YAKIMA REGIONAL CLEAN AIR AGENCY

Order of Approval Permit No NSRP-22-DG-15

New Source Review Order of Approval for Darigold, Inc. for the Installation of a New 1200 Cleaver-Brook Horsepower (Hp) (CBEX 200-1200-150ST(460/3/60))

IN THE MATTER OF approving a project which establishes a new air contaminant source at Darigold, Inc., in Sunnyside, WA. THIS ORDER OF APPROVAL IS HEREBY ISSUED TO:

Applicant/Permittee: Darigold, Inc.
Food Processing Facility

Located at: 400 Alexander Rd
Sunnyside, WA. 98944

Contact: Darigold, Inc.
Attn: Todd Hughes
Senior Environmental, Health, and Safety Analyst

Contact at the site: Ronald Phillips, EH&S Manager
400 Alexander Rd
Sunnyside, WA. 98944
(509) 837-8000

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: April 27, 2016.

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 Darigold, Inc., hereafter referred to as the Permittee, the Facility, DGI or the Source is the owner and operator of the dairy processing facility at 400 Alexander Rd., Sunnyside, WA. The Permittee is proposing to install a 1200 Horsepower (Hp) Cleaver-Brook steam boiler (CBEX 200-1200-150ST(460/3/60)) using Natural Gas (NG) as the main source of fuel. However, the boiler is capable and will be equipped to burn distillate oil/diesel number 2 ultralow sulfur diesels with 0.0015% sulfur by weight.

1.2 The boiler will be limited to maximum of annual 48 hours for testing purposes and a maximum of 500 hours per year in case of emergency, using ultralow sulfur diesel 0.0015% sulfur by weight.

1.3 Air emissions from operating this boiler 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 boiler operation. The City of Sunnyside issued a Mitigated Determination of Nonsignificance (MDNS) pursuant to the State Environmental Policy Act (SEPA).

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

1.6 Installation of this new boiler, is 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 at or greater than 80 percent of a Title V threshold as of the time of issuance of this permit;

2.3 The Facility is not a major stationary as of the date of issuance of this Order nor is this

installation is subject to the Prevention of Significant Deterioration (PSD) permitting requirements of WAC 173-400-700 through 173-400-750;

2.4 This boiler will be burning mainly about 95 percent of the time NG, but equipped and permitted to burn up to 500 hours annually and a maximum of 48 hours per year for testing purposes. Therefore, the boiler is subject to 40 CFR Part 63 National Emission Standards for Hazardous Air Pollutants (NESHAP) for Area Sources: Subpart JJJJJJ, Industrial, Commercial, and Institutional Boilers;

2.5 The boiler 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 boiler 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 Permits 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 1200 Hp Cleaver-Brook steam boiler as specified above, located at 400 Alexander Rd., Sunnyside, 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) 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 boiler will be equipped with an Ultra-Low NOx 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 limit section below;

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

3.2.4 The boiler must be operated as per manufacturer specifications and 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 main fuel source for the boiler;

3.2.7 Ultralow fuel diesel may be used for this boiler for an annual maximum of 48 hours for testing purposes and a maximum of 500 hours annually for backup in case of emergency.

3.2.8 The boiler 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

3.2.9 The boiler should not operate more than the limits specified in this permit.

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, 40 CFR Part 63, Subpart JJJJJJ, 173-400-040 and 173-460.

3.4 The Permittee shall comply with all applicable air emission limit requirements, but not limited

3.5 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	Process Capacity	Motor HP
1	Small Industrial Boiler	Cleaver-Brook	CBEX 200-1200-150ST(460/3/60)	1200 Hp	125 Hp blower
2	Economizer/feedwater heater	Cleaver-Brook	CRE-66K		
3	Deaerator and Feedwater pumps	Cleaver-Brook SprayMaster	SMP series spray type		

3.6 The Permittee must develop and implement specific O&M plan based on the boiler 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.

3.7 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 boiler i.e. model/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.

