YAKIMA REGIONAL CLEAN AIR AGENCY

Order of Approval Permit No NSRP-15-JMS-18

New Source Review Order of Approval for J.M. Smucker for the Installation of Two New 700 Cleaver-Brook Horsepower (Hp) (CBEX Elite Boilers)

IN THE MATTER OF approving a project which establishes a new air contaminant source at J.M. Smucker, in Grandview, WA. THIS ORDER OF APPROVAL IS HEREBY ISSUED TO:

Applicant/Permittee:	J.M. Smucker *Food Processing Facility*
Located at:	100 Forsell Rd Grandview, WA. 98930
Contact:	J.M. Smucker Attn: Chad Sander
Contact at the site:	Chad Sander 100 Forsell Rd Grandview, WA. 98930

IN COMPLIANCE WITH THE PROVISIONS OF THE STATE OF WASHINGTON CLEAN AIR ACT (Revised Code of Washington (RCW)) CHAPTER 70.94.152, WASHINGTON ADMINISTRATIVE CODE (WAC) 173-400-110, 173-460-040:

ISSUE DATE: November 13, 2018.

THIS ORDER OF APPROVAL PERMIT IS SUBJECT TO THE FOLLOWING CONDITIONS:

Construction/Installation of the equipment must be conducted in compliance with all data and specifications submitted with the New Source Review (NSR) application under which this Order of Approval is issued unless otherwise specified herein. The conditions and limitations of this NSR Order of Approval are attached as follows:

1.0 DESCRIPTION OF THE SOURCE.

1.1 J.M. Smucker, hereafter referred to as the Permittee, the Facility, JMS or the Source is the owner and operator of a food processing facility at 100 Forsell Rd., Grandview, WA. The Permittee is proposing to install two 700 Horsepower (Hp) Cleaver-Brook steam boilers Model CBEX Elite (shown in Figures below) using Natural Gas (NG) as the only source of fuel.

1.2 The Facility will demolish/remove one old Nebraska boiler which was installed in 1986 with a capacity of 90,000 pounds of steam per hour. The Permittee was issued a Permit for that boiler (After the fact) on March 31, 1998 with permit number NC-JMSC-17-97. Therefore, upon the demolition/removal of the Nebraska's boiler, Permit number NC-JMSC-17-97 shall be voided.

1.3 Air emissions from operating these boilers are in the form of small Particulate Matter (PM_{10}, $PM_{2.5}$), Oxides of Nitrogen and Sulfur (NOx, SOx), Volatile Organic Compounds (VOCs) some of which are known as Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs) in accordance with the Federal Clean Air Act (FCAA) or Washington Administrative Code (WAC), respectively.

1.4 These air emissions are emitted during boilers combustion operation. The City of Grandview exempted this installation from the State Environmental Policy Act (SEPA) as signed by the application on July 25, 2018.

1.5 The layout and specifications of the boilers was submitted with the New Source Review (NSR) application and are enclosed in the NSR review as provided by the Permittee.

1.6 Installation of these two boilers, are considered a new source of air contaminants requiring a NSR and an Order of Approval (Order/Permit) pursuant to the Revised Code of Washington (RCW) 70.94.152 and the Washington Administrative Code (WAC) 173-400-110 and 173-460-040.

2.0 DETERMINATIONS.

In relation to the above installation, YRCAA determines that the source shall comply with the federal, state and local regulations and laws including but not limited to the following determination:

2.1 The Facility is located in an area that is in attainment with all state and federal air quality standards for all criteria pollutants;

2.2 The Facility is classified as a synthetic minor source;

2.3 The Facility is not a major stationary source as of the date of issuance of this Order nor is this installation subject to the Prevention of Significant Deterioration (PSD) permitting

requirements of WAC 173-400-700 through 173-400-750;

2.4 These boilers will be burning only natural gas;

2.5 These boilers have a heat capacity greater than 10 MMBtu/hr and therefore it is subject to 40 CFR Part 60 New Source Performance Standards (NSPS) for Area Sources: Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units;

2.6 The boilers have a heat capacity greater than 4 MMBtu/hr and therefore this installation is subject to the NSR requirements of WAC 173-400-110 and WAC 173-460-040;

2.7 The conditions and limitations of this Order will become part of a Title V Air Operating Permit (AOP) when and if the Permittee becomes a Title V source; and

2.8 The Facility is subject to WAC 173-400-099 – Registration Program and YRCAA Regulation 1, 4.01 – Registration Program, unless the Facility becomes a Title V Permitted source, pursuant to the State and Federal Clean Air Acts.

THEREFORE, it is hereby ordered that the project as described above, in the NSR application, and in detailed plans, specifications and other information submitted in reference thereto, is **APPROVED** for operation, **PROVIDED** the specification submitted with the application and the following conditions are met:

3.0 OPERATIONAL APROVAL CONDITIONS.

3.1 This Order is for the two 700 Hp Cleaver-Brook steam boilers as specified above, and to be located at 100 Forsell Rd., Grandview, Washington, in accordance with the plan and specifications submitted with the NSR application to YRCAA and specified in Table 1 of this Order.

3.2 Best Available Control Technology (BACT) and toxic BACT (t-BACT) pursuant to RCW 70.94.152, WAC 173-400-113 and WAC 173-460-060 shall be satisfied for any proposed new facility or modified air emission source to control air emissions. YRCAA finds BACT to be satisfied as follows:

3.2.1 The Cleaver-Brook boilers will be equipped with an Ultra-Low NOx (9 ppm) burner as stipulated in the specification submitted to YRCAA;

3.2.2 The maximum air emission limits for NOx, CO, PM and other air emissions shall be limited, as per the submitted specifications with this NSR application and specified in the Emission Limits Section 5.0 below;

3.2.3 An Operation and Maintenance (O&M) plan for the boilers shall be developed as specified in this Order and manufacturers recommended standards;

3.2.4 The boilers must be operated as per manufacturer specifications and any certification;

3.2.5 TAPs air emissions shall always be below the Acceptable Source Impact Levels (ASIL);

3.2.6 Only NG shall be used as the only fuel source for the boilers;

3.2.7 The boilers shall meet the ASIL of WAC 173-460 and the National Ambient Air Standards (NAAQs) of 40 CFR Part 50 and as specified in this Order; and

3.2.8 The boilers should not operate more than the limits specified in this Order.

3.3 All air emissions from this Facility shall be in compliance with air emission standards at all times. It is the responsibility of the owner to make sure that air emissions are within all known rules and regulations standards, including but not limited to 40 CFR Part 60, Subpart Dc, 173-400-040 and 173-460.

