Technical Support Document
Notice of Construction Approval Order No. 10AQ-C147 Second Revision
Central Washington University
AQPID No. B0370004
Ellensburg, WA

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1. Project Summary

Central Washington University (the source) is an institution classified as a synthetic minor source with multiple existing emissions units. This review is for a replacement of three natural gas-fired boilers, the addition of two natural gas-fired water heaters, and reevaluation of the potential to emit (PTE) of existing emission units. The Approval Order was also updated to reflect removed and exempt emission units.

An initial Notice of Construction (NOC) application dated September 6, 2022 was submitted by the source for the new emission units. The Washington State Department of Ecology (Ecology) reviewed the initial application and found it incomplete per Washington Administrative Code (WAC) 173-400-111 on September 28, 2022. Another application was submitted on December 1, 2023 for the reassessment of the source's PTE. Ecology reviewed the second application and found it incomplete on December 18, 2023. Amended NOC application materials were received by Ecology on multiple dates, with the last information received on November 13, 2024.

2. Application Processing

a. Public Notice

Receipt of the application was posted on Ecology's Public input & events – Listings webpage from October 19, 2022 through November 3, 2022. No requests for a public comment period received. However, due to the reassessment of PTE, this project is subject to a mandatory 30-day public comment period per WAC 173-400-171(3)(k) for an order issued under WAC 173-400-091 that establishes limitations on a source's potential to emit. Therefore, a comment period is scheduled for this project; if any comments are received, responses will be issued in a separate document.

b. State Environmental Policy Act (SEPA)

An environmental checklist was submitted with the NOC Application which considered environmental impacts of the project as required by Chapter 43.21C RCW, also known as the State Environmental Policy Act (SEPA). Ecology reviewed the checklist and determined that the existing Determination of Nonsignificance issued by Ecology on March 27, 2020 stands for the new emission units.

3. Applicable Regulations

a. State Regulations

i. Minor New Source Review Applicability

Per WAC 173-400-110, an NOC application and an order of approval must be issued by the permitting authority prior to the establishment of a new source or modification.

As stated in the NOC application and consistent with Ecology's review, the new units are being constructed by this project and therefore are subject to minor new source review (NSR).

A. Exempt Equipment

The source identified many categorically-exempt emission units, which are identified in Appendix A of the order. The basis of exemption is discussed below.

I. Maintenance/Construction

WAC 173-400-110(4)(a)(v) exempts "Plant maintenance and upkeep activities (grounds keeping, general repairs, house keeping, plant painting, welding, cutting, brazing, soldering, plumbing, retarring roofs, etc.)". This exemption covers the dust collector located within the Jongeward Facility Maintenance Shops.

II. Combustion units

WAC 173-400-110(4)(c)(v) exempts new or modified combustion units with combined aggregate heat inputs under specified thresholds. This exemption covers the kilns and melting furnace located in Hogue Hall and Randall Hall, as well as multiple boilers and water heaters.

III. Laboratory Equipment

WAC 173-400-110(4)(f)(iv) exempts "Laboratory research, experimentation, analysis and testing at sources whose primary purpose and activity is research or education". This exemption covers: paint booths located in Hogue Hall and Randall Hall; and the dust collectors located in Hogue Hall, McConnell Hall, and Randall Hall. Given the unique nature of this determination, it was arrived at with the help of my fellow engineers and two managers.

B. Potential to Emit (Potential Emissions)

The potential emissions from the project are greater than the exemption levels listed under WAC 173-400-110(5) as shown below in Tables 1 and 2 (in bold).

Table 1. Potential emissions for pollutants listed under WAC 173-400-110(5), versus the minor NSR Exemption Levels

Pollutant	New Units (tons/year)	Minor NSR Exemption (tons/year)
Carbon Monoxide (CO)	0.9	5.0
Lead (Pb)	1E-05	0.005
Nitrogen Oxides (NO_X)	0.6	2.0
PM_{10}	0.2	0.75
$PM_{2.5}$	0.2	0.5
Total Suspended Particulates (TSP)	0.2	1.25
Sulfur Dioxide (SO_2)	0.01	2.0
Volatile Organic Compounds, total (VOC)	0.1	2.0

Table 2. Potential Toxic Air Pollutant (TAP) emissions increase and de minimis emission values