3.8 No fugitive emissions shall be released from this boiler 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.

3.9 An initial opacity as measured by 40 CFR Part 60, Appendix A, Method 9, July 1, 2004 from this 1200 Hp Cleaver-Brook boiler installation must be conducted and shall not exceed a zero percent (0%) using NG fuel and five percent (5%) for ultralow sulfur diesel, average for six consecutive minutes in any given one hour period. The Permittee shall maintain 0% and 5% for each respective fuel opacity from the boiler 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% and 5% opacity limit based on the manufacturer or design recommendation, YRCAA should be notified immediately which may result in opacity modification.

3.10 In addition to the initial opacity reading above, once a month, the Permittee shall conduct and record visual opacity from the boiler stack. Zero percent (0%) opacity means no smoke coming out of the stack. Only heat wave maybe seen, but nothing else likes smoke. Five percent means barely you see little smoke (mainly black) coming out from the stack. If the observer sees anything more than what has been explained above, the Permittee shall immediately stop the boiler operation and take corrective action as directed in the O&M plan until visible emissions are below 0% or 5% opacity, depending on the fuel being used at the time of observation (NG or diesel, respectively). Corrective actions may include the following:

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

3.10.2 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% or 5% opacity limit. If opacity is greater than 0% or 5%, 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.

3.11 An initial source performance test for NOx, CO, PM_{10}, $PM_{2.5}$ and Chromium VI as specified in this Order using NG fuel shall be conducted no later than 180 days after initial startup of the boiler 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.

3.12 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 limit section below.

3.13 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.

3.14 The source test for Chromium (VI) 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.

3.15 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 boiler is operating at its normal operation of the boiler's firing rate. However, the specified limit in the limit 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 Natural gas is and shall be main source of fuel for combustion; however, the boiler may

use ultralow diesel fuel, but not more than 500 hours in case of emergency, and not to exceed 48 hours annually for testing purposes.

3.19 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 boiler 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), 40 CFR Part 63 National Emission Standards for Hazardous Air Pollutants (NESHAP) for Area Sources: Subpart JJJJJJ, Industrial, Commercial, and Institutional Boilers 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 The Permit 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 boiler shall use an Ultra- Low-NOx burner, 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 the Appendix.

5.3 Emissions of NOx from the boiler 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 boiler 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 Emissions of NOx from the boiler shall not exceed seventy parts per million by volume, dry and corrected to three percent oxygen (70 ppmvd @ 3% O_2) using ultralow sulfur diesel fuel.

5.6 Emissions of CO from the boiler shall not exceed ten parts per million by volume, dry and corrected to three percent oxygen (10 ppmvd @ 3% O_2) using ultralow sulfur diesel fuel with sulfur content of 0.0015% by weight.

5.7 Chromium VI limits shall be determined after the performance source test and shall always be below the ASIL at the boundary property of the Facility. Based on the source test results, the ASIL at the boundary will be analyzed further.

6.0 MONITORING AND RECORDKEEPING REPORTING REQUIREMENTS.

6.1 The Permittee shall record the annual amount of NG and the ultralow sulfur diesels used, including the number of hours and dates, by the subject boiler 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 five 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 a responsible official or responsible official designee.

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.

Any person feeling aggrieved by this NSR Order of Approval may obtain review thereof by application, within thirty (30) days of receipt of this NSR order to the Pollution Control Hearings Board, P.O. Box 40903, Olympia, WA, 98504-0903. Concurrently, a copy of the application must be sent to the YRCAA, 329 N 1st St., Yakima, WA 98901. These procedures are consistent with the provisions of Chapter 43.21B RCW and the rules and regulations adopted thereunder.

DATED at Yakima, Washington this 27th day of April, 2016.