3.4 This Order authorizes the construction of the following equipment:

Table. 1 Authorized Equipment List.

Unit No.	Unit Type	Manufacturer	Model/ Serial number and/or Size	Motor HP Capacity
2	Industrial Boilers with Economizer	Cleaver-Brook	CBEX Elite Low NOx (9 ppm)	700 each

3.5 The Permittee must develop and implement specific O&M plan based on the boilers manufacturer's operations manual as specified in the BACT determination above. In addition, the existing O&M plan must be updated to reflect this installation. The O&M plan must be completed within 120 days of the issuance of this Order.

3.6 Within 120 days from the date of issuance of this Order, the Permittee shall submit notification to YRCAA indicating that the O&M plan is completed and in place. If the Permittee needs to make any future modification to the boilers or boiler replacements (i.e. model with serial number changes), or its operating procedures, an approval in writing from YRCAA must be obtained before such modification takes place. The O&M documents must also be updated and implemented to reflect such modification.

3.7 No emissions shall be released from this boilers beyond the property boundary in a quantity that interferes unreasonably with the use and enjoyment of the property upon which the material is deposited or is detrimental to the health, safety or welfare of any person or causes damage to any property or business.

3.8 An initial opacity as measured by 40 CFR Part 60, Appendix A, Method 9, July 1, 2004 from this two 700Hp Cleaver-Brook boilers installation must be conducted and shall not exceed a zero percent (0%) using NG fuel average for six consecutive minutes in any given one hour period. The Permittee shall maintain 0% opacity from the boilers at all times, except during periods of startup, shutdown or malfunction as provided in WAC 173-400-081. If the Permittee cannot meet the 0% opacity limit based on the manufacturer or design recommendation, YRCAA should be notified immediately which may result in opacity modification.

3.9 In addition to the initial opacity reading above, once a month, the Permittee shall conduct and record visual opacity from the boilers stack. Zero percent (0%) opacity means no Only heat wave maybe seen, no smoke. If the observer sees smoke/black smoke, the Permittee shall immediately stop the operation and take corrective action as directed in the O&M plan until visible emissions are below 0% opacity. Corrective actions may include the following:

3.9.1 Certify that the boilers are performing according to its design functions within the acceptable design parameters and are being operated according to O&M procedures. Therefore, it must be checked against all operational conditions that have resulted in compliance in the past. If the boilers are not performing according to design and O&M procedures, the Permittee must take corrective action within 48 hours to correct the problem; or

3.9.2 Conduct an opacity evaluation by a certified opacity reader in accordance with 40 CFR 60, Appendix A, Method 9 and such opacity evaluation shall be conducted within 48 hours to verify compliance with the 0% opacity limit. If opacity is greater than 0%, appropriate and timely corrective action must be taken no later than 48 hours to identify and correct the problem causing the opacity. If the Permittee has no certified reader on site, the Permittee should call YRCAA and will be advised accordingly.

3.10 An initial source performance test for NOx, CO, PM_{10} and $PM_{2.5}$ except Chromium VI as specified in this Order using NG fuel shall be conducted no later than 180 days after initial startup of the boilers or issuance of this permit. The Permittee shall provide the source test protocol to YRCAA at least thirty days before the test takes place. The parameters must not be changed or altered prior to the test without written approval from YRCAA.

3.11 The source test must be conducted pursuant to 40 CFR Part 60, Appendix A, Method 7E for NOx and Method 10 for CO in accordance with the limits specified in the emission limits section below.

3.12 The source test for the fine PM_{10} and $PM_{2.5}$ shall be conducted in accordance with 40 CFR Part 60, Appendix A, Method 5 with Method 202 or 201A with 202 fronts and back half.

3.13 The source test for Chromium (VI), when required shall be conducted using EPA approved method SW-846, Volume Two, Chapter 10, Method number 0061: Determination of Hexavalent Chromium Emissions from Stationary Sources, or any other approved EPA method. If another method to be used, it must be approved in writing by YRCAA forty five days prior to the source test date. The Permittee must provide the source test results to YRCAA within 30 days after the source test is completed.

3.14 There is no required initial source test for Chromium VI. However, if it becomes a requirement, YRCAA will inform the Permittee in writing of this requirement.

3.15 The Permittee shall repeat the source test for NOx and CO and PM_{10} and $PM_{2.5}$ every five years, thereafter, from the date of the first source test.

3.16 The Permittee shall perform the source performance testing to gauge compliance with this NSR approval while the boilers are operating at its normal operation parameters of the boilers firing rate. However, the specified limit in the emission limits section below shall also be applicable to all firing range.

3.17 In accordance with WAC 173-400-105(4) and YRCAA Regulation 1, Article V, Section 5.11(c), the Permittee shall conduct a source test when deemed necessary by YRCAA to demonstrate compliance for any air pollutant, specific to this installation. YRCAA will inform the Permittee of the source test requirement and method at that time, if deemed necessary.

3.18 The Air Pollution Control Officer (APCO) of the YRCAA or his designated staff shall be allowed to enter the Facility at reasonable times to inspect for compliance with applicable laws, regulations and the conditions on this Order.

4.0 GENERAL APPROVAL CONDITIONS.

4.1 The Cleaver-Brook boilers shall comply with all other requirements specified in all current federal, state and local air pollution laws and regulations, including, but not limited to, RCW 70.94 (Washington Clean Air Act), WAC 173-400 (General Regulations for Air Pollution Sources), WAC 173-460 (Controls for New Sources of Toxic Air Pollutants), 40 CFR Part 60, Subpart Dc (Standards of Performance for New Stationary Sources) and the YRCAA Regulation 1.

4.2 All plans, specifications or other information submitted to YRCAA and any further authorizations, approvals, or denials in relation to this project, shall be incorporated herein and made a part of the YRCAA file and this Order.

4.3 Nothing in this approval shall be construed as obviating compliance with any requirement(s) of law including those imposed pursuant to the Clean Air Washington Act, and rules and regulations thereunder. Any violation(s) of such rules and regulations are penalized in accordance with RCW 70.94.430 and YRCAA Regulation 1, Article 5,

Compliance and Enforcement.

