4% by weight sulfur for coal or less than 1% by weight sulfur for other fuels.	x	
(g) Combustion source, of less than one million Btu/hr. if using kerosene, No. 1, or No. 2 fuel oil.	x	
(h) Combustion source, not greater than five hundred thousand Btu/hr. if burning used oil and not greater than four hundred thousand Btu/hr. if burning waste, wood, or waste paper.		x
(i) Welding using not more than one ton per day of welding rod.	x	
(j) Foundry sand molds, unheated and using binders with less than 0.25% free phenol by sand weight.		x
(k) "Parylene" coaters using less than five hundred gallons of coating per year.		x
(l) Printing and silk screening, using less than two gallon/day of any combination of the following: Inks, coatings, adhesives, fountain solutions, thinners, retarders, or nonaqueous cleaning solutions.	x	
(m) Water cooling towers and ponds, not using chromium-based corrosion inhibitors, not used with barometric jets or condensers, not greater than ten thousand gpm, not in direct contact with gaseous or liquid process streams containing regulated air pollutants.		x
(n) Combustion turbines, of less than 500 HP		x
(o) Batch solvent distillation, not greater than fifty-five gallons batch capacity.	x	
(p) Municipal and industrial water chlorination facilities of not greater than twenty million gallons per day capacity. The exemption does not apply to waste water treatment.	x	

Table B-2. Insignificant Emission Units Based on Washington Administrative Code 173-401-533(2) Size and Production Rates.

IEU Description	IEU Present?	
	Yes	No
(q) Surface coating, using less than two gallons per day.	x	
(r) Space heaters and hot water heaters using natural gas, propane, or kerosene and generating less than five million Btu/hr.	x	
(s) Tanks, vessels, and pumping equipment, with lids or other appropriate closure for storage or dispensing of aqueous solutions of inorganic salts, bases, and acids excluding: (i) 99% or greater H2SO4 or H3PO4 (ii) 70% or greater HNO3 (iii) 30% or greater HCl (iv) More than one liquid phase where the top phase is more than 1% VOCs	x	
(t) Equipment used exclusively to pump, load, unload, or store high boiling organic material, material with initial boiling point (IBP) not less than 150°C or vapor pressure (vp) not more than 5mm Hg at 21°C with lids or other appropriate closure.		x
(u) Smokehouses under twenty square feet.		x
(v) Milling and grinding activities, using paste-form compounds with less than 1% VOCs.	x	
(w) Rolling, forging, drawing, stamping, shearing, or spinning hot or cold metals.	x	
(x) Dip-coating operations, using materials with less than one percent VOCs.		x
(y) Surface coating, aqueous solution, or suspension containing less than 1% VOCs.	x	
(z) Cleaning and stripping activities and equipment, using solutions having less than one percent VOCs by weight. On metallic substrates, acid solutions are not considered for listing as insignificant.	x	
(aa) Storage and handling of water based lubricants for metal working where the organic content of the lubricant is less than ten percent.	x	
(bb) Municipal and industrial waste water chlorination facilities of not greater than one million gallons per day capacity.		x

1

1 Table B-3 below identifies each category of miscellaneous emission units and activities previously
2 accepted by Ecology as IEUs and whether or not they are present on the Hanford Site. No additional
3 Hanford Site IEUs with emissions below the threshold levels of WAC 173-401-530(4) and WAC 173-
4 401-531 were identified. IEUs which likely have emissions below the referenced thresholds were
5 determined to fit into at least one of the IEU categories in Sections 2.4.1 through 2.4.4.

6

Table B-3. Miscellaneous Emission Units and Activities Listing

- Chemical or physical analytical laboratory operations or equipment including fume hoods and vacuum pumps regulated as insignificant per WAC 173-401-533(3)(c) (e.g., 338 Building Prototype Engineering Laboratory).
- Insecticide, pesticide, or fertilizer spray or broadcast equipment.
- Internal combustion engines less than the affected source size threshold for the United States Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, 40 CFR Part 63 Subpart ZZZZ. This includes attached fuel tanks.
- Laboratory testing and quality assurance/control testing equipment used exclusively for chemical or physical analysis, teaching, or experimentation, including non-production bench scale research equipment.
- Storage tanks:
 - (A) that do not store substances capable of emitting air contaminants; or
 - (B) with a rated capacity of 1,000 gallons (3,780 liters) or less used for storage of gasoline or diesel fuel; or
 - (C) with a rated capacity of less than 10,000 gallons (38,000 liters) used for storage of volatile organic compounds; or
 - (D) with a rated capacity of less than 40,000 gallons (150,000 liters) used for storage of volatile organic compounds with a true vapor pressure less than 0.01 kPa (0.002 psia).
- Storage tanks not regulated under 40 CFR Part 60 Subpart K, Ka, or Kb.
- Wipe solvent cleaning.
- Equipment maintenance and repair, including off-road equipment.
- Instrument functional checks/calibration, maintenance, and repair; including the use of alcohol, gases, or other solvents and fluids.
- Groundwater remediation operations.
- Solvent cleaning of non-motor vehicle parts
- Small industrial vacuum systems that vent outside.
- Miscellaneous abrasive blast units not requiring an Order of Approval.
- Liquid storage and transfer operations not requiring an NOC.
- Firearm training, maintenance, and cleaning.
- Hazardous waste worker training and training equipment.
- Any source emitting minimal amounts of criteria/hazardous air pollutants, but determined through evaluation not to trigger new source review applicability or portable/temporary notification pursuant to WAC 173-400-110, WAC 173-460-030, or WAC 173-400-035, respectively.

7

Effective Date: 08/01/2019
Expiration Date: 08/01/2024

Hanford Air Operating Permit
Permit No. 00-05-006
Renewal 3

- 1 **APPENDIX C**
- 2 Reserved

Effective Date: 08/01/2019
Expiration Date: 08/01/2024

Hanford Air Operating Permit
Permit No. 00-05-006
Renewal 3

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