PREPARED and APPROVED BY:

Hasan M. Tahat, Ph.D.
Engineering and Planning Division Supervisor
Yakima Regional Clean Air Agency
for
Gary W. Pruitt
Air Pollution Control Officer
Yakima Regional Clean Air Agency

REVIEWED BY:

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

Appendix A

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Boiler: Cleaver Brook & Modeling results for NG
1200 Hp Steam Boiler (CBEX 200-1200-150ST(460/3/60))

Hours of operation: 8212
Natural gas usage: 50.21 MMBTU/hr NOx 1.09E-2 lb/mmbtu
CO 1.74E-2 lb/mmbtu

Emissions [TPY] = (Emission factor [lb/MMft^3]) x (Heat Input [MMBTU/hr] x (hours of operation [hr/yr]) x (fuel heating value [1ft3/1050Btu]) x (ton conversion [1 ton/2000 lb])

Modeling:

DATA		
Input	Value	Units
Stack height	31	ft
Inside diam	2.67	ft
ACFM (VF)	15703	acfm
gas exit temp	337	F

AERMOD Model Results		
Max @		m
concentration (1 hour)	***438.15***	ug/m^3
(24-hr)	88.21	
(Annual)	29.13	

	Emission Factor	Heat Input	Emissions							
	Emission(E)	Heat Input								
Pollutants	#/MMft^3	MMBtu/Hr	Tons/Yr	lbs/year	g/s	ug/m3	NAAQS			
PM	7.6	50.21	1.4923	2984.6	*0.042871862*	*18.78*				
PM_{10}	7.6	50.21	1.4923	2984.6	*0.042871862*	*18.78*				
SO_2	0.6	50.21	0.1178	235.6	*0.003384621*	*1.48*				
NOx (uncontrolled)	100	50.21	19.6353	39270.6	*0.564103451*	*247.16*	*53 ppb (annual)*	*13.17*		
NOx (controlled)	1.25	50.21	0.2454	490.9	*0.007051293*	*3.09*	*53 ppb (annual)*	*0.16*	*~9ppm*	
N_2O	0.64	50.21	0.1257	251.3	*0.003610262*	*1.58*				
TOC	11	50.21	2.1599	4319.8	*0.06205138*	*27.19*				
CO (uncontrolled)	84	50.21	16.4936	32987.3	*0.473846899*	*207.62*				
CO (controlled)	2.12	50.21	0.4163	832.5	*0.011958993*	*5.24*		*25ppm*		
CO_2	120,000	50.21	23562.3397	47124679.3	*676.9241416*	*296594.31*				
Methane	2.3	50.21	0.4516	903.3	*0.012974379*	*5.68*				
VOC	5.5	50.21	1.0799	2159.9	*0.03102569*	*13.59*				
	Emission Factor	**Heat Input**	**Tons/Yr**	lbs/yr	g/s	ug/m3	lb avg period	averaging period	SQER	
2-methylnaphthalene	2.40E-05	50.21	4.71E-06	0.00942	1.36E-07					
3-methylchloranthrene	1.80E-06	50.21	3.53E-07	0.00071	1.02E-08	2.96E-07		yr	0.0305	TAPs
7,12-dimethylbenz(a)anthracene	1.60E-05	50.21	3.14E-06	0.00628	9.05E-08	2.63E-06		yr	0.00271	TAPs