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

4.4.1 Violation of any terms or conditions of this authorization; or,

4.4.2 Obtaining this authorization by misrepresentation or failure to disclose fully all relevant facts.

4.5 The provisions of this authorization are severable and, 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.

4.6 This Order and its conditions requirements apply to the Facility owner and/or operator(s) and any contractor or subcontractor performing any activity authorized under this Order. Any person(s), including contractor(s) and/or subcontractor(s), not in compliance with the applicable requirements in this Order are in violation of State and local laws and subject to appropriate civil and criminal penalties. The Facility owner and/or operator, and all contractor(s) or subcontractor(s) are liable for the actions and violations of their employee(s). Any violation committed by a contractor or subcontractor shall be considered a violation by the Facility owner and/or operator, and is also a violation by the contractor and/or any subcontractor(s).

4.7 Laws, rules and regulations may be superseded or revised without notice. It is the Permittee's responsibility to stay current with laws rules and regulations governing their business and therefore is expected to comply with all new laws, rules and regulations immediately upon their effective date. New laws, rules and regulation updates will be incorporated into existing Orders or upon renewal of said Orders.

4.8 All air emissions from this Facility shall be in compliance with all air emission standards at all times. It is the responsibility of the owner to make sure that air emissions are within all known and promulgated laws, rules and regulations standards.

4.9 If, or whenever the Permittee wants to change the quantity of emissions set forth in this Order, another NSR must be filed with YRCAA before any change takes place and BACT requirements must be satisfied.

4.10 This Order is invalid without paying the complete appropriate/required fees to YRCAA, pursuant to RCW 70.94.152 within the specified time of the invoice.

5.0 EMISSION LIMITS

5.1 Pursuant to WAC 173-400-113(2) determination, the Cleaver-Brook boilers shall use an

Ultra- Low-NOx burner (9 ppm), as per the submitted materials with the NSR application and the specified emission limit.

5.2 Air emission from this operation is estimated to generate small PM_{10}, $PM_{2.5}$, CO, VOC's, NOx, SOx and others as shown in Appendix A. These maximum emissions shall not be exceeded as specified in this Appendix.

5.3 Emissions of NOx from the boilers shall not exceed nine parts per million by volume, dry and corrected to three percent oxygen (9 ppmvd @ 3% O_2) using NG fuel.

5.4 Emissions of CO from the boilers shall not exceed twenty five parts per million by volume, dry and corrected to three percent oxygen (25 ppmvd @ 3% O_2) using NG fuel.

5.5 TAPs air emissions shall always be below the Acceptable Source Impact Levels (ASIL);

6.0 MONITORING AND RECORDKEEPING REPORTING REQUIREMENTS.

6.1 The Permittee shall record the annual amount of NG used, including the number of hours and dates, by the subject boilers and report it along with the plant-wide total in the annual registration submittal on forms provided by the agency.

6.2 This Order and its conditions shall remain in effect in the event of any change in control of ownership or operation of the Facility. In the event of any such change in control of ownership or operation, the Permittee shall notify the succeeding owner of this Order and conditions and shall notify the YRCAA of the change by filing an "Ownership or Name Change" form within fifteen (15) days of that change. The form can be obtained or requested from YRCAA's office or the website.

6.3 Results of the source test requirements in this Order shall be submitted to the YRCAA within 30 days following the completion date of the test.

6.4 The final source test results must be reported to YRCAA in units of ppmvd, pounds per hour and potential tons per year for each pollutant.

6.5 The Permittee shall keep all records including this Order on site. Records shall include, at minimum, the monthly number of hours of operation of all units, the NG usage, and the O&M items performed. Forms for recordkeeping must be designed by the Permittee and shall include the date and time of maintenance performed and the operator's name.

6.6 The required records, logs and a copy of the O&M plan for this Facility shall be kept on site and shall always be readily available, organized, accessible and be made available to the APCO of the YRCAA or his designated staff during inspections or upon request. The O&M plan shall be updated to reflect any changes in operating procedures and such changes shall be routinely be implemented.

6.7 All required records shall be kept and maintained on-site for the most previous three years from any current date.

6.8 Any application form, report, compliance certification, monthly record and the annual consumption report submitted to YRCAA pursuant to this Order must be signed by the responsible official.

6.9 Total air emission for each air pollutant including HAPs/TAPs, number of hours of operation must be calculated and reported to YRCAA on an annual basis as specified in the annual registration provided by YRCAA to the Facility, as long as the Facility is not a Title V source.

You may appeal this Order to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process and applicable requirements is governed by Chapter 43.21B RCW. "Date of receipt" is defined in RCW 43.21B.001(2).

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

- File your appeal and a copy of this Order with the PCHB, P.O. Box 40903, Olympia, WA, 98504-0903. Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Order on YRCAA in paper form - by mail or in person. E-mail is not accepted.

DATED at the City of Yakima, Washington this 13th day of November, 2018.

PREPARED and APPROVED BY:

Hasan M. Tahat, Ph.D.
Compliance, Engineering and Planning Division Supervisor
Yakima Regional Clean Air Agency

REVIEWED BY:

Norman Hepner, P.E.,
Nth Degree Engineering Solutions

ISSUED BY:

Keith Hurly
Air Pollution Control Officer
Yakima Regional Clean Air Agency

Potential Emissions from the New two 700HP Boiler - Natural Gas Combustion

Operating Hours	8,760	hr/year
Natural Gas Heating Value [a]	1,020	Btu/scf
Maximum Heat Input Capacity [b]	63.000	MMBtu/hr

Pollutant		Natural Gas Emission Factor (lb/MMscf)	Exhaust Gas Emission Factor (lb/dry 10^6 scf)	Emission Factor (lb/MMBtu)	Emission Rate (lb/hr)	Emission Rate (tpy)
PM_{10}	[c]	7.6	--	7.45E-03	0.47	2.06
$PM_{2.5}$	[c]	7.6	--	7.45E-03	0.47	2.06
SO_2	[c]	0.6	--	5.88E-04	0.04	0.16
NO_X	[d]	--	1.25	1.09E-02	0.69	3.02
VOC	[c]	5.5	--	5.39E-03	0.34	1.49
CO	[c]	--	2.12	1.85E-02	1.16	5.09
CO_2e	[e]		--	--	7,377.17	32,312.01
CO_2	[f]	--	--	116.98	7,369.56	32,278.67
N_2O	[f]	--	--	2.20E-04	1.39E-02	0.06
CH_4	[f]	--	--	2.20E-03	0.14	0.61

[a] The natural gas heating value uses a typical heating value from AP-42.