Pollutant	Potential Emissions from Project	De Minimis Emission Values	Averaging Period
Acetaldehyde	3.2E-01	3.0E+00	year
Acrolein	2.7E-04	1.3E-03	24-hr
Ammonia	3.2E-01	1.9E+00	24-hr
Arsenic	**7.2E-03**	**2.5E-03**	**year**
Benzene	2.9E-01	1.0E+00	year
Beryllium	4.3E-04	3.9E-03	year
Cadmium	**4.0E-02**	**1.9E-03**	**year**
Chromium(VI)	**2.0E-03**	**3.3E-05**	**year**
Cobalt	8.3E-06	3.7E-04	24-hr
Copper	3.5E-06	9.3E-03	1-hr
Ethyl benzene	3.4E-01	3.2E+00	year
Formaldehyde	**8.0E+00**	**1.4E+00**	**year**
Hexane	1.8E-01	2.6E+00	24-hr
Lead	1.8E-02	1.0E+01	year
Manganese	3.8E-05	1.1E-03	24-hr
Mercury	2.6E-05	1.1E-04	24-hr
Nickel	**7.6E-02**	**3.1E-02**	**year**
Benz(a)anthracene	6.5E-05	4.5E-02	year
Benzo(a)pyrene	1.7E-04	8.2E-03	year
Benzo(b)fluoranthene	6.5E-05	4.5E-02	year
Benzo(k)fluoranthene	6.5E-05	4.5E-02	year
Chrysene	6.5E-05	4.5E-01	year
Dibenzo(a,h)anthracene	4.3E-05	4.1E-03	year
Dichlorobenzene	4.3E-02	7.4E-01	year
7,12-Dimethylbenz(a)anthracene	**5.8E-04**	**6.9E-05**	**year**

Pollutant	Potential Emissions from Project	De Minimis Emission Values	Averaging Period
Indeno (1,2,3-cd) pyrene	6.5E-05	4.5E-02	year
3-Methylchloranthrene	6.5E-05	7.8E-04	year
Naphthalene	2.2E-02	2.4E-01	year
Propylene	7.2E-02	1.1E+01	24-hr
Selenium	2.4E-06	7.4E-02	24-hr
Toluene	3.6E-03	1.9E+01	24-hr
Vanadium	2.3E-04	3.7E-04	24-hr
Xylenes	2.7E-03	8.2E-01	24-hr

ii. Prevention of Significant Deterioration (PSD)

Prior to this project, the source was classified as a 'Synthetic Minor 80% Source' since its potential to emit is in excess of 80% of the CO and NO_X Title V thresholds. The source has further limited emissions to levels that are below 80% of the major thresholds. Thus, the emissions are also well below the PSD applicability thresholds.

iii. Other Applicable Requirements

In accordance with WAC 173-400-113, the proposed new units must comply with all applicable emission standards adopted under Chapter 70A.15 RCW. The following applicable emission standards are associated with the proposed project:

A. General Standards for Maximum Emissions

WAC 173-400-040(2) generally limits visible emissions from all sources to no more than three minutes of 20% opacity, in any one hour, of an air contaminant from any emissions unit. This standard applies to the project; however, a stricter standard of 0% opacity is specified by Approval Condition 2.c.iv.

B. Emission Standards for Combustion and Incineration Units

WAC 173-400-050(1) limits emissions of PM from combustion units to 0.10 grains per dry standard cubic foot (dscf) of exhaust gas. This standard applies to project. However, the standard is not included in the order as boilers typically have negligible PM emissions and no initial or periodic source testing is required by the order.

b. Federal Regulations

In accordance with WAC 173-400-113, the proposed new units must comply with all applicable new source performance standards (NSPS) included in 40 C.F.R. Part 60, national emission standards for hazardous air pollutants (NESHAPs) included in 40 C.F.R. Part 61, and NESHAPs for source categories included in 40 C.F.R. Part 63. No federally-applicable emission standards are associated with the proposed project.

4. Emissions

a. Emission Factors/Calculations

i. Criteria Air Pollutants (Except Lead) and VOC

Emission-unit specific emission factors for CO and NO_X were provided by the manufacturer. EPA's AP-42 Compilation of Air Pollutant Emission Factors, 5th Edition, Volume 1, Chapter 1.4 - Natural Gas Combustion Emission factors (for small boilers <100 MMBtu/hr) was utilized for particulate, SO_2, and VOC emissions factors.

ii. Lead, non-Criteria Toxic Air Pollutants, and Hazardous Air Pollutants

Fuel-usage based emission factors were employed for lead, toxic air pollutants (other than CO, NO_X, and SO_2), and hazardous air pollutants. The highest emission factor from the following sources was utilized:

- California Air Toxics Emission Factor (CATEF) database.
- EPA's AP-42 Compilation of Air Pollutant Emission Factors, 5th Edition, Volume 1, Chapter 1.4 - Natural Gas Combustion.
- EPA's AP-42 document titled "Development and Selection of Ammonia Emission Factors" for ammonia from natural gas-fired boilers.
- VCAPCD's AB 2588 Combustion Emission Factors, for natural gas fired external combustion equipment (<10 MMBtu/hr), dated May 17, 2001. Bulk 'PAH's (including naphthalene)' was reduced for the stated naphthalene value, with the remainder treated as having 4.7% of the risk of benzo(a)pyrene.

b. Best Available Control Technology (BACT)| Best Available Control Technology for Toxics (tBACT)

The consultant's BACT analysis was focused on CO and NO_X. The analysis was based on vendor consultation and South Coast Air Quality Management District (SCAQMD) Rule 1146.2. The boiler vendor indicated that ultra-low NO_X burners were not available for the proposed boilers and water heaters due to their small size; therefore, low NO_X burners emitting no more than 20 ppm_{vd} at 3% O_2 were proposed. Emissions of CO from the proposed burners is 50 ppm_{vd} at 3% O_2.

On a presumptive-BACT basis, I agree that the proposal meets or exceeds BACT for emissions of criteria pollutants. For the TAPs subject to review, I accept the evaluated emissions factors as meeting tBACT, due to lack of information to indicate otherwise.

c. Allowable Emissions

The allowable emissions from the project are equivalent to the potential emissions listed above, in Section 3.i.B. The table below presents the total allowable emissions for the

source, including emissions from the project. The source has sufficiently limited emissions to be classified as a 'synthetic minor source' for CO and NO_X emissions under Title V of the federal Clean Air Act.

Table 6. Potential and Allowable Emissions for Total Source

Pollutant	Total Source Allowable Emissions (tons/year)
CO	30.
Pb	4.0E-04
NO_X	43.
PM_{10}	3.2
$PM_{2.5}$	3.2
TSP	3.2
SO_2	0.83

5. Ambient Air Quality Standards

As specified in WAC 173-400-113, the proposed new or modified source(s) must not cause or contribute to a violation of any ambient air quality standard. This includes the ambient air quality standards for both criteria and toxic air pollutants.

a. Pollutants Listed Under WAC 173-400-110 (Except TAPs)

Since the potential emissions of the project are below each of the Table 110(5) exemption levels listed under WAC 173-400-110, modeling was not required for these pollutants. This is in keeping with prior practice within this section, where it is assumed that the exemption levels were based on concentrations which would not cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS) or Washington Ambient Air Quality Standards (WAAQS).

b. Toxic Air Pollutants (TAPs)

In accordance with WAC 173-460-040, new TAP sources must meet the requirements of Chapter 173-460 WAC, unless they are exempt by WAC 173-400-110(5).

As shown in Table 2, minor NSR is required for TAP emissions. As such, the new emission units must comply with WAC 173-460-070 (ambient impact requirement). The source may demonstrate compliance with the ambient impact requirement by either showing that the emissions increase is less than the small quantity emissions rates (SQER) or through dispersion modeling. The table below includes the estimated emissions increases associated with the project and the applicable SQER.

Table 8. TAP Analysis

TAP	Project Increase (lb/avg. period)	SQER (lb/avg. period)	Modeling Required?
Arsenic	7.2E-03	4.9E-02	no
Cadmium	**4.0E-02**	**3.9E-02**	**yes**
Chromium(VI)	**2.0E-03**	**6.5E-04**	**yes**
Formaldehyde	8.0E+00	2.7E+01	no
Nickel	7.6E-02	6.2E-01	no
7,12-Dimethylbenz(a)anthracene	5.8E-04	1.4E-03	no

For cadmium and chromium(VI), modeling was performed to satisfy the requirements of Washington's state toxics rule in Chapter 173-460 WAC. The modeling demonstrates that the emissions increases as a result of the project will not exceed the acceptable source impact level (ASIL) screening thresholds. The modeling results are included in the table below.

Table 9. TAP Modeling Results

TAP	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)	ASIL ($\mu g/m^3$)	Percent of ASIL
Cadmium	annual	5.9E-05	2.4E-04	25%
Chromium(VI)	annual	3.0E-06	4.0E-06	75%