acenaphthene	1.80E-06	50.21	3.53E-07							
acenaphthylene	1.80E-06	50.21	3.53E-07							
anthracene	2.40E-06	50.21	4.71E-07							
Arsenic	2.00E-04	50.21	3.93E-05	0.079	1.13E-06	3.29E-05		yr	0.0581	TAPs
Barium	4.40E-03	50.21	8.64E-04							
Benzene	2.10E-03	50.21	4.12E-04	0.825	1.19E-05	3.46E-04		yr	6.62	HAPS
Benzo(a)anthracene	1.80E-06	50.21	3.53E-07	7.07E-04	1.02E-08	2.96E-07		yr	1.74	TAPs
Benzo(a)pyrene	1.20E-06	50.21	2.36E-07	4.71E-04	6.78E-09	1.98E-07		yr	0.174	TAPs
Benzo(b)fluoranthene	1.80E-06	50.21	3.53E-07	7.07E-04	1.02E-08	2.96E-07		yr	1.74	TAPs
benzo(ghi)perylene	1.20E-06	50.21	2.36E-07							
Benzo(k)fluoranthene	1.80E-06	50.21	3.53E-07	7.07E-04	1.02E-08	2.96E-07		yr	1.74	TAPs
Beryllium	1.20E-05	50.21	2.36E-06	4.71E-03	6.78E-08	1.98E-06			0.08	TAPs
Cadmium	1.10E-03	50.21	2.16E-04	4.32E-01	6.22E-06	1.81E-04		yr	0.0457	TAPs
Chromium	1.40E-03	50.21	2.75E-04	0.549787925	7.91E-06	2.31E-04		yr	0.00128	TAPs
chrysene	1.80E-06	50.21	3.53E-07							
Cobalt	8.40E-05	50.21	1.65E-05	3.30E-02	4.75E-07	4.19E-05	9.04E-05	24-hr	0.013	TAPs
Copper	8.50E-04	50.21	1.67E-04	3.34E-01	4.81E-06	2.11E-03	3.81E-05	1-hr	0.219	TAPs
Dibenzo(a,h)anthracene	1.20E-06	50.21	2.36E-07	4.71E-04	6.78E-09	1.98E-07		yr	0.16	TAPs
Dichlorobenzene	1.20E-03	50.21	2.36E-04					yr	17.4	HAPs
fluoranthene	3.00E-06	50.21	5.89E-07							
fluorene	2.80E-06	50.21	5.50E-07							
Formaldehyde	7.50E-02	50.21	1.47E-02	29.45	4.24E-04	1.24E-02		yr	32	HAPs
Indeno(123-cd)pyrene	1.80E-06	50.21	3.53E-07							
Lead	0.0005	50.21	9.82E-05	1.96E-01	2.83E-06	8.23E-05		yr		NAAQS
Manganese	3.80E-04	50.21	7.46E-05	1.49E-01	2.15E-06	1.90E-04	0.00041	24-hr	0.00526	TAPs
Mercury	2.60E-04	50.21	5.11E-05	1.02E-01	1.47E-06	1.30E-04	0.00028	24-hr	0.0118	TAPs
Molybdenum	1.10E-03	50.21	2.16E-04							
Naphthalene	6.10E-04	50.21	1.20E-04	2.40E-01	3.45E-06	1.00E-04		yr	5.64	HAPs
Nickel	2.10E-03	50.21	4.12E-04							
Phenanathrene	1.70E-05	50.21	3.34E-06							
Pyrene	5.00E-06	50.21	9.82E-07							
Selenium	2.40E-05	50.21	4.71E-06	9.42E-03	1.36E-07	3.95E-06	0.000026		2.63	TAPs
Toluene	3.40E-03	50.21	6.68E-04	1.34E+00	1.92E-05	5.60E-04		yr	657	HAPS
Vanadium	2.30E-03	50.21	4.52E-04	9.03E-01	1.30E-05	1.15E-03	0.002475	24-hr	0.0263	TAPs
Zinc	2.90E-02	50.21	5.69E-03							