[b] The maximum heat input is based on vendor provided emission data at 100% firing rate.

[c] Emission factors for small boilers (<100 MMBtu/hr) are obtained from Table 1.4.1 and Table 1.4.2, AP-42 Chapter 1.4, Natural Gas Combustion.

[d] Emission factors for NO_X and CO are obtained from vendor guarantee of 9 ppm and 25 ppm corrected to 3% oxygen, respectively. The emission factors are converted from ppm to lb/MMscf using EPA Method 19 using the equations below. A conversion fuel factor of 8,710 dscf/MMBtu is used to determine the emission factor in lb/MMBtu.

NO_X EF (lb/MMscf) = NO_X concentration (ppm) × 1.194×10^{-7} (lb/scf)/(ppm-NO_X) × 20.9%/(20.9%-3%) × 10^6

CO EF (lb/MMscf) = CO concentration (ppm) × 1.660×10^{-7} (lb/scf)/(ppm-SO_2) × 28.0101 (g/mol SO_2) / 64.066 (g/mol CO) × 20.9%/(20.9%-3%) × 10^6

[e] The GHGs emissions are calculated based on the Global Warming Potentials (GWP) provided in Table A-1 of 40 CFR 98.

CO_2	1
N_2O	298
CH_4	25

[f] The emission factors are obtained from 40 CFR 98 Subpart C, Tables C-1 and C-2, and converted to values in lb/MMBtu.

HAPs/TAPs Emission Summary

Heat Input Capacity	63.0 MMBtu/hr
Natural Gas Heating Value	1020 Btu/scf

AERSCREEN Modeling Results for Stack 312 Feet	24' to P.L.	38' to P.L.	Combined	@ 95 meters or
1 hr conc.	64	64	128	
3 hr conc.	64.7	64.7	129.4	
8 hr conc.	57.66	57.66	115.32	
24 hr conc.	38.44	38.44	76.88	
Annual conc.	6.407	6.407	12.814	

				Natural Gas Combustion [a]													
Pollutant	CAS Number	HAP?	TAP?	Emission Factor (lb/MMscf)	Hourly Emissions (lb/hr)	Annual Emissions (lb/yr)	Annual Emissions (tpy)	Averaging Period	ASIL ($\mu g/m^3$)	SQER (lb/avg. period)	De Minimis (lb/avg. period)	Modeling Required?	Averaging Period	ASIL ($\mu g/m^3$)	SQER (lb/avg. period)	De Minimis (lb/avg. period)	Modeling Required?	From Model Value ($\mu g/m^3$)
Benzene	71-43-2	Yes	Yes	2.10E-03	1.30E-04	1.14	5.68E-04	year	0.0345	6.62	0.331	No	year	0.0345	6.62	0.331	De Minimis	
Formaldehyde	50-00-0	Yes	Yes	7.50E-02	4.63E-03	40.58	0.02	year	0.167	32	1.6	Yes	year	0.167	32	1.6	De Minimis	0.007469337
Toluene	108-88-3	Yes	Yes	3.40E-03	2.10E-04	1.84	9.20E-04	24-hr	5000	657	32.9	De Minimis	24-hr	5000	657	32.9	De Minimis	
2-Methylnaphthalene	91-57-6	Yes	No	2.40E-05	1.48E-06	1.30E-02	6.49E-06	--	--	--	--	--	--	--	--	--	--	
3-Methylchloranthrene	56-49-5	Yes	Yes	1.80E-06	1.11E-07	9.74E-04	4.87E-07	year	0.000159	0.0305	0.00153	De Minimis	year	0.000159	0.0305	0.00153	De Minimis	
7,12-Dimethylbenz(a)anthrancen	--	Yes	No	1.60E-05	9.88E-07	8.66E-03	4.33E-06	--	--	--	--	--	--	--	--	--	--	
Acenaphthylene	203-96-8	Yes	No	1.80E-06	1.11E-07	9.74E-04	4.87E-07	--	--	--	--	--	--	--	--	--	--	
Benzo(a)pyrene	50-32-8	Yes	Yes	1.20E-06	7.41E-08	6.49E-04	3.25E-07	year	0.000909	0.174	0.00872	De Minimis	year	0.000909	0.174	0.00872	De Minimis	
Benzo(b)fluoranthene	205-99-2	Yes	Yes	1.80E-06	1.11E-07	9.74E-04	4.87E-07	year	0.00909	1.74	0.0872	De Minimis	year	0.00909	1.74	0.0872	De Minimis	
Benzo(k)fluoranthene	207-08-9	Yes	Yes	1.80E-06	1.11E-07	9.74E-04	4.87E-07	year	0.00909	1.74	0.0872	De Minimis	year	0.00909	1.74	0.0872	De Minimis	
Dibenzo(a,h)anthracene	53-70-3	Yes	Yes	1.20E-06	7.41E-08	6.49E-04	3.25E-07	year	0.000833	0.16	0.00799	De Minimis	year	0.000833	0.16	0.00799	De Minimis	
Dichlorobenzene	25321-22-6	Yes	No	1.20E-03	7.41E-05	0.65	3.25E-04	--	--	--	--	--	--	--	--	--	--	
Hexane	110-54-3	Yes	Yes	1.80	0.11	973.91	0.49	24-hr	700	92	4.6	De Minimis	24-hr	700	92	4.6	De Minimis	
Naphthalene	91-20-3	Yes	Yes	6.10E-04	3.77E-05	0.33	1.65E-04	year	0.0294	5.64	0.282	No	year	0.0294	5.64	0.282	De Minimis	
Acenaphthene	83-32-9	Yes	No	1.80E-06	1.11E-07	9.74E-04	4.87E-07	--	--	--	--	--	--	--	--	--	--	
Anthracene	120-12-7	Yes	No	2.40E-06	1.48E-07	1.30E-03	6.49E-07	--	--	--	--	--	--	--	--	--	--	
Benz(a)anthracene	56-55-3	Yes	Yes	1.80E-06	1.11E-07	9.74E-04	4.87E-07	year	0.00909	1.74	0.0872	De Minimis	year	0.00909	1.74	0.0872	De Minimis	
Benzo(b,k)fluoranthene	--	Yes	No	--	-	-	-	--	--	--	--	--	--	--	--	--	--	
Benzo(g,h,i)perylene	--	Yes	No	1.20E-06	7.41E-08	6.49E-04	3.25E-07	--	--	--	--	--	--	--	--	--	--	
Chrysene	218-01-9	Yes	Yes	1.80E-06	1.11E-07	9.74E-04	4.87E-07	year	0.0909	17.4	0.872	De Minimis	year	0.0909	17.4	0.872	De Minimis	
Ethylbenzene	100-41-4	Yes	Yes	--	-	-	-	year	0.4	76.8	3.84	De Minimis	year	0.4	76.8	3.84	De Minimis	
1,1,1-Trichloroethane	71-55-6	Yes	Yes	--	-	-	-	24-hr	1000	131	6.57	De Minimis	24-hr	1000	131	6.57	De Minimis	
o-Xylene	95-47-6	Yes	Yes	--	-	-	-	24-hr	221	29	1.45	De Minimis	24-hr	221	29	1.45	De Minimis	
OCDD	3268-87-9	Yes	Yes	--	-	-	-	year	0.000263	0.0505	0.00252	De Minimis	year	0.000263	0.0505	0.00252	De Minimis	
Fluoranthene	206-44-0	Yes	No	3.00E-06	1.85E-07	1.62E-03	8.12E-07	--	--	--	--	--	--	--	--	--	--	
Fluorene	86-73-7	Yes	No	2.80E-06	1.73E-07	1.51E-03	7.57E-07	--	--	--	--	--	--	--	--	--	--	
Indeno(1,2,3-cd)pyrene	193-39-5	Yes	Yes	1.80E-06	1.11E-07	9.74E-04	4.87E-07	year	0.00909	1.74	0.0872	De Minimis	year	0.00909	1.74	0.0872	De Minimis	
Phenanthrene	85-01-8	Yes	No	1.70E-05	1.05E-06	9.20E-03	4.60E-06	--	--	--	--	--	--	--	--	--	--	
Pyrene	129-00-0	Yes	No	5.00E-06	3.09E-07	2.71E-03	1.35E-06	--	--	--	--	--	--	--	--	--	--	
Arsenic	**7440-38-2**	**Yes**	**Yes**	**2.00E-04**	**1.24E-05**	**0.11**	**5.41E-05**	**year**	**0.000303**	**0.0581**	**0.00291**	**Yes**	**year**	**0.000303**	**0.0581**	**0.00291**	**De Minimis**	**1.99182E-05**
Beryllium	7440-41-7	Yes	Yes	1.20E-05	7.41E-07	6.49E-03	3.25E-06	year	0.000417	0.08	0.004	No	year	0.000417	0.08	0.004	De Minimis	
Cadmium	**7440-43-9**	**Yes**	**Yes**	**1.10E-03**	**6.79E-05**	**0.60**	**2.98E-04**	**year**	**0.000238**	**0.0457**	**0.00228**	**Yes**	**year**	**0.000238**	**0.0457**	**0.00228**	**De Minimis**	**0.00010955**
Chromium	7440-47-3	Yes	No	1.40E-03	8.65E-05	0.76	3.79E-04	--	--	--	--	--	--	--	--	--	--	
Chromium (VI) [d]	18540-29-9	Yes	Yes	5.60E-05	3.46E-06	0.03	1.51E-05	year	0.00000667	0.00128	0.000064	Yes	year	0.00000667	0.00128	0.000064	De Minimis	5.57711E-06
Cobalt	7440-48-4	Yes	Yes	8.40E-05	5.19E-06	0.05	2.27E-05	24-hr	0.1	0.013	0.000657	De Minimis	24-hr	0.1	0.013	0.000657	De Minimis	
Copper	7440-50-8	No	Yes	8.50E-04	5.25E-05	0.46	2.30E-04	1-hr	100	0.219	0.011	De Minimis	1-hr	100	0.219	0.011	De Minimis	
Lead	7439-92-1	Yes	Yes	5.00E-04	3.09E-05	0.27	1.35E-04	year	0.0833	16	10	De Minimis	year	0.0833	16	10	De Minimis	
Manganese	7440-96-5	Yes	Yes	3.80E-04	2.35E-05	0.21	1.03E-04	24-hr	0.04	0.00526	0.000263	No	24-hr	0.04	0.00526	0.000263	De Minimis	
Mercury	7439-97-6	Yes	Yes	2.60E-04	1.61E-05	0.14	7.03E-05	24-hr	0.09	0.0118	0.000591	De Minimis	24-hr	0.09	0.0118	0.000591	De Minimis	
Nickel	7440-02-0	Yes	No	2.10E-03	1.30E-04	1.14	5.68E-04	--	--	--	--	--	--	--	--	--	--	
Selenium	7782-49-2	Yes	Yes	2.40E-05	1.48E-06	1.30E-02	6.49E-06	24-hr	20	2.63	0.131	De Minimis	24-hr	20	2.63	0.131	De Minimis	
Vanadium	7440-62-2	No	Yes	2.30E-03	1.42E-04	1.24	6.22E-04	24-hr	0.2	0.0263	0.00131	No	24-hr	0.2	0.0263	0.00131	De Minimis	
SO_2	7446-09-05	No	Yes	--	0.04	324.64	0.16	1-hr	660	1.45	0.457	De Minimis	1-hr	660	1.45	0.457	De Minimis	
NO_2 [e]	10102-44-0	No	Yes	--	0.69	6031.19	3.02	1-hr	470	1.03	0.457	No	1-hr	470	1.03	0.457	De Minimis	
CO	630-08-0	No	Yes	--	1.16	10183.36	5.09	1-hr	23000	50.4	1.14	No	1-hr	23000	50.4	1.14	De Minimis	
Total																		
Total																		

[a] Natural gas emission factors are obtained from Table 1.4-2, Table 1.4-3, and Table 1.4-4, AP-42, for all the HAPs and TAPs with available emission factors. Annual emissions are based on 8,760 hours per year operation.

[b] Fuel oil emission factors are obtained from Table 1.3-9 and Table 1.3-10, AP-42. Annual emissions are based on 500 hours per year operation, which is the maximum number of hours expected including during gas curtailment period under worst-case scenario. The emission factors are considered conservative because the emission factors are for residual oil fired boilers instead of No.2 fuel oil. All fuel oil trace elements emissions are conservatively assumed to be elemental metal and metal compounds. Only metal compounds are considered HAP.