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-CO) × 28.0101 (g/mol CO) / 64.066 (g/mol CO) × 20.9%/(20.9%-3%) × 10^6

Appendix A

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Boiler: Cleaver Brook **Using Diesel for 548 hrs w/ modeling results**
1200 Hp Steam Boiler (CBEX 200-1200-150ST(460/3/60))

Heat Capacity	Capacity	Max fuel consumption	Fuel S content	Max hours per year	Actual Max fuel per year	Potential Max fuel per yr
Btu/hr	MMBtu/hr	gal/hr	% by weight	hours	gallons	gallons
50,200,000	50.200	371.85	0.0015	548	17,849	203,775

Boilers using #2 Ultra-low sulfur diesel fuel

Boiler using #2 Ultra-low sulfu	50,200,000	Btu/hr	NOx	20	lb/10^3gal		
Capacity =	50.2	MMBtu/hr	SO2	142S	lb/10^3gal	0.213	
Max fuel consumption =	371.85	gal/hr	SO3	2S	lb/10^3gal	0.003	0.216
Fuel S content =	0.0015	% by weight	CO	5	lb/10^3gal		
Max hours per year =	548	hours	PM	2	lb/10^3gal		
Actual Max fuel per year =	17,849	gallons for 48 hrs only					
Potential Max fuel per yr	203,775	gallons					
Ratio	1.000						

Potential to Emit (PTE) 203,775 gal/year 27509.6 MMBtu/yr based on fuel rating (137000 Btu/ gal)

Lead emission factor 9 lb/1E12 BTU

Criteria Pollutant	Emissions Tons/yr	Emission Factors lb/1000 gal	Emissions Factor lb/yr	Potential Emissions lb/hr	De Minimis (lb/avg period)	avg period
CO	0.509	5	1,019	1.859	1.14	1-hr
SOx	0.022	0.2	44	0.080	0.457	1-hr
NO_2	2.038	20	4,075	7.437	0.457	1-hr
Lead	0.000	0.00015(1)	0	3.51E-05	(1)	1-yr
VOC	0.051	0.504	103	0.187		
PM10	0.204	2.00	408	0.744	0.032	1-yr
PM2.5	0.085	0.83	169	0.309	0.0208	

	AERMOD Model Results	
	Max @	m
concentration (1 hour)	***438.15***	ug/m^3
(24-hr)	88.21	
(Annual)	29.13	

*actual max fuel value for PM10: 35.7 lb/yr

*PTE in Tons/yr = [Potential Fuel Usage (10^3 gallons) * Emission Factor (lb/10^3 gal)/2000 (lb/ton)
*Emission Factors taken from Section 1.3 of AP-42, Fifth Edition, Volume 1, Chapter 1: External Combustion Sources, July, 1998.

AP-42 Table 3.4-3

CAS No.	Toxic Air Pollutant	Emission Factor (lb/1000gal) AP 42	Emission Factor (lb/MMBtu)	Emissions (lb/yr) (using total gallons)	Emissions (g/s)	Model Emissions (µg/m^3) 24 hr ave	Model Emissions (µg/m^3) Annual ave	ASIL (µg/m^3) 24 hr ave	ASIL (µg/m^3) Annual ave	Ave. period	SQER (lb/averaging period)	De Minimis (lb/averaging period)	Classification
71-43-2	Benzene	2.14E-04	1.56E-06	0.04	9.88E-06		0.00028789		0.12	yr	20	N/A	VOC, TAP, HAP
108-88-3	Toluene	6.20E-03	4.53E-05	1.24	2.86E-04	0.025		400		24	43748	5	VOC, TAP, HAP
1330-20-7	o-Xylenes	1.09E-04	7.96E-07	0.02	5.03E-06	0.000		1500		24	43748	5	VOC, TAP, HAP
100-41-4	Ethylbenzene	6.36E-05	4.64E-07	0.01	2.94E-06		0.00008556		0.4	yr	76.8	3.84	VOC, TAP, HAP
50-00-0	Formaldehyde	3.30E-02	2.41E-04	6.63	1.52E-03		0.04439392		0.077	yr	20	N/A	VOC, TAP, HAP
	PAH												
91-20-3	Naphthalene	1.13E-03	8.25E-06	0.23	5.22E-05		0.00152016	170		yr	22750	2.6	VOC, TAP, HAP
71-55-6	1,1,1-Trichloroethane	2.36E-04	1.72E-06	0.05	1.09E-05		0.00031748	1000		yr	131	6.57	VOC, TAP, HAP
56-55-3	Benz(a)anthracene	4.01E-06	2.93E-08	0.0008	1.85E-07	0.000	0.00000539		0.00909	na	N/A	N/A	VOC, TAP
218-01-9	Chrysene	2.38E-06	1.74E-08	0.0005	1.10E-07		0.00000320		0.00909	yr	N/A	N/A	VOC, TAP
205-99-2; 207-08-9	Benzo(b,k)fluoranthene	1.48E-06	1.08E-08	0.0003	6.83E-08		0.00000199		0.00909	yr	N/A	N/A	VOC, TAP
193-39-5	Indo(1,2,3-cd)pyrene	2.14E-06	1.56E-08	0.0004	9.88E-08		0.00000288		0.00909	yr	N/A	N/A	VOC, TAP
53-70-3	Dibenzo(a,h)anthracene	1.67E-06	1.22E-08	0.0003	7.71E-08		0.00000225		9.09E-05	yr	N/A	N/A	VOC, TAP
	Total PAH	1.38E-03	1.01E-05	0.2766	6.36E-05		0.00185335						
		Total VOC Emissions (lb/yr):		8.23									
		Tons/yr		0.004									

CAS No.	Metals	Emission Factor (lb/10^12BTU) AP-42	Emissions (lb/yr)	Emissions (lb/hr)	Emissions (g/s)	Model Conc. (µg/m^3) 24 hr ave	Model Conc. (µg/m^3) Annual ave	ASIL (µg/m^3)	Averaging Period	SQER (lb/averaging period)	De Minimis (lb/averaging period)	Classification
	Arsenic	4	1.10E-02	0.000020	2.53E-06		0.000074	0.000303	year	0.0581	0.00291	VOC, TAP, HAP
~	Beryllium	3	8.25E-03	0.000015	1.90E-06		0.000055	0.000417	year	0.08	0.004	VOC, TAP, HAP
7440-43-9	Cadmium	3	8.25E-03	0.000015	1.90E-06		0.000055	0.000238	year	0.0457	0.00228	VOC, TAP, HAP
	Chromium	3	8.25E-03	0.000015	1.90E-06	0.000168	0.000055		N/A			VOC, TAP, HAP
	Chromium IV	at 5% Cr	4.13E-04	0.000001	9.50E-08		0.000003	6.67E-06	year	0.00128	6.40E-05	VOC, TAP, HAP
~	Copper	6	1.65E-02	0.000030	3.80E-06	0.001664		100	1-hr	0.219	0.011	VOC, TAP, HAP
~	Lead	9	2.48E-02	0.000045	5.70E-06		0.000166	0.0833	year	16	10	VOC, TAP, HAP
7439-97-6	Mercury	3	8.25E-03	0.000015	1.90E-06	0.000168		0.09	24-hr	0.0118	0.000591	VOC, TAP, HAP
	Manganese	6	1.65E-02	0.000030	3.80E-06	0.000335		0.04	24-hr	0.00526	0.000263	VOC, TAP, HAP
~	Nickel	3	8.25E-03	0.000015	1.90E-06		0.000055	0.0042	year	0.806	0.0403	VOC, TAP, HAP
~	Selenium	15	4.13E-02	0.000075	9.50E-06	0.000838		20	24-hr	2.63	0.131	VOC, TAP, HAP
	Zinc	4	1.10E-02	0.000020	2.53E-06	0.000223	0.000074		N/A			VOC

Appendix A
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Boiler: Cleaver Brook ***N.G.***
1200 Hp Steam Boiler (CBEX 200-1200-150ST(460/3/60))

Calculates the annual PTE for natural gas use fuel
N.G. TPY =(mm BTU per hour *8760*(1ft3/1050Btu)*(# Emissions/1.0 mmft3)x 1 ton/2000 lb

	Pollutants	Emission(E)		Heat Input	Emissions		
		#/MMft**3		MMBtu/Hr	Tons/yr	1bs/year	1bs/hr
		Uncontrolled Emissions					
PM		7.6		50.20	1.492E+00	2.98E+03	3.63E-01
PM10		7.6		50.20	1.492E+00	2.98E+03	3.63E-01
SO2		0.6		50.20	1.178E-01	2.36E+02	2.87E-02
NOx~ 9ppm	*lb/1E6 scf	1.25	1.0144 lbs/hr	50.20	4.165E+00	8.33E+03	1.01E+00
N2O		2.2		50.20	4.319E-01	8.64E+02	1.05E-01
TOC		11		50.20	2.159E+00	4.32E+03	5.26E-01
CO~25ppm	*lb/1E6 scf	2.12	0.87 lbs/hr	50.20	3.572E+00	7.14E+03	8.70E-01
Methane		2.3		50.20	4.515E-01	9.03E+02	1.10E-01
VOC		5.5		50.20	1.080E+00	2.16E+03	2.63E-01
Lead		0.0005		50.20	9.815E-05	1.96E-01	2.39E-05
Formaldehyde		7.50E-002		50.20	1.472E-02	2.94E+01	3.59E-03
Benzo(a)anthracene		1.80E-006		50.20	3.534E-07	7.07E-04	8.61E-08
Benzo(a)pyrene		1.20E-006		50.20	2.356E-07	4.71E-04	5.74E-08
Benzo(b)fluoranthene		1.80E-006		50.20	3.534E-07	7.07E-04	8.61E-08
Benzo(k)fluoranthene		1.80E-006		50.20	3.534E-07	7.07E-04	8.61E-08
Dibenzo(a,h)anthracene		1.20E-006		50.20	2.356E-07	4.71E-04	5.74E-08
2-Methylnaphthalene		2.40E-005		50.20	4.711E-06	9.42E-03	1.15E-06
Benzene		2.10E-003		50.20	4.122E-04	8.24E-01	1.00E-04
Butane		2.10E+000		50.20	4.122E-01	8.24E+02	1.00E-01
Dischlorobenzenne		1.20E-003		50.20	2.356E-04	4.71E-01	5.74E-05
Ethane		3.10E+000		50.20	6.085E-01	1.22E+03	1.48E-01
Fluoranthene		3.00E-006		50.20	5.889E-07	1.18E-03	1.43E-07
Fluorene		2.80E-006		50.20	5.497E-07	1.10E-03	1.34E-07
Hexane		1.80E+000		50.20	3.534E-01	7.07E+02	8.61E-02
Naphthalene		6.10E-004		50.20	1.197E-04	2.39E-01	2.92E-05
Pentane		2.60E+000		50.20	5.104E-01	1.02E+03	1.24E-01
Phenanathrene		1.70E-005		50.20	3.337E-06	6.67E-03	8.13E-07
Propane		1.60E+000		50.20	3.141E-01	6.28E+02	7.65E-02
Pyrene		5.00E-006		50.20	9.815E-07	1.96E-03	2.39E-07
Toluene		3.40E-003		50.20	6.674E-04	1.33E+00	1.63E-04
Arsenic		2.00E-004		50.20	3.926E-05	7.85E-02	9.56E-06
Barium		4.40E-003		50.20	8.637E-04	1.73E+00	2.10E-04
Beryllium		1.20E-005		50.20	2.356E-06	4.71E-03	5.74E-07
Cadmium		1.10E-003		50.20	2.159E-04	4.32E-01	5.26E-05
Chromium		1.40E-003		50.20	2.748E-04	5.50E-01	6.69E-05
Cobalt		8.40E-005		50.20	1.649E-05	3.30E-02	4.02E-06
Copper		8.50E-004		50.20	1.669E-04	3.34E-01	4.06E-05
Manganese		3.80E-004		50.20	7.460E-05	1.49E-01	1.82E-05
Mercury		2.60E-004		50.20	5.104E-05	1.02E-01	1.24E-05
Molybdenum		1.10E-003		50.20	2.159E-04	4.32E-01	5.26E-05
Nickel		2.10E-003		50.20	4.122E-04	8.24E-01	1.00E-04
Selenium		2.40E-005		50.20	4.711E-06	9.42E-03	1.15E-06
Vanadium		2.30E-003		50.20	4.515E-04	9.03E-01	1.10E-04
Zinc		2.90E-002		50.20	5.693E-03	1.14E+01	1.39E-03
				Sum HAPs	2.209E+00	Not including Lead and Formaldehyde	

*AP-42 Tab. 1.4-1,2: 7/98