[c] The total annual emission rates for HAPs and TAPs are the greater of the emissions from two scenarios: 1) continuous 8,760 hours operation firing natural gas; 2) 8,260 hours operation firing natural gas and 500 hours firing fuel oil. The maximum hourly emissions are the greater of hourly emission rates firing natural gas or fuel oil.

[d] Chromium compounds are assumed to be 4% chromium (VI) for gaseous fuel combustion and 18% for fuel oil combustion, from EPA 2005 National Emissions Inventory Data and Documentation chromium speciation data for utility boilers, which can be found here: http://www3.epa.gov/ttn/chief/net/2005inventory.html.

[e] It's conservatively assumed that all NO_x is emitted in the form of NO_2.

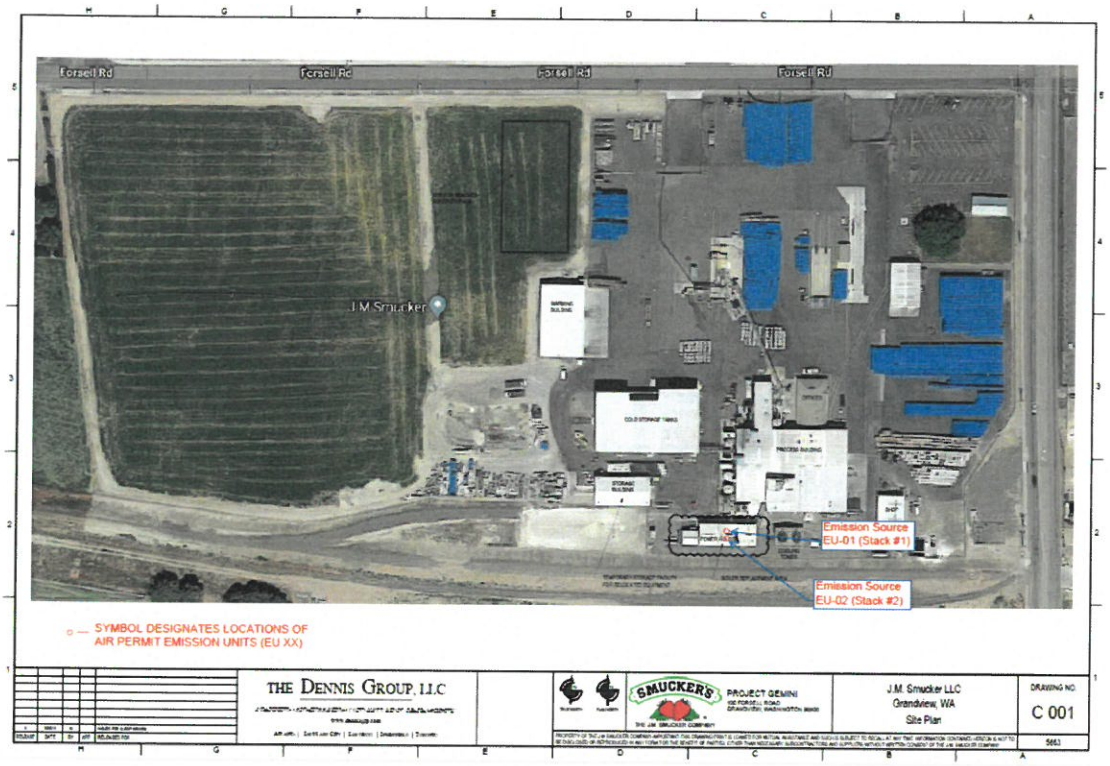

Figure 1. Location of the Facility and the Boilers

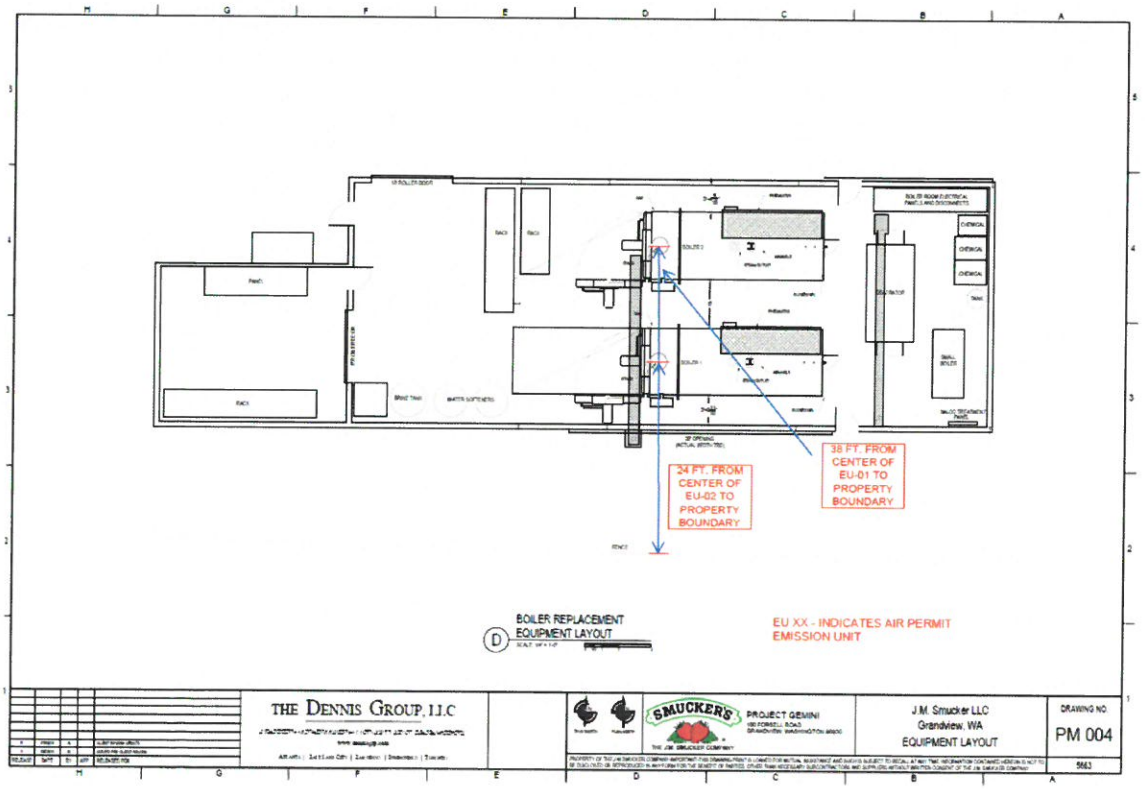

Figure 2. Boiler stacks locations and distances

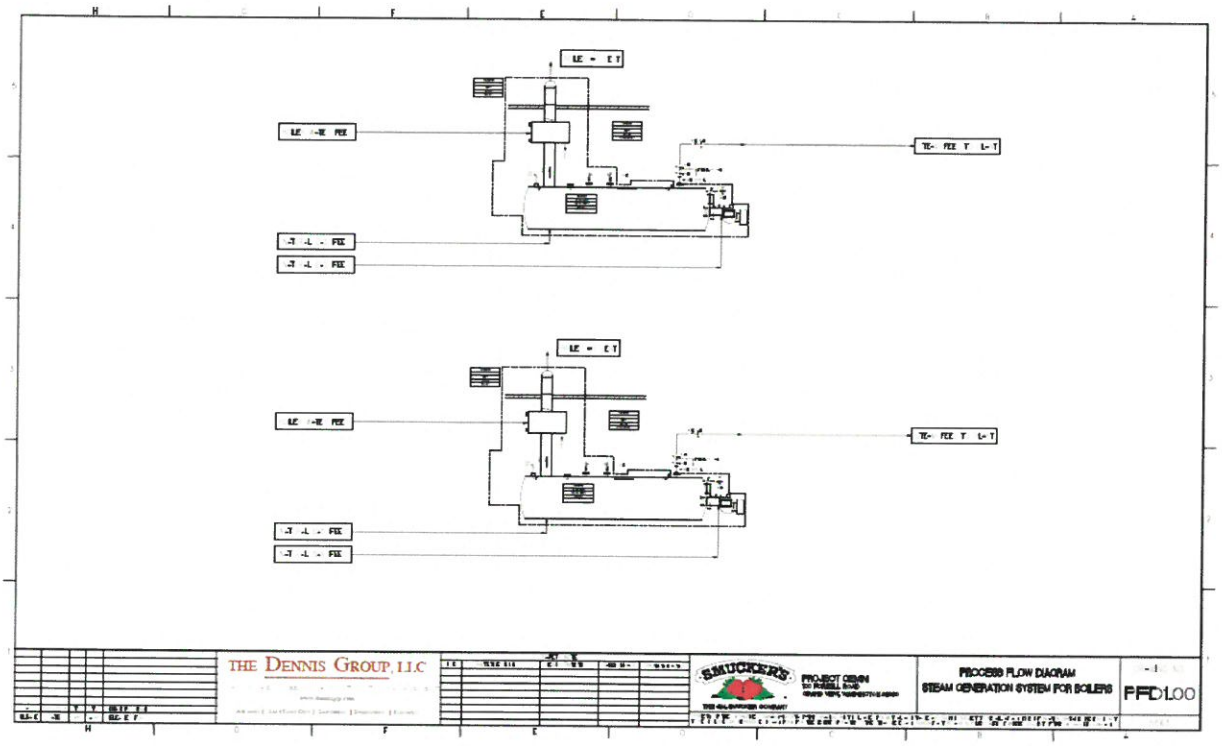

Figure 3. Process flow diagram

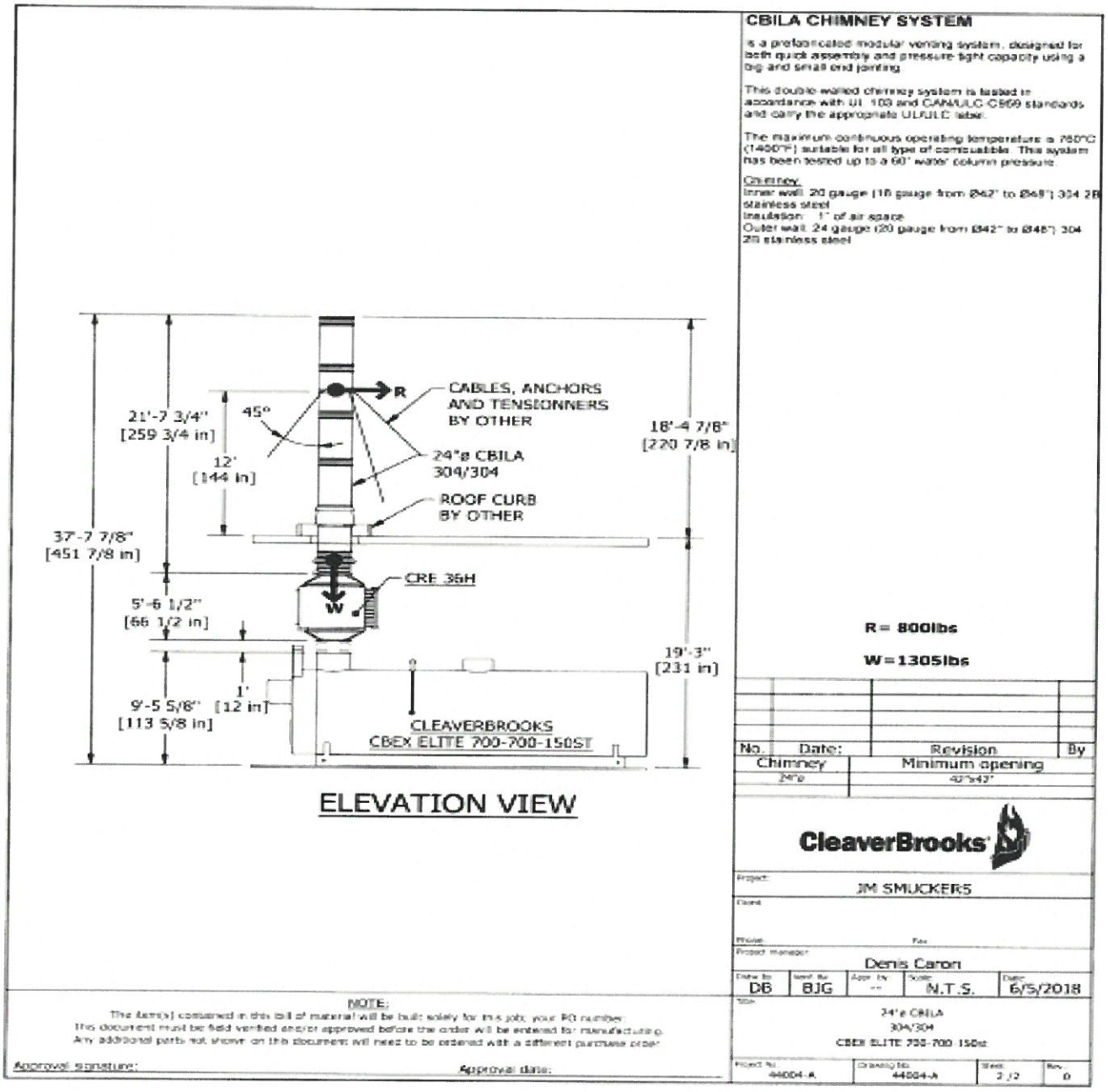

Figure 4. Elevation and stack heights

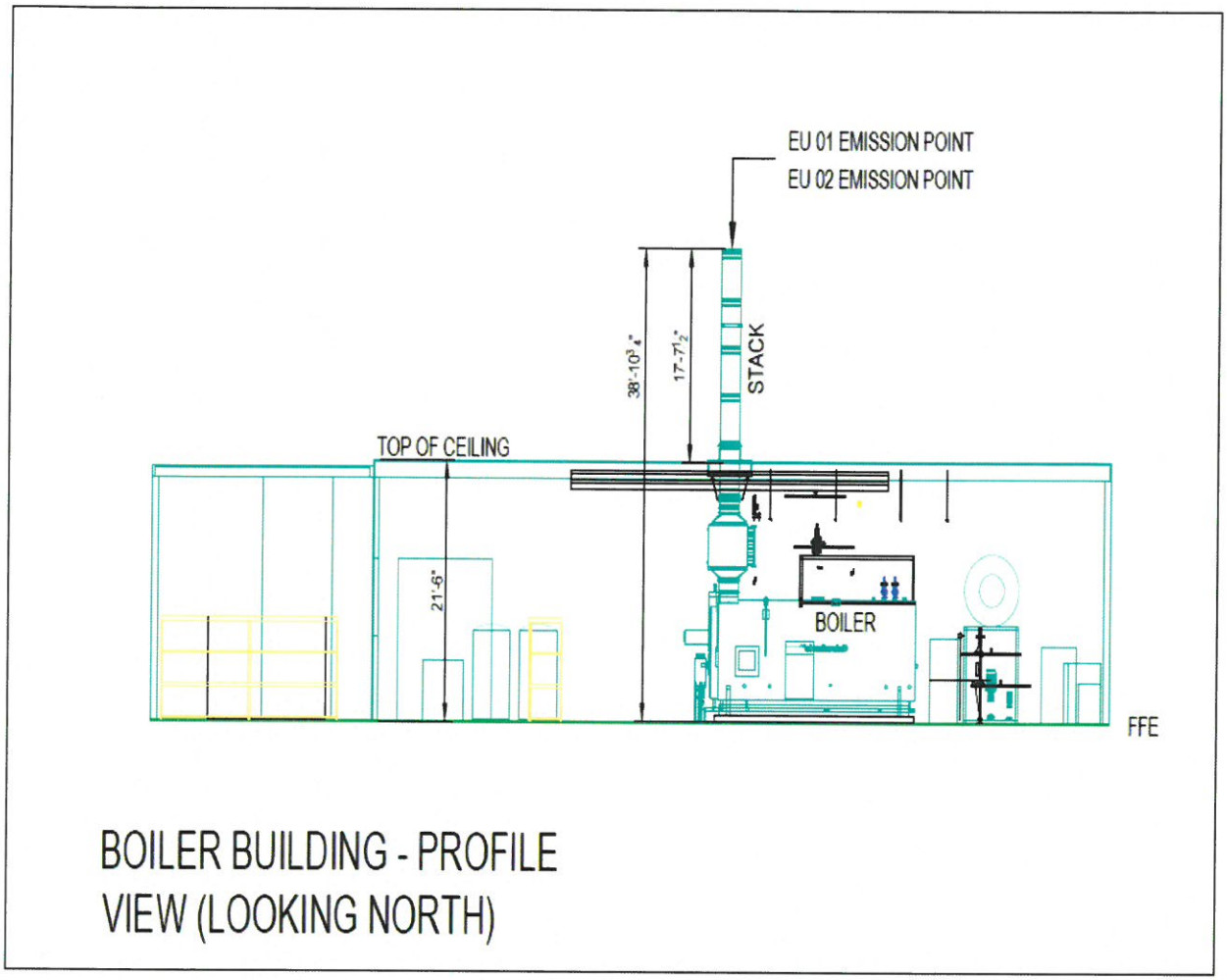

Figure 5. Building and boilers view profiles (the two stacks are perpendicular)

GENERAL REQUIREMENTS FOR RAIN CAPS AND EXHAUST STACKS

1. RAIN CAPS: Good engineering design for vertically oriented exhaust stacks in the Pacific Northwest generally includes some type of rain protection device or rain cap. These devices are designed to keep rain, moisture and animals (birds and squirrels) out of the stack. Exhaust stacks are part of most equipment that has an air discharge to the environment. Good air pollution practices require that any air discharge be directed in a vertical fashion to facilitate good dispersion of air and potential contaminants (including odorous substances). Including any type of device at the end of a stack that redirects the discharge air back toward the ground defeats the purpose of having an exhaust stack. Typical types of equipment that discharge air from facilities includes: paint spray booths or similar operations, combustion sources like boilers, internal combustion engines, roof vents, baghouses and cyclone separators. Moisture can have a detrimental effect on processes and machinery if allowed to enter the top of the stack. Therefore, proper design of rain caps should take into account not only protection of processes and equipment but also not hinder the vertical discharge of air from this equipment. There are many different types of rain caps provided by many different vendors. Examples of acceptable configurations are provided below in Figure 1. Many variations of these configurations exist and may be acceptable as well.

2. EXHAUST STACKS: Exhaust stacks shall be vertically discharged to the atmosphere. The discharge point of the exhaust system shall be located at least three feet above the peak height of surrounding roofs (six feet is preferable). There shall be no flow obstruction at the point of discharge that inhibits vertical dispersion (i.e., rain cap, elbow, etc.). Exhaust stack configurations designed to prevent rain infiltration are generally acceptable provided the configuration does not obstruct vertical discharge. Good Engineering Practice (GEP) shall be utilized when designing and installing stacks. Examples of acceptable rain cap configurations are provided below in Figure 1.

FIGURE 1: Acceptable types of weatherproof exhaust systems: