Attachments to July 11, 2023 Community Advisory Committee Meeting Agenda Item 5: Annual Report on Humboldt Sawmill Company Memorandum of Understanding

Contents:

MEMORANDUM OF UNDERSTANDING BETWEEN REDWOOD COAST ENERGY AUTHORITY AND HUMBOLDT SAWMILL COMPANY REGARDING ALTERNATIVE USES OF MATERIALS USED FOR BIOMASS POWER GENERATION

THIS is a MEMORANDUM OF UNDERSTANDING ("MOU") setting forth the understanding between Redwood Coast Energy Authority ("RCEA") and Humboldt Sawmill Company ("HSC"), regarding the periodic assessment of alternate biomass feedstock uses and other environmental considerations during the term of an existing power purchase agreement between RCEA and HSC.

Background

1. RCEA and HSC (the "Parties") have been parties to power purchase agreements since 2017, under which HSC sells renewable biomass power to supply RCEA's community choice aggregation program for Humboldt County electricity users. The current power purchase agreement is dated April 27, 2017, and was amended on March 1, 2019, May 1, 2021, and June 1, 2021 ("PPA").

2. Renewable biomass power provides a needed and financially viable local means of disposing of residual material produced by Humboldt County's forest products industry.

3. Members of the RCEA Community Advisory Committee (CAC) and members of the public have asked that RCEA consider the environmental and public health impacts of local generation of biomass power and explore alternative, lower impact uses of the feedstock material currently used by the plant.

4. The RCEA Board of Directors (the Board) at its April 22, 2021 meeting approved an amendment to its PPA with HSC, extending its term until May 31, 2031. In approving that extension of the PPA term, the RCEA Board directed staff to "periodically review the contract with Humboldt Sawmill Company, assessing current alternate biomass uses and other environmental considerations."

5. RCEA staff discussed with the CAC at their May 11, 2021 meeting the creation of a memorandum of understanding (MOU) between RCEA and HSC to implement the RCEA Board's direction to staff mentioned above. CAC members proposed that such an MOU should include a commitment from HSC to share feedstock supply and plant operation data helpful in assessing alternative biomass uses, and that the assessment consider both financial and non-financial benefits of such alternative uses, including avoided carbon emissions.

Mutual Understandings

1. Annually on or around May 1 and continuing until the termination of the PPA, representatives of the Parties will meet to review the terms of the PPA and to discuss the continued viability of biomass power production by the HSC facility relative to other

potential or actual uses of the biomass feedstock by HSC or other entities. Such uses to be considered might include but not be limited to those recently analyzed on RCEA's behalf by a consultant and by a team of Humboldt State University engineering students[1]:
   a. Soil amendments, including compost, mulch, and biochar;
   b. Energy products, including gasification, torrefied wood, and wood pellets;
   c. Chemical products, including ethanol, nanocellulose, and bioplastics; and
   d. Other products, including construction materials, pulp for tissue manufacture, and wastewater treatment media

2. HSC will make available to RCEA upon request current or recent data on the types, quantities, and quality of feedstock material used by the plant, to the extent such data is tracked by HSC; the facility's heat rate expressed in million British Thermal Units of biomass fuel consumed per megawatt-hour of electric power generated; and the associated plant emissions reported to regulatory authorities, to the extent disclosure of such data does not directly place HSC at a competitive disadvantage in its forest products or power sales business activities, or cause HSC to violate confidentiality agreements it may have with its various business partners. Data should be made available showing monthly quantities, and disaggregated to show how material is sourced from within or outside Humboldt County, and whether it is sourced internally from the Humboldt Redwood Company and Mendocino Redwood Company family of companies, or externally from other suppliers.

3. RCEA and HSC will observe the confidentiality provisions (section 10.6) in the PPA with regard to any data deemed confidential by either party that is exchanged in fulfillment of this MOU.

4. HSC has engaged a consultant to analyze alternative uses of the biomass residuals produced by the company. This consultant is examining pathways to commercialization for alternative technologies and determining their financial viability. HSC will make the results of the consultant study available to RCEA when it is completed.

5. This MOU does not and is not intended to supersede, replace, or subordinate any provisions, representations, covenants, rights, or obligations in the PPA.

[1] See https://redwoodenergy.org/wp-content/uploads/2020/07/Biomass-Humboldt-RCEA-1_19-FINAL-1.pdf and https://redwoodenergy.org/power-resources/ (expand "Read more about Biomass" section and scroll to "Humboldt State University Capstone Class on Alternative Biomass Uses").

Signatories to the Memorandum of Understanding

Humboldt Sawmill Company

Name: Jim Pelkey

Signature: DocuSigned by: Jim Pelkey 0F0FEB424317402...

Date: 9/30/2021

Redwood Coast Energy Authority

Name: Matthew Marshall

Signature: DocuSigned by: [signature] 71854927A198432...

Date: 10/1/2021

HSC RCEA MOU Data Reporting Template
Feedstock

Reporting Period: May 1, 2022-April 30, 2023

		Geographic Origin		Supplier	
Month	Biomass Fuel Use (tons)	Sourced from Within Humboldt County (%)	Sourced from Outside Humboldt County (%)	Sourced internally from HRC/MRC forestlands (including Arcata Forest Products) (%)	Sourced externally (%)
May-22	19,867	82.5%	17.5%	87.8%	12.2%
Jun-22	17,594	77.6%	22.4%	87.5%	12.5%
Jul-22	19,244	82.0%	18.0%	92.2%	7.8%
Aug-22	18,993	73.6%	26.4%	85.3%	14.7%
Sep-22	17,226	71.3%	28.7%	70.1%	29.9%
Oct-22	19,597	91.3%	8.7%	83.1%	16.9%
Nov-22	15,445	88.9%	11.1%	69.8%	30.2%
Dec-22	13,752	90.9%	9.1%	79.8%	20.2%
Jan-23	12,124	87.6%	12.4%	80.5%	19.5%
Feb-23	10,297	88.1%	11.9%	62.0%	38.0%
Mar-23	11,307	89.5%	10.5%	76.7%	23.3%
Apr-23	16,178	93.6%	6.4%	87.1%	12.9%

What biomass species were used during the reporting period (e.g. redwood, Douglas-fir, etc.)? Provide an approximate % breakdown of those species.

Redwood	60%
Doug Fir	23%
Hem Fir	14%
Other	3%

Describe the general quality of biomass material used and what potential alternative markets have been identified by HSC for material of this type and quality (e.g. biofuels, landscaping materials, building materials, etc.)

Biofuels from timberlands/sawmill	95%
Biofuels from PG&E line clearing	3%
Landscaping materials	2%

HSC RCEA MOU Data Reporting Template
Fuel Use and Electric Generation

Reporting Period: May 1, 2022-April 30, 2023

Month	Biomass Fuel Use (Tons)	Biomass Fuel Use (MMBTU)	Diesel Use (gallons)	Diesel Use (MMBTU)	Other Fuel Use *(state units)*	Other Fuel Use (MMBTU)	Total Electric Generation (MWh)	Facility Heat Rate MMBTU/MWh	Total Electric Sales to RCEA (MWh)	Onsite Electric Use from Plant (MWh)	Recovered Thermal Energy for Onsite Use (MMBTU)
May-22	19,867	311122	3567	490.04	0	0	15747	19.79	11521	4226	8098
Jun-22	17,594	275522	2709	372.17	0	0	14357	19.22	10159	4198	7821
Jul-22	19,244	301361	571	78.44	0	0	16072	18.76	11662	4410	10235
Aug-22	18,993	297438	852	117.05	0	0	15656	19.01	11226	4430	8923
Sep-22	17,226	269763	3553	488.11	0	0	14137	19.12	10058	4079	8875
Oct-22	19,597	306887	870	119.52	0	0	15774	19.46	11582	4192	8248
Nov-22	15,445	241863	6795	933.50	0	0	11909	20.39	7478	4431	5533
Dec-22	13,752	215357	9932	1364.47	0	0	9872	21.95	6487	3385	2410
Jan-23	12,124	189868	3656	502.26	0	0	9358	20.34	5637	3721	3812
Feb-23	10,297	161249	12681	1742.13	0	0	8136	20.03	4723	3413	3752
Mar-23	11,307	177063	17767	2440.85	0	0	9156	19.61	5561	3595	5198
Apr-23	16,178	126805	13830	1899.98	0	0	13235	9.72	9736	3499	4336

HSC RCEA MOU Data Reporting Template
Emissions

Reporting Period: 2022 Full Year

Month		CO2 (Metric Tons)	CH4 (Metric Tons)	N2O (Metric Tons)	Biomass CO2 (Metric Tons CO2e)	Non-Biomass CO2 (Metric Tons CO2e)	Total GHG (Metric Tons CO2e)	VOC (Tons)	NOx (Tons)	SOx (Tons)	PM Combined (Tons)	PM10 (Tons)	PM2.5 (Tons)	Benzene (lbs)	1,3-Butadiene (lbs)	Chromium, Hexavalent (lbs)	Diesel PM (lbs)	Formaldehyde (lbs)	Hydrochloric Acid (lbs)	Hydrogen Sulfide (lbs)	Nickel (lbs)
2020 - Annual (Jan-Dec)	Published - CA Air Resources Board	(2)	98.56	12.94	288,829	653	295,562	34.7	222	36.9	-	24.8	22.5	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
2021 - Annual (Jan - Dec)	Published - CA Air Resources Board	(2)	99.42	13.05	291,406	206	297,987	20.9	248	30.7	21.4	(3)	(3)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
2022 -Annual (Jan-Dec)	Uncertified **(1)**	(2)	104.21	13.67	305,414	463.1	312,559	34.3	272	50.5	34.2	(3)	(3)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)

May-21																				
Jun-21																				
Jul-21																				
Aug-21																				
Sep-21																				
Oct-21																				
Nov-21																				
Dec-21																				
Jan-22																				
Feb-22																				
Mar-22																				
Apr-22																				

Note: the pollutants listed are those reported to the California Air Resources Board as shown on its CARB Pollution Mapping Tool (v2.5) at https://www.arb.ca.gov/ei/tools/pollution_map/

(1) 2022. Data has been submitted to CARB but not verified. Data will be verified by August 31, 2023.

(2) Note: Pollutants reported are those reported to the California Air Resources Board as shown on it CARB Pollution Mapping Tool (v2.5) at https://ww3.arb.ca.gov/ei/tools/pollution_map/.
(3) Source test data and PM 10 and PM 2.5 data not provided per 2021 & 2022 Source Test.
(4) Data not compiled by Scotia Power Plant. Air District calculates and reports to CARB.

FORM V-K1
COMPLIANCE CERTIFICATION REPORT

I. FACILITY INFORMATION

1. Company Name: Humboldt Sawmill CO., LLC
2. Facility Name Scotia Co-Gen
3. Mailing Address: P.O. Box 37 Scotia, CA 95565
4. Street Address or Source Location: 153 Main St. Scotia, CA 95565
5. Facility Permit Number: NCU-060-12

II. GENERAL INFORMATION

1. Reporting period (specify dates): January 1st, 2022 - December 31st, 2022
2. Due date for submittal of report: January 31st, 2023
3. Type of submittal: [ ] Monitoring Report (complete Section III below)

   [ ] Compliance Schedule Progress Report (complete Section IV)

   [X] Compliance Certification (complete Section V)
   [X] Annual [ ] Semi-Annual

III. MONITORING REPORT INFORMATION

1. Were deviations from permit requirements encountered during the reporting period?

   [X] Yes [ ] No

   If Yes, explain any deviation(s) from permitting or monitoring requirements for each applicable permitted unit, including the cause of deviation(s) and any actions taken to correct deviation(s):

   See attached deviations reports

IV. COMPLIANCE SCHEDULE PROGRESS INFORMATION

1. Dates the activities, milestones, or compliance required by schedule of compliance was achieved/will be achieved:

   N/A

2. Provide explanation of why any dates in schedule of compliance were not/will not be met:

   N/A

3. Describe in chronological order preventive or corrective action taken:

   N/A

V. COMPLIANCE CERTIFICATION

1. Was source in compliance with applicable federal requirements and permit conditions during the reporting period specified in Section II?

   [X] Yes [ ] No

   If No, explain any non-compliance for each applicable permitted unit including but not limited to the date(s) of non-compliance, the cause(s) of non-compliance, and any action(s) taken to correct non-compliance (attach supplemental sheets as necessary):

I hereby certify based on information and belief formed after reasonable inquiry that the above statement(s) and information in this document and supplements are true, accurate, and complete.

[signature] 1/19/2023

Signature of Responsible Official Date

CHRISTIAN VERDERBER

Print Name of Responsible Official

DIRECTOR, OPERATIONS

Ti[redacted]

Telephone Number of Responsible Official

January Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A					No Deviations
Boiler B					No Deviations
Boiler C					No Deviations

February Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A					No Deviations
Boiler B					No Deviations
Boiler C					No Deviations

March Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A	3/25/22 21:24	3/25/22 21:29	Opacity 6min Daily	46.26	Startup/Shutdown
Boiler A	3/25/22 21:30	3/25/22 21:35	Opacity 6min Daily	43.84	Startup/Shutdown
Boiler A	3/25/22 21:36	3/25/22 21:41	Opacity 6min Daily	32.88	Startup/Shutdown
Boiler A	3/3/22 0:00	3/3/22 11:59	24 Hr. Ave CO Lb/Mmbtu	2.01	Startup/Shutdown
Boiler B					No Deviations
Boiler C	3/1/22 0:00	3/1/22 11:59	24 Hr. Ave CO Lb/Mmbtu	1.31	Startup/Shutdown
Boiler C	3/26/22 4:54	3/25/22 4:59	Opacity 6min Daily	29.7	Breakdown Submitted

April Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A					No Deviations
Boiler B	4/16/22 11:36	4/16/22 11:41	Opacity 6min Daily	21.75	Breakdown Report Submitted
Boiler B	4/16/22 11:42	4/16/22 11:47	Opacity 6min Daily	21.05	Breakdown Report Submitted
Boiler C					No Deviations

May Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A					No Deviations
Boiler B					No Deviations
Boiler C					No Deviations

June Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A	6/7/22 12:18	6/7/22 12:23	Opacity 6min Daily	21.86	Startup/Shutdown
Boiler B					No Deviations
Boiler C					No Deviations

July Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A					No Deviations
Boiler B					No Deviations
Boiler C					No Deviations

August Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A	8/23/22 0:00	8/23/22 12:59	24 Hr. Ave CO Lb/Mmbtu	3.019	Startup/Shutdown
	8/30/22 0:00	8/30/22 12:59	24 Hr. Ave CO Lb/Mmbtu	2.939	Startup/Shutdown
	8/31/22 0:00	8/31/22 12:59	24 Hr. Ave CO Lb/Mmbtu	3.283	Startup/Shutdown
	8/22/22 12:00	8/22/22 12:59	Opacity 6min Daily		See attached Report
Boiler B	8/27/22 7:12	8/27/22 7:17	Opacity 6min Daily	53.6	Upset Condition Breakdown Called In
	8/27/22 7:18	8/27/22 7:23	Opacity 6min Daily	35.2	Upset Condition Breakdown Called In
	8/27/22 10:42	8/27/22 10:47	Opacity 6min Daily	57.8	Startup/Shutdown
	8/27/22 10:48	8/27/22 10:53	Opacity 6min Daily	30.6	Startup/Shutdown
Boiler C					No Deviations

September Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION	
Boiler A	9/1/22 11:48	9/1/22 11:53	Opacity 6min Daily	35.2	Startup/Shutdown	
	9/1/22 11:54	9/1/22 11:59	Opacity 6min Daily	36.1	Startup/Shutdown	
	9/27/22 9:24	9/27/22 9:29	Opacity 6min Daily	29.6	Breakdown Submitted	
	9/10/22 15:42	9/10/22 15:47	Opacity 6min Daily	42.7	Breakdown Submitted	
	9/10/22 0:00	9/10/22 12:59	24 Hr. Ave CO Lb/Mmbtu	4.22	Breakdown Submitted	
	9/11/22 0:00	9/11/22 12:59	24 Hr. Ave CO Lb/Mmbtu	12.3	Startup/Shutdown	
Boiler B	9/14/22 9:18	9/14/22 9:23	Opacity 6min Daily	25.7 MOS	Monitoring Solutions calibration	MOS (monitor out of service)
	9/14/22 9:24	9/14/22 9:29	Opacity 6min Daily	28.7 MOS	Monitoring Solutions calibration	
	9/14/22 9:30	9/14/22 9:35	Opacity 6min Daily	26.2 MOS	Monitoring Solutions calibration	
	9/14/22 10:06	9/14/22 10:11	Opacity 6min Daily	25.9 MOS	Monitoring Solutions calibration	
	9/14/22 10:12	9/14/22 10:17	Opacity 6min Daily	26.1 MOS	Monitoring Solutions calibration	
	9/14/22 10:18	9/14/22 10:23	Opacity 6min Daily	38.7 MOS	Monitoring Solutions calibration	
	9/14/22 10:24	9/14/22 10:29	Opacity 6min Daily	49.2 MOS	Monitoring Solutions calibration	
	9/14/22 10:30	9/14/22 10:35	Opacity 6min Daily	40.3 MOS	Monitoring Solutions calibration	
Boiler C	9/3/22 0:00	9/3/22 12:59	24 Hr. Ave NOX Lb/Mmbtu	0.31	Shutdown/Not Operating	
	9/4/22 0:00	9/4/22 12:59	24 Hr. Ave NOX Lb/Mmbtu	0.74	Shutdown/Not Operating	
	9/5/22 0:00	9/5/22 12:59	24 Hr. Ave NOX Lb/Mmbtu	2.02	Shutdown/Not Operating	
	9/6/22 0:00	9/6/22 12:59	24 Hr. Ave NOX Lb/Mmbtu	1.83	Shutdown/Not Operating	
	9/12/22 13:36	9/12/22 1:41	Opacity 6min Daily	27.9 MOS	Monitoring Solutions calibration	MOS (monitor out of service)
	9/12/22 13:42	9/12/22 13:47	Opacity 6min Daily	27.0 MOS	Monitoring Solutions calibration	
	9/12/22 14:12	9/12/22 14:17	Opacity 6min Daily	20.3 MOS	Monitoring Solutions calibration	
	9/12/22 14:18	9/12/22 14:23	Opacity 6min Daily	26.7 MOS	Monitoring Solutions calibration	
	9/12/22 14:24	9/12/22 14:29	Opacity 6min Daily	26.7 MOS	Monitoring Solutions calibration	
	9/12/22 14:30	9/12/22 14:35	Opacity 6min Daily	29.1 MOS	Monitoring Solutions calibration	
	9/12/22 14:36	9/12/22 14:41	Opacity 6min Daily	46.5 MOS	Monitoring Solutions calibration	
	9/12/22 14:42	9/12/22 14:47	Opacity 6min Daily	46.5 MOS	Monitoring Solutions calibration	

October Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A					No Deviations
Boiler B	10/18/22 0:00	10/18/22 12:59	24 Hr. Ave CO Lb/Mmbtu	8.092 NSA	Compltely Shutdown See attached report
	10/19/22 0:00	10/19/22 12:59	24 Hr. Ave CO Lb/Mmbtu	4.066 NSA	Compltely Shutdown See attached report
	10/8/22 5:30	10/8/22 5:35	Opacity 6min Daily	29.7 SPN	Span Calibration
	10/9/22 5:30	10/9/22 5:35	Opacity 6min Daily	29.7 SPN	Span Calibration
	10/10/22 5:30	10/10/22 5:35	Opacity 6min Daily	28.7 SPN	Span Calibration
	10/11/22 5:30	10/11/22 5:35	Opacity 6min Daily	29.7 SPN	Span Calibration
	10/12/22 5:30	10/12/22 5:35	Opacity 6min Daily	29.7 SPN	Span Calibration
	10/13/22 5:30	10/13/22 5:35	Opacity 6min Daily	29.7 SPN	Span Calibration
	10/14/22 5:30	10/14/22 5:35	Opacity 6min Daily	29.7 SPN	Span Calibration
	10/15/22 5:30	10/15/22 5:35	Opacity 6min Daily	29.7 SPN	Span Calibration
	10/16/22 5:30	10/16/22 5:35	Opacity 6min Daily	29.6 SPN	Span Calibration
	10/17/22 5:30	10/17/22 5:35	Opacity 6min Daily	29.7 SPN	Span Calibration
Boiler C					No Deviations

November Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A					No Deviations
Boiler B	11/21/22 0:00	11/21/22 12:59	24 Hr. Ave CO Lb/Mmbtu	4.832 NSA	Compltely Shutdown See attached report
	11/22/22 0:00	11/22/22 12:59	24 Hr. Ave CO Lb/Mmbtu	10.47 NSA	Compltely Shutdown See attached report
	11/16/22 10:06	11/16/22 10:11	Opacity 6min Daily	23.5 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/16/22 10:12	11/16/22 10:17	Opacity 6min Daily	30.6 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/16/22 10:18	11/16/22 10:23	Opacity 6min Daily	26.1 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/16/22 10:54	11/16/22 10:59	Opacity 6min Daily	26.0 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/16/22 11:00	11/16/22 11:05	Opacity 6min Daily	26.3 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/16/22 11:06	11/16/22 11:11	Opacity 6min Daily	40.6 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/16/22 11:12	11/16/22 11:17	Opacity 6min Daily	49.3 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/16/22 11:18	11/16/22 11:23	Opacity 6min Daily	42.6 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
Boiler C	11/7/22 8:36	11/7/22 8:41	Opacity 6min Daily	21.2	PG&E ISOC
	11/7/22 8:54	11/7/22 8:59	Opacity 6min Daily	29.4	PG&E ISOC
	11/8/22 0:00	11/8/22 12:59	24 Hr. Ave CO Lb/Mmbtu	1.407	PG&E ISOC
	11/9/22 0:00	11/9/22 12:59	24 Hr. Ave CO Lb/Mmbtu	1.116	PG&E ISOC
	11/13/22 9:00	11/13/22 9:05	Opacity 6min Daily	27.2	Startup
	11/15/22 14:36	11/15/22 14:41	Opacity 6min Daily	28.9 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/15/22 14:42	11/15/22 14:47	Opacity 6min Daily	26.7 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/15/22 14:48	11/15/22 14:53	Opacity 6min Daily	22.3 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/15/22 15:24	11/15/22 15:29	Opacity 6min Daily	26.5 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/15/22 15:30	11/15/22 15:35	Opacity 6min Daily	26.5 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/15/22 15:36	11/15/22 15:41	Opacity 6min Daily	41.2 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/15/22 15:42	11/15/22 15:47	Opacity 6min Daily	46.3 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/15/22 15:48	11/15/22 15:53	Opacity 6min Daily	26.7 MOS	Monitor out of Service Monitoring Solutions Quarterly Visit
	11/21/22 15:24	11/21/22 15:29	Opacity 6min Daily	46.6 MOS	Startup/Monitor out of Service
	11/21/22 15:36	11/21/22 15:41	Opacity 6min Daily	22.8	Startup
	11/21/22 15:42	11/21/22 15:47	Opacity 6min Daily	23	Startup
	11/21/22 15:48	11/21/22 15:53	Opacity 6min Daily	22.4	Startup
	11/20/22 0:00	11/20/22 12:59	24 Hr. Ave CO Lb/Mmbtu	1.359	Shutdown

December Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A	12/10/22 0:36	12/10/22 0:41	Opacity 6min Daily	21.3	Breakdown Submitted
	12/10/22 0:42	12/10/22 0:47	Opacity 6min Daily	29.1	Breakdown Submitted
	12/10/22 0:48	12/10/22 0:53	Opacity 6min Daily	27.1	Breakdown Submitted
	12/22/22 0:00	12/22/22 12:59	24 Hr. Ave CO Lb/Mmbtu	6.477	Shutdown Due to Earthquake
	12/23/22 0:00	12/23/22 12:59	24 Hr. Ave CO Lb/Mmbtu	4.822	Shutdown Due to Earthquake
Boiler B	12/12/22 0:00	12/12/22 12:59	24 Hr. Ave CO Lb/Mmbtu	5.473 NSA	Shutdown
	12/13/22 0:00	12/13/22 12:59	24 Hr. Ave CO Lb/Mmbtu	4.088 NSA	Shutdown
Boiler C	12/12/22 1:00	12/12/22 0:05	Opacity 6min Daily	39.8	Startup
	12/12/22 1:06	12/12/22 1:11	Opacity 6min Daily	60.6	Startup
	12/27/22 5:12	12/27/22 5:17	Opacity 6min Daily	22.5	Breakdown Submitted
	12/27/22 6:12	12/27/22 6:17	Opacity 6min Daily	8.1 NSA	Breakdown Submitted
	12/27/22 6:18	12/27/22 6:23	Opacity 6min Daily	29.5	Breakdown Submitted
	12/27/22 6:24	12/27/22 6:29	Opacity 6min Daily	28.4	Breakdown Submitted
	12/27/22 6:30	12/27/22 6:35	Opacity 6min Daily	30.6	Breakdown Submitted
	12/27/22 7:12	12/27/22 7:17	Opacity 6min Daily	33.6	Breakdown Submitted
	12/27/22 7:18	12/27/22 7:23	Opacity 6min Daily	54.3	Breakdown Submitted
	12/27/22 7:24	12/27/22 7:29	Opacity 6min Daily	59.8	Breakdown Submitted
	12/27/22 7:30	12/27/22 7:35	Opacity 6min Daily	59.8	Breakdown Submitted
	12/27/22 7:36	12/27/22 7:41	Opacity 6min Daily	59.3	Breakdown Submitted
	12/27/22 7:42	12/27/22 7:47	Opacity 6min Daily	68.3	Breakdown Submitted
	12/27/22 7:48	12/27/22 7:53	Opacity 6min Daily	57.8	Breakdown Submitted
	12/27/22 7:54	12/27/22 7:59	Opacity 6min Daily	46.5	Breakdown Submitted
	12/27/22 9:24	12/27/22 9:29	Opacity 6min Daily	32.5	Breakdown Submitted
	12/27/22 9:30	12/27/22 9:35	Opacity 6min Daily	45.6	Breakdown Submitted
	12/27/22 9:42	12/27/22 9:47	Opacity 6min Daily	29.3	Breakdown Submitted

2022 HSC-ANNUAL THROUGHPUT NCAQMD

	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Boiler A -NS-074													
Steam Produced (KPPH)	835,997	58,305	85,331	23,310	92,214	58,043	50,776	88,401	67,457	93,786	96,790	68,721	52,863
BDT Fuel	83,599	5,831	8,533	2,331	9,221	5,804	5,078	8,840	6,745	9,379	9,679	6,872	5,286
Diesel Combusted (gallons)	20,513	7077	5000	1162	0	0	1735	571	0	1211	0	3603	154
Days of Operation	282	23	28	10	30	18	19	29	22	30	31	23	19
Boiler B - NS-075													
Steam Produced (KPPH)	871,560	79,571	74,136	78,336	85,126	87,982	93,515	96,155	93,448	66,247	51,942	31,049	34,053
BDT Fuel	87,158	7,957	7,414	7,834	8,513	8,798	9,352	9,616	9,345	6,625	5,194	3,105	3,405
Diesel Combusted (gallons)	12,674	1	1	2,435	0	1,039	0	0	0	1,590	0	1,266	6,342
Days of Operation	304	31	28	29	30	30	30	31	31	23	17	10	14
Boiler C - NS-076													
Steam Produced	370,309	21,668	0	62,678	0	52,648	31,649	7,884	29,035	12,230	47,236	54,676	50,605
BDT Fuel	37,033	2,167	0	6,268	0	5,265	3,165	788	2,904	1,223	4,724	5,468	5,061
Diesel Combusted	12,187	1	0	848	0	2528	974	0	852	752	870	1926	3,436
Days of Operation	156	9	0	30	0	23	12	3	10	4	17	20	28

FORM V-K1
COMPLIANCE CERTIFICATION REPORT

I. FACILITY INFORMATION

1. Company Name: Humboldt Sawmill CO., LLC
2. Facility Name: Scotia Co-Gen
3. Mailing Address: P.O. Box 37 Scotia, CA 95565
4. Street Address or Source Location: 153 Main St. Scotia, CA 95565
5. Facility Permit Number: NCU-060-12

II. GENERAL INFORMATION

1. Reporting period (specify dates): January 1st, 2022 - June 30th, 2022
2. Due date for submittal of report: July 31st, 2022
3. Type of submittal:
   [ ] Monitoring Report (complete Section III below)
   [ ] Compliance Schedule Progress Report (complete Section IV)
   [X] Compliance Certification (complete Section V)
   [ ] Annual [X] Semi-Annual

III. MONITORING REPORT INFORMATION

1. Were deviations from permit requirements encountered during the reporting period?

   [X] Yes [ ] No

   If Yes, explain any deviation(s) from permitting or monitoring requirements for each applicable permitted unit, including the cause of deviation(s) and any actions taken to correct deviation(s):

   See attached deviations reports

IV. COMPLIANCE SCHEDULE PROGRESS INFORMATION

1. Dates the activities, milestones, or compliance required by schedule of compliance was achieved/will be achieved:

   N/A

2. Provide explanation of why any dates in schedule of compliance were not/will not be met:

   N/A

3. Describe in chronological order preventive or corrective action taken:

   N/A

V. COMPLIANCE CERTIFICATION

1. Was source in compliance with applicable federal requirements and permit conditions during the reporting period specified in Section II?

   [X] Yes [ ] No

   If No, explain any non-compliance for each applicable permitted unit including but not limited to the date(s) of non-compliance, the cause(s) of non-compliance, and any action(s) taken to correct non-compliance (attach supplemental sheets as necessary):

I hereby certify based on information and belief formed after reasonable inquiry that the above statement(s) and information in this document and supplements are true, accurate, and complete.

[signature] 7/22/2022

Signature of Responsible Official   Date

CHRISTIAN VERDERBER

Print Name of Responsible Official

DIRECTOR, OPERATIONS

Title of Responsible Official

[redacted]

Telephone Number of Responsible Official

January Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A					No Deviations
Boiler B					No Deviations
Boiler C					No Deviations

February Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A					No Deviations
Boiler B					No Deviations
Boiler C					No Deviations

March Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A	3/25/22 21:24	3/25/22 21:29	Opacity 6min Daily	46.26	Startup/Shutdown
Boiler A	3/25/22 21:30	3/25/22 21:35	Opacity 6min Daily	43.84	Startup/Shutdown
Boiler A	3/25/22 21:36	3/25/22 21:41	Opacity 6min Daily	32.88	Startup/Shutdown
Boiler A	3/3/22 0:00	3/3/22 11:59	24 Hr. Ave CO Lb/Mmbtu	2.01	Startup/Shutdown
Boiler B					No Deviations
Boiler C	3/1/22 0:00	3/1/22 11:59	24 Hr. Ave CO Lb/Mmbtu	1.31	Startup/Shutdown
Boiler C	3/26/22 4:54	3/25/22 4:59	Opacity 6min Daily	29.7	Breakdown Submitted

April Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A					No Deviations
Boiler B	4/16/22 11:36	4/16/22 11:41	Opacity 6min Daily	21.75	Breakdown Report Submitted
Boiler B	4/16/22 11:42	4/16/22 11:47	Opacity 6min Daily	21.05	Breakdown Report Submitted
Boiler C					No Deviations

May Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A					No Deviations
Boiler B					No Deviations
Boiler C					No Deviations

June Deviation Summary

Unit	START_DATE_TIME	END_DATE_TIME	TYPE	VALUE	DESCRIPTION
Boiler A	6/7/22 12:18	6/7/22 12:23	Opacity 6min Daily	21.86	Startup/Shutdown
Boiler B					No Deviations
Boiler C					No Deviations

2022 HRC-ANNUAL THROUGHPUT NCAQMD

	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	PERMIT LIMITS
Aggregate Plant -000518-2														
Tons Processed	68,716													
Diesel Engine Crusher (366 hp)	1,264													
Diesel Engine Screen (100hp)	568													
Boiler A -NS-074														
Steam Produced (KPPH)	835,997	58,305	85,331	23,310	92,214	58,043	50,776	88,401	67,457	93,786	96,790	68,721	52,863	150,000 pounds/hour
BDT Fuel	83,599	5,831	8,533	2,331	9,221	5,804	5,078	8,840	6,745	9,379	9,679	6,872	5,286	
Diesel Combusted (gallons)	20,513	7077	5000	1162	0	0	1735	571	0	1211	0	3603	154	1.47 Million gallons fo diesel oil/calendar year
Hours of Operation	6,763	552	672	240	720	432	456	696	523	720	744	552	456	
														407,000 pounds per hour total for A, B, & C
Boiler B - NS-075														
Steam Produced (KPPH)	871,560	79,571	74,136	78,336	85,126	87,982	93,515	96,155	93,448	66,247	51,942	31,049	34,053	
BDT Fuel	87,158	7,957	7,414	7,834	8,513	8,798	9,352	9,616	9,345	6,625	5,194	3,105	3,405	
Diesel Combusted (gallons)	12,674	1	1	2,435	0	1,039	0	0	0	1,590	0	1,266	6,342	
Hours of Operation	7,296	744	672	696	720	720	720	744	744	552	408	240	336	
Boiler C - NS-076														
Steam Produced	370,309	21,668	0	62,678	0	52,648	31,649	7,884	29,035	12,230	47,236	54,676	50,605	
BDT Fuel	37,033	2,167	0	6,268	0	5,265	3,165	788	2,904	1,223	4,724	5,468	5,061	
Diesel Combusted	12,187	1	0	848	0	2528	974	0	852	752	870	1926	3,436	
Hours of Operation	3,744	216	0	720	0	552	288	72	240	96	408	480	672	
Emergency Diesel Generator - 0009938-2														
Diesel Fuel Combusted	0													
Hours Operation	31.1													No Limit
Hours of Operation Maintenance	10.3													30 hours/year
Knife Planner -000937-2														
Hours of Operation	3,115	276	276	403	264	221	228	154	301	309	256	251	176	4,160
Gang Trimmer -000937-2														
Hours of Operation														4,160
	3,115	276	276	403	264	221	228	154	301	309	256	251	176	
Dry Kilns -000936-2 rev. 2														
RW mbf processed/hour	42,879	3,095	3,078	4,795	3,823	3,020	3,524	4,282	3,555	4,263	3,319	2,788	3,337	119.7 (MMbf)
DF mbf processed/hour	0	0	0	0	0	0	0	0	0	0	0	0	0	40.1 (MMnf)
HF mbf processed/hour	0	0	0	0	0	0	0	0	0	0	0	0		1.4 (MMbf)
														Total: 162.6 (MMbf)
NG Boiler -000973-2														
Quantity MMCF	0													16.8 (MMBtu)
Hours of Operation	0													
HMA -000974-2														
Weight in Tons/Month	942.3	522.40	207.00	108.80	0	0	0	0	0	104.10	0	0	0	150/hr ; 1,200/day; 54,000/month
Diesel Fuel Combusted	1,822	984	357	224	0	0	0	0	0	257	0	0	0	
Hours of Operation	22	15	3	2	0	0	0	0	0	2	0	0	0	

Fuel Combusted S-3B (Drum/Dryer Mix)													
Fuel Combisted S-4 (Heated Asphalt Plant													

Operation	Species		202201	202202	202203	202204	202205	202206	202207	202208	202209	202210	202211	202212	Total
Sawmill - Production	RWD		14,220	6,793	5,551	5,950	6,511	10,730	9,966	9,141	5,459	4,557	2,147	9,482	90,505
Sawmill - Production	DFR		-	2,009	2,337	6,129	6,472	2,214	3,015	3,366	7,578	2,810	6,081	3,303	45,315
Sawmill - Production	HFR		-		-	-	-	1,832	-	-	147	3,514	3,347	386	9,225
Total			14,220	8,802	7,887	12,079	12,982	14,775	12,981	12,507	13,183	10,881	11,575	13,172	145,046
Total YTD			14,220	23,023	30,910	42,989	55,972	70,747	83,728	96,235	109,418	120,299	131,874	145,046	
Sawmill - Consumption	RWD		8,204	4,674	5,024	4,346	4,229	5,880	5,803	4,989	2,951	2,463	1,342	5,480	55,384
Sawmill - Consumption	DFR		-	1,489	1,759	3,600	3,319	1,135	1,685	2,040	4,726	1,497	3,287	1,321	25,858
Sawmill - Consumption	HFR		-	-	-	-	-	1,308	-	-	105	2,510	2,391	215	6,529
Total			8,204	6,163	6,782	7,946	7,548	8,324	7,489	7,029	7,781	6,470	7,020	7,016	87,771
Total YTD			8,204	14,366	21,149	29,094	36,642	44,966	52,455	59,485	67,266	73,736	80,756	87,771	
Hours	RWD		320	148	207	184	188	270	258	235	141	123	56	214	2,344
Hours	DFR		-	46	95	173	166	53	80	87	212	86	145	103	1,245
Hours	HFR		-	-	-	-	-	40	-	-	8	72	80	21	221
Hours			320	194	302	357	355	363	338	322	360	281	280	338	3,811
Hours YTD			320	514	816	1,173	1,527	1,890	2,228	2,550	2,911	3,192	3,472	3,811	
Board Ft/Hour	RWD		44	46	27	32	35	40	39	39	39	37	38	44	39
Board Ft/Hour	DFR		-	44	25	35	39	42	38	39	36	33	42	32	36
Board Ft/Hour	HFR		-	-	-	-	-	45	-	-	18	49	42	18	42
Board Ft/Hour			44	45	26	34	37	41	38	39	37	39	41	39	38
Board Ft/Hour YTD			44	45	38	37	37	37	38	38	38	38	38	38	
Overrun MTD	RWD		1.73	1.45	1.10	1.37	1.54	1.82	1.72	1.83	1.85	1.85	1.60	1.73	1.63
Overrun MTD	DFR		-	1.35	1.33	1.70	1.95	1.95	1.79	1.65	1.60	1.88	1.85	2.50	1.75
Overrun MTD	HFR		-	-	-	-	-	1.40	-	-	1.40	1.40	1.40	1.80	1.41
Overrun MTD			1.73	1.43	1.16	1.52	1.72	1.78	1.73	1.78	1.69	1.68	1.65	1.88	1.65
Overrun YTD	RWD		1.73	1.63	1.48	1.46	1.47	1.54	1.56	1.60	1.61	1.62	1.62	1.63	1.63
Overrun YTD	DFR		-	1.35	1.34	1.53	1.67	1.70	1.71	1.70	1.68	1.69	1.71	1.75	1.75
Overrun YTD	HFR		-	-	-	-	-	1.40	1.40	1.40	1.40	1.40	1.40	1.41	1.41
Overrun YTD			1.73	1.60	1.46	1.48	1.53	1.57	1.60	1.62	1.63	1.63	1.63	1.65	1.65
Kiln	RWD		3,095	3,078	4,795	3,823	3,020	3,524	4,282	3,555	4,263	3,319	2,788	3,337	42,880
Kiln	DFR		-	-	-	-	-	-	-	-	-	-	-	-	-
Kiln	HFR		-	-	-	-	-	-	-	-	-	-	-	-	-
Total			3,095	3,078	4,795	3,823	3,020	3,524	4,282	3,555	4,263	3,319	2,788	3,337	42,880
Total YTD			3,095	6,173	10,968	14,791	17,811	21,335	25,617	29,172	33,435	36,754	39,542	42,880	
Hours			160	160	200	160	160	200	160	160	200	160	160	200	2,080
Hours YTD			160	320	520	680	840	1,040	1,200	1,360	1,560	1,720	1,880	2,080	
Board Ft/Hr			19	19	24	24	19	18	27	22	21	21	17	17	21
Board Ft/Hour YTD			19	19	21	22	21	21	21	21	21	21	21	21	
Planer	RWD	Surfaced	2,683	3,617	5,169	3,666	1,085	5,579	2,069	4,365	2,942	3,200	1,090	2,866	38,330
Planer	RWD	Sort	2,113	3,612	928	1,910	1,327	1,160	2,229	2,684	2,288	1,824	716	3,234	24,025
Planer	RWD	Sizing	-	2,621	1,819	591	1,035	-	1,695	729	408	110	694	627	10,328
Planer	RWD	Rip	582	-	185	280		654	608	-	-	-	1,250	559	4,118
Total	RWD		5,378	9,850	8,100	6,447	3,447	7,393	6,600	7,778	5,637	5,133	3,750	7,287	76,801
Total	DFR		4,745	842	2,880	3,587	5,063	4,859	1,559	3,858	6,677	2,328	5,642	9	42,048
Total	HFR		326	-	-	-	-	-	1,072	406	-	2,964	-	2,791	7,560
Total			10,449	10,691	10,981	10,034	8,509	12,252	9,231	12,042	12,315	10,425	9,392	10,087	126,409
Total YTD			10,449	21,140	32,121	42,155	50,665	62,916	72,147	84,190	96,504	106,930	116,322	126,409	
Hours	RWD		184	320	304	209	123	266	223	247	201	155	140	213	2,583
Hours	DFR		147	30	99	119	160	150	53	101	177	64	156	1	1,255
Hours	HFR		19	-	-	-	-	-	38	12	-	93	-	87	249
Hours			349	350	402	328	283	417	314	360	378	312	296	300	4,087
Hours YTD			349	699	1,101	1,429	1,712	2,128	2,442	2,802	3,179	3,491	3,787	4,087	
Board Ft/Hr	RWD		29	31	27	31	28	28	30	31	28	33	27	34	30
Board Ft/Hr	DFR		32	28	29	30	32	32	30	38	38	36	36	18	34
Board Ft/Hr	HFR		17	-	-	-	-	-	28	34	-	32	-	32	30
Board Ft/Hr			30	31	27	31	30	29	29	33	33	33	32	34	31
Board Ft/Hour YTD			30	30	29	29	30	30	30	30	30	31	31	31	

SOURCE TEST REPORT
2022 COMPLIANCE TESTING
HUMBOLDT REDWOOD COMPANY, LLC
SCOTIA FACILITY
BOILERS A & C
SCOTIA, CALIFORNIA

Prepared For:

Humboldt Redwood Company
169 Main Street
Scotia, California 95565

For Submittal To:

North Coast Unified Air Quality Management District
707 L Street
Eureka, California 95501

Prepared By:

Montrose Air Quality Services, LLC
2825 Verne Roberts Circle
Antioch, California 94509

Document Number:	**W005AS-019719-RT-2536**
Test Dates:	**November 29, 2022**
Submittal Date:	**January 12, 2023**

REVIEW AND CERTIFICATION

All work, calculations, and other activities and tasks performed and presented in this document were carried out by me or under my direction and supervision. I hereby certify that, to the best of my knowledge, Montrose operated in conformance with the requirements of the Montrose Quality Management System and ASTM D7036-04 during this test project.

Signature: Dan Duncan for RO Date: 01 / 12 / 2023

Name: Robert Odell Title: Vice President, Technical

I have reviewed, technically and editorially, details, calculations, results, conclusions, and other appropriate written materials contained herein. I hereby certify that, to the best of my knowledge, the presented material is authentic, accurate, and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature: Date: 01 / 12 / 2023

Name: Patrick Switzer Title: Reporting/QC Specialist

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LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

1.1 SUMMARY OF TEST PROGRAM

Humboldt Redwood Company, LLC (HRC) contracted Montrose Air Quality Services, LLC (Montrose) to perform a series of emission tests on the sources listed in Table 1-1 at their facility located in Scotia, California. The tests were conducted to determine compliance with the source testing limitations of the North Coast Unified Air Quality Management District (NCUAQMD) Title V Operating Permit (PTO) No. NCU 060-12. This testing was required after initial compliance testing performed in September, 2022 failed to demonstrate compliance with permit limits.

The specific objectives were to:

- Determine emissions of PM from the exhaust of Boilers A and C
- Determine O_2 and CO_2 concentrations as well as volumetric flow rates as needed to calculate the required emission parameters
- Collect and analyze fuel samples in order to determine its composition, F factor and higher heating value
- Conduct the test program with a focus on safety

Montrose performed the tests to measure the emission parameters listed in Table 1-1.

TABLE 1-1
SUMMARY OF TEST PROGRAM AND SCHEDULE

Proposed Test Dates	Unit ID/ Source Name	Activity/ Parameters	Test Methods	No. of Runs	Duration (Minutes)
Tues. Nov. 29, 2022	Boiler A	Vol. flow rate	EPA 1&2/19	3	60
		O_2, CO_2	EPA 3a	3	60
		Moisture Content	EPA 4	3	60
		PM	CARB 5	3	60
		Fuel Sample	ASTM D2015	1	Grab
Tues. Nov. 29, 2022	Boiler C	Vol. flow rate	EPA 1&2/19	3	60
		O_2, CO_2	EPA 3a	3	60
		Moisture Content	EPA 4	3	60
		PM	CARB 5	3	60
		Fuel Sample	ASTM D2015	1	Grab
--	--	Post-test meter calibration check	EPA ALT-009	--	--
--	--	Post-test thermocouple calibration check	EPA ALT-011	--	--

To simplify this report, a list of Units and Abbreviations is included in Appendix D.1. Throughout this report, chemical nomenclature, acronyms, and reporting units are not defined. Please refer to the list for specific details.

This report presents the test results and supporting data, descriptions of the testing procedures, descriptions of the facility and sampling locations, and a summary of the quality assurance procedures used by Montrose. The average emission test results are summarized and compared to their respective permit limits in Table 1-2. Detailed results for individual test runs can be found in Section 4.0. All supporting data can be found in the appendices.

The testing was conducted by the Montrose personnel listed in Table 1-3. The tests were conducted according to the test plan (protocol) dated November 18, 2022 that was submitted to and approved by the NCUAQMD.

TABLE 1-2
SUMMARY OF AVERAGE COMPLIANCE RESULTS -
BOILERS A AND C
NOVEMBER 29, 2022

Parameter/Units	Boiler A Avg. Results	Boiler C Avg. Results	Emission Limits
Total Particulate Matter (TPM)			
gr/dscf	0.0046	0.0092	--
lb/hr	3.1	4.7	--
lb/MMBtu	0.01	0.02	0.04

1.2 KEY PERSONNEL

A list of project participants is included below:

Facility Information

Source Location:	Humboldt Redwood Company, LLC PO Box 37 169 Main St. Scotia, CA 95565	
Project Contact:	Krista Ranstrom	Jeffery Miller
Role:	EH&S Manager	Power Plant Superintendent
Company:	Humboldt Redwood Comp., LLC	Humboldt Redwood Comp., LLC
Telephone:	([redacted]	[redacted]
Email:	[redacted]	[redacted]

Agency Information

Regulatory Agency:	Lloyd Green
Agency Contact:	NCUAQMD
Telephone:	[redacted]
Email:	[redacted]

Testing Company Information

Testing Firm:	Montrose Air Quality Services, LLC (Montrose)	
Contact:	Robert Odell	Nishad Patel
Title:	Vice President, Technical	Project Manager
Telephone:	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Laboratory Information

Laboratory:	Montrose-Antioch
City, State:	Antioch, California
Method:	CARB 5
Laboratory:	Hazen Research, Inc.
City, State:	Golden, Colorado
Method:	ASTM D2015

Test personnel and observers are summarized in Table 1-3.

TABLE 1-3
TEST PERSONNEL AND OBSERVERS

Name	Affiliation	Role/Responsibility
Robert Odell	Montrose	Project Manager
Nishad Patel	Montrose	Field Team Leader/Qualified Individual (QI)/Trailer operator/Sample recovery
Nicholas Vandehey	Montrose	Sample train operator
Dan Duncan	Montrose	Calculations and report preparation
Krista Ranstrom	HRC	Test Coordinator
Jeffery Miller	HRC	Observer
Lloyd Green	NCUAQMD	Observer

2.0 PLANT AND SAMPLING LOCATION DESCRIPTIONS

2.1 PROCESS DESCRIPTION, OPERATION, AND CONTROL EQUIPMENT

The HRC facility in Scotia, CA is a redwood lumber mill operation. The facility has several emission sources that include the following:

1) Three 150M lb/hr-steam Riley Stoker cogeneration boilers. The boilers produce steam for the mill and kiln operations as well as generate electricity for the mill and distribution to the power grid. The boilers are equipped with General Electric electrostatic precipitators (ESP) for control of particulate matter emissions.

2) Two cyclones incorporated into the waste-wood handling system for the Knife Planer and Gang Trimmer operations.

3) One 100 ton/hr portable hot mix asphalt plant. The plant is equipped with a parallel flow rotary drying/mixing drum and a 41 MMBtu/hr diesel-fired burner. Control of particulate matter emissions is accomplished with the use of a baghouse.

Boilers A and C were the only units tested during this mobilization.

2.2 FLUE GAS SAMPLING LOCATIONS

Information regarding the sampling locations is presented in Table 2-1.

TABLE 2-1
SAMPLING LOCATIONS

Sampling Location	Stack Inside Dimensions	Distance from Nearest Disturbance: Downstream EPA "B" (in./dia.)	Distance from Nearest Disturbance: Upstream EPA "A" (in./dia.)	Number of Traverse Points
Boiler A	84" dia.	~175 / ~2.1	~48 / ~0.6	Isokinetic: 24 pts (12/port) Gaseous: Initial 12 pt, 3 pts if no stratification
Boiler C	84" dia.	~175 / ~2.1	~48 / ~0.6	Isokinetic: 24 pts (12/port) Gaseous: Initial 12 pt, 3 pts if no stratification

See Appendix A.1 for more information regarding the sample locations.

2.3 OPERATING CONDITIONS AND PROCESS DATA

Emission tests are performed while the source units, and applicable abatement units, are operating at the conditions required by the permit. Tests are performed at each of the following conditions:

- TPM emissions compliance tests are performed while the units are operating at or above 90 percent of rated capacity.

Plant personnel were responsible for establishing the test conditions and collecting all applicable unit-operating data. The CEMS and process data that was provided is presented in Appendix B. Data collected includes the following parameters:

- Steam production rate, Mlb/hr
- Electrical generation rate, MW
- ESP operating parameters – kV and amps

3.0 SAMPLING AND ANALYTICAL PROCEDURES

3.1 TEST METHODS

The test methods for this test program were presented previously in Table 1-1. Additional information regarding specific applications or modifications to standard procedures is presented below.

3.1.1 EPA Method 1, Sample and Velocity Traverses for Stationary Sources

EPA Method 1 is used to assure that representative samples or measurements of volumetric flow rate are obtained by dividing the cross-section of the stack or duct into equal areas, and then locating a traverse point within each of the equal areas. Acceptable sample locations must be located at least two stack or duct equivalent diameters downstream from a flow disturbance and one-half equivalent diameter upstream from a flow disturbance.

Pertinent information regarding the performance of the method is presented below:

- Method Options: N/A
- Method Exceptions: N/A

3.1.2 EPA Method 2, Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)

EPA Method 2 is used to measure the gas velocity using an S-type pitot tube connected to a pressure measurement device, and to measure the gas temperature using a calibrated thermocouple connected to a thermocouple indicator. Typically, Type S (Stausscheibe) pitot tubes conforming to the geometric specifications in the test method are used, along with an inclined manometer. The measurements are made at traverse points specified by EPA Method 1. The molecular weight of the gas stream is determined from independent measurements of O_2, CO_2, and moisture. The stack gas volumetric flow rate is calculated using the measured average velocity head, the area of the duct at the measurement plane, the measured average temperature, the measured duct static pressure, the molecular weight of the gas stream, and the measured moisture.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - S-type pitot tube coefficient is 0.84
- Method Exceptions: N/A

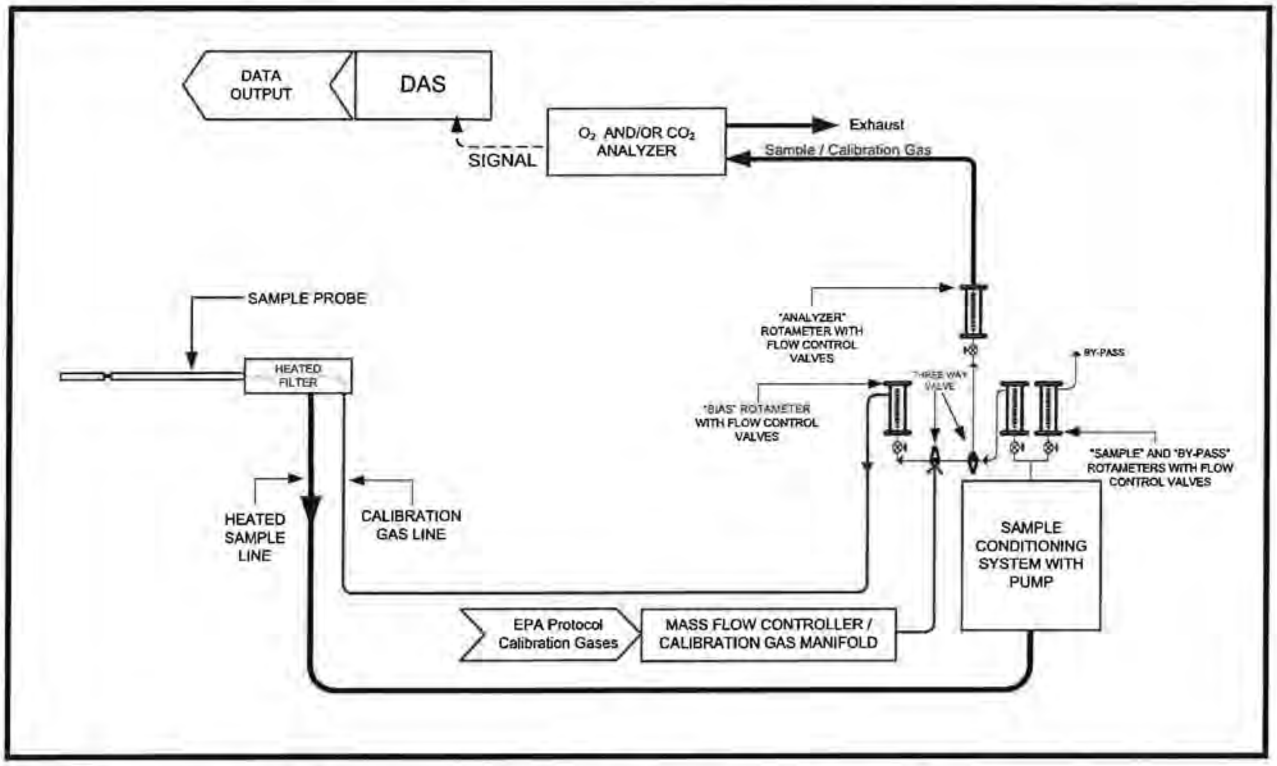
3.1.3 EPA Methods 3A, Determination of Oxygen and Carbon Dioxide in Emissions from Stationary Sources (Instrumental Analyzer Procedures)

Concentrations of O_2 and CO_2 are measured simultaneously using EPA Method 3A, which are instrumental test methods. Conditioned gas is sent to a series of analyzers to measure the gaseous emission concentrations. The performance requirements of the method must be met to validate the data.

- Method Options:
  - A dry extractive sampling system is used to report emissions on a dry basis
  - A paramagnetic analyzer is used to measure O_2
  - A nondispersive infrared analyzer is used to measure CO_2
- Method Exceptions: N/A
- Minimum Required Sample Duration: 60 minutes

The typical sampling system is detailed in Figure 3-1.

FIGURE 3-1
EPA METHOD 3A SAMPLING TRAIN



3.1.4 EPA Method 4, Determination of Moisture Content in Stack Gas

EPA Method 4 is a manual, non-isokinetic method used to measure the moisture content of gas streams. Gas is sampled at a constant sampling rate through a probe and impinger train. Moisture is removed using a series of pre-weighed impingers containing methodology-specific liquids and silica gel immersed in an ice water bath. The impingers are weighed after each run to determine the percent moisture.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - Condensed water is measured gravimetrically
  - Moisture sampling is performed as part of the pollutant sample trains

  - Since it is theoretically impossible for measured moisture to be higher than psychrometric moisture, the psychrometric moisture is also calculated, and the lower moisture value is used in the calculations
- Method Exceptions:
  - If moisture sampling is performed as a stand-alone method, sample may be extracted from a single point in the centroid of the stack
- Target Sample Duration: 30 minutes
- Target Sample Volume: 21 scf

3.1.5 CARB Method 5, Determination of Particulate Matter from Stationary Sources

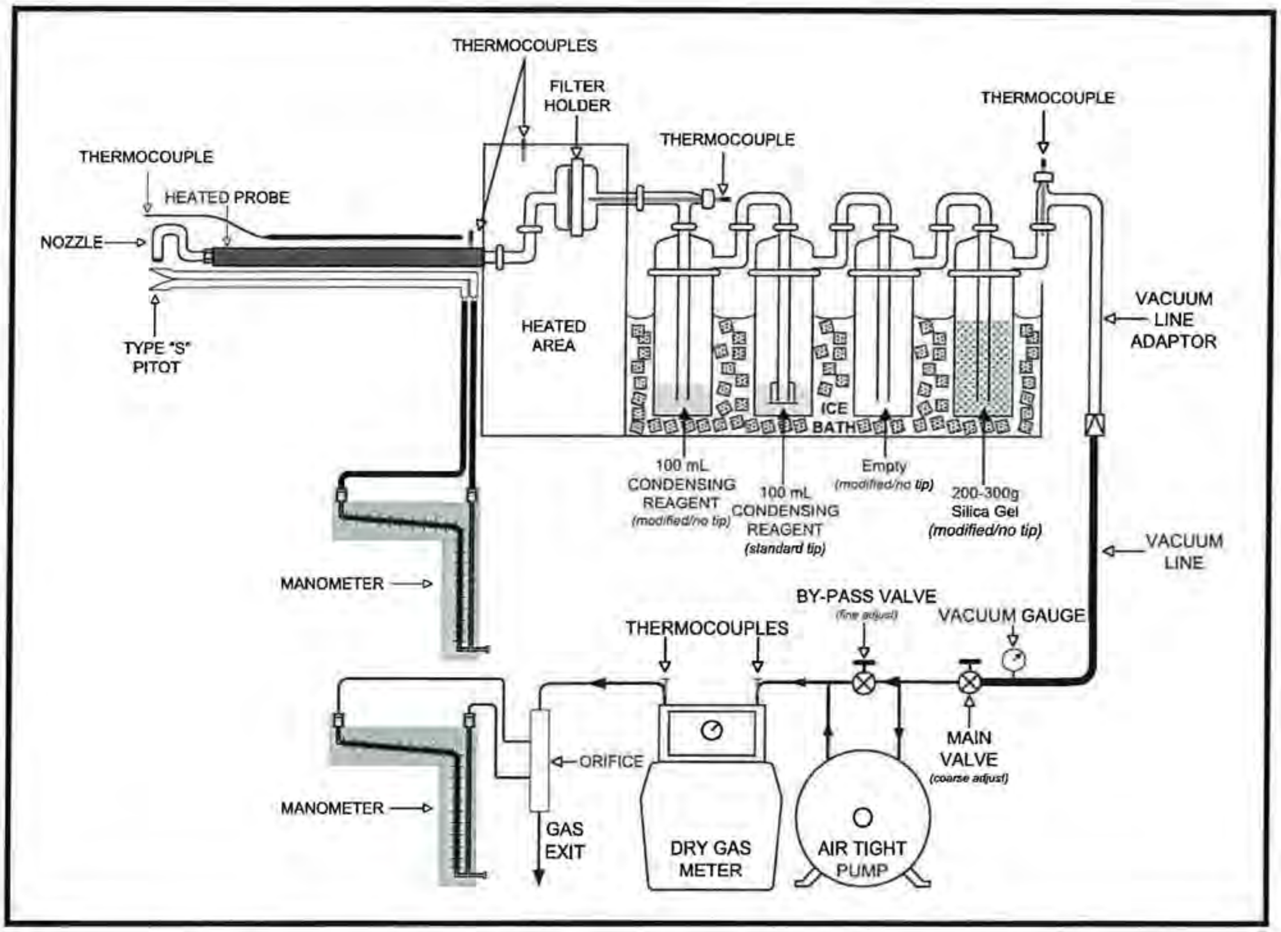
CARB Method 5 is a manual, isokinetic method used to measure TPM emissions. The samples are analyzed gravimetrically. This method is performed in conjunction with EPA Methods 1 through 4. The stack gas is sampled through a nozzle, probe, filter, and impinger train. TPM results are reported in emission concentration and emission rate units.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - Glass sample nozzles and probe liners are used
  - Condensed water is measured gravimetrically
- Method Exceptions:
  - An unheated flexible probe extension is used to connect the sample probe to the impinger box
- Target Sample Duration: 120 minutes
- Target Sample Volume: 70.6 dscf (2 dscm)
- Analytical Laboratory: MAQS – Antioch, CA

The typical sampling system is detailed in Figure 3-2.

FIGURE 3-2
CARB METHOD 5 SAMPLING TRAIN



3.1.6 EPA Method 19, Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxide Emission Rates

EPA Method 19 is a manual method used to determine emission rates. EPA Method 19 is used to calculate mass emission rates in units of lb/MMBtu. EPA Method 19, Table 19-2 contains a list of assigned fuel factors for different types of fuels, which can be used for these calculations.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - F factor is calculated from analysis of fuel samples collected on the test day

3.1.7 ASTM D2015, Standard Test Method for Gross Calorific Value of Coal and Coke by the Adiabatic Bomb Calorimeter

ASTM Method D2015 is an instrumental method used to measure the chemical composition of solid fuels which can be applied to wood biomass mixtures. This test method is used to calculate the physical properties of a sample, such as heating values, relative density, and fuel factors.

Sample is typically collected in a bag and then shipped to a laboratory where it is analyzed using gas chromatography and appropriate detectors.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - A composite sample was collected.
- Method Exceptions: N/A
- Analytical Laboratory: Hazen Research, Inc., Golden, CO

3.1.8 EPA Method ALT-009, Alternative Method 5 Post-Test Calibration

EPA Approved Alternative Method 009 (ALT-009) is used as an alternative to a two-point post-test meter box calibration. This procedure uses a calculation to check the meter box calibration factor rather than requiring a physical post-test meter box calibration using a standard dry gas meter. The average calculated meter box percent (%) error must result in a percent error within ±5% of Y. If not, a full calibration is performed, and the results are presented using the Y factor that yields the highest emissions.

3.1.9 EPA Method ALT-011, Alternative Method 2 Thermocouple Calibration

EPA Approved Alternative Method 011 (ALT-011) is used as an alternative to the EPA Method 2 two-point thermocouple calibration. This procedure involves a single-point in-field check using a reference thermometer to confirm that the thermocouple system is operating properly. The temperatures of the thermocouple and reference thermometers shall agree to within ±2 °F.

3.2 PROCESS TEST METHODS

The test plan did not require that process samples be collected during this test program; therefore, no process sample data are presented in this test report.

4.0 TEST DISCUSSION AND RESULTS

4.1 FIELD TEST DEVIATIONS AND EXCEPTIONS

No deviations or exceptions from the test plan or test methods occurred during this test program:

4.2 PRESENTATION OF RESULTS

The average results are compared to the permit limits and performance specifications in Table 1-2. The results of individual compliance test runs performed are presented in Tables 4-1 and 4-2. Emissions are reported in units consistent with those in the applicable regulations or requirements. Additional information is included in the appendices as presented in the Table of Contents.

TABLE 4-1
PM EMISSIONS RESULTS -
BOILER A

Run Number	1-PM-A	2-PM-A	3-PM-A	Average
Date	11/29/22	11/29/22	11/29/22	--
Time	1445-1549	1619-1725	1743-1847	--
Process Data				
steam production, klb/hr	~120-125	~110-125	~115-125	~120
Sampling & Flue Gas Parameters				
sample duration, minutes	60	60	60	--
sample volume, dscf	37.638	37.407	37.821	37.622
isokinetic rate, %	94	94	95	--
O_2, % volume dry	12.3	11.9	11.9	12.0
CO_2, % volume dry	8.3	8.7	8.7	8.6
flue gas temperature, °F	319	319	319	319
moisture content, % volume	17.9	18.0	18.1	18.0
volumetric flow rate, dscfm	79,147	79,035	78,918	79,033
Filterable Particulate Matter (PM)				
mg	3.92	4.78	5.52	4.74
gr/dscf	0.0016	0.0020	0.0023	0.0019
lb/hr	1.1	1.3	1.5	1.3
lb/MMBtu	0.005	0.006	0.007	0.006
Condensable PM				
mg	5.67	6.46	7.49	6.54
gr/dscf	0.0023	0.0027	0.0031	0.0027
lb/hr	1.6	1.8	2.1	1.8
lb/MMBtu	0.007	0.008	0.009	0.008
Total PM				
mg	9.59	11.24	13.01	11.28
gr/dscf	0.0039	0.0046	0.0053	0.0046
lb/hr	2.7	3.1	3.6	3.1
lb/MMBtu	0.013	0.014	0.016	0.014

TABLE 4-2
PM EMISSIONS RESULTS -
BOILER C

Run Number	1-PM-C	2-PM-C	3-PM-C	Average
Date	11/29/22	11/29/22	11/29/22	--
Time	0836-0940	1004-1108	1138-1242	--
Process Data				
steam production, klb/hr	~115-140	~120-135	~110-150	~125-130
Sampling & Flue Gas Parameters				
sample duration, minutes	60	60	60	--
sample volume, dscf	37.897	40.678	39.443	39.339
isokinetic rate, %	96	103	99	--
O_2, % volume dry	8.2	7.6	7.8	7.9
CO_2, % volume dry	12.1	12.7	12.5	12.4
flue gas temperature, °F	380	380	380	380
moisture content, % volume	24.8	25.0	24.8	24.9
volumetric flow rate, dscfm	59,538	59,525	59,564	59,542
Filterable Particulate Matter (PM)				
mg	13.44	8.82	8.39	10.22
gr/dscf	0.0055	0.0033	0.0033	0.0040
lb/hr	2.8	1.7	1.7	2.1
lb/MMBtu	0.012	0.007	0.007	0.009
Condensable PM				
mg	12.76	5.81	20.87	13.15
gr/dscf	0.0052	0.0022	0.0082	0.0052
lb/hr	2.7	1.1	4.2	2.6
lb/MMBtu	0.011	0.005	0.017	0.011
Total PM				
mg	26.20	14.63	29.26	23.36
gr/dscf	0.0107	0.0055	0.0114	0.0092
lb/hr	5.4	2.8	5.8	4.7
lb/MMBtu	0.023	0.012	0.024	0.020

5.0 INTERNAL QA/QC ACTIVITIES

5.1 QA/QC AUDITS

The meter boxes and sampling trains used during sampling performed within the requirements of their respective methods. All post-test leak checks, minimum metered volumes, minimum sample durations, and percent isokinetics met the applicable QA/QC criteria.

EPA Method 3A calibration audits were all within the measurement system performance specifications for the calibration drift checks, system calibration bias checks, and calibration error checks.

CARB Method 5 analytical QA/QC results are included in the laboratory report. The method QA/QC criteria were met.

ASTM Method D2015 analytical QA/QC results are included in the laboratory report. The method QA/QC criteria were met.

5.2 QA/QC DISCUSSION

All QA/QC criteria were met during this test program.

5.3 QUALITY STATEMENT

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is included in the report appendices. The content of this report is modeled after the EPA Emission Measurement Center Guideline Document (GD-043).

SOURCE TEST REPORT
2022 COMPLIANCE & RATA TESTING
HUMBOLDT REDWOOD COMPANY, LLC
SCOTIA FACILITY
BOILERS A, B & C
SCOTIA, CALIFORNIA

Prepared For:

Humboldt Redwood Company
169 Main Street
Scotia, California 95565

For Submittal To:

North Coast Unified Air Quality Management District
707 L Street
Eureka, California 95501

Prepared By:

Montrose Air Quality Services, LLC
2825 Verne Roberts Circle
Antioch, California 94509

Document Number:	**W005AS-019719-RT-2400**
Test Dates:	**September 13-15, 2022**
Submittal Date:	**November 7, 2022**

REVIEW AND CERTIFICATION

All work, calculations, and other activities and tasks performed and presented in this document were carried out by me or under my direction and supervision. I hereby certify that, to the best of my knowledge, Montrose operated in conformance with the requirements of the Montrose Quality Management System and ASTM D7036-04 during this test project.

Signature:		Date:	11 / 07 / 2022
Name:	Robert Odell	Title:	Vice President, Technical

I have reviewed, technically and editorially, details, calculations, results, conclusions, and other appropriate written materials contained herein. I hereby certify that, to the best of my knowledge, the presented material is authentic, accurate, and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature:		Date:	11 / 07 / 2022
Name:	Patrick Switzer	Title:	Reporting/QC Specialist

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1.0 INTRODUCTION

1.1 SUMMARY OF TEST PROGRAM

Humboldt Redwood Company, LLC (HRC) contracted Montrose Air Quality Services, LLC (Montrose) to perform a series of emission tests on the sources listed in Table 1-1 at their facility located in Scotia, California. The tests were conducted to determine compliance with the source testing limitations of the North Coast Unified Air Quality Management District (NCUAQMD) Title V Operating Permit (PTO) No. NCU 060-12. Additionally, audits of the CEMS/CERMS serving each boiler were performed per 40 CFR Part 60, Appendices B and F.

The specific objectives were to:

- Determine emissions of CO and NO_X from the exhaust of the three boilers
- Determine the RA for the O_2, NO_X and CO analyzers serving the CEMS/CERMS of each boiler
- Determine O_2 and CO_2 concentrations as well as volumetric flow rates as needed to calculate the required emission parameters
- Collect and analyze fuel samples in order to determine its composition, F factor and higher heating value
- Conduct the test program with a focus on safety

Montrose performed the tests to measure the emission parameters listed in Table 1-1.

TABLE 1-1
SUMMARY OF TEST PROGRAM AND SCHEDULE

Proposed Test Dates	Unit ID/ Source Name	Activity/ Parameters	Test Methods	No. of Runs	Duration (Minutes)
Tues. Sept. 13, 2022	Boiler C	Vol. flow rate	EPA 1&2/19	3	21
		O_2, CO_2	EPA 3a, PS-3	3	21
		Moisture Content	EPA 4	3	60
		NO_X	EPA 7e, PS-2	3	21
		CO	EPA 10, PS-4a	3	21
		PM	CARB 5	3	60
		Fuel Sample	ASTM D2015	1	Grab
Wed. Sept. 14, 2022	Boiler C	Vol. flow rate	EPA 1&2/19	3	21
		O_2, CO_2	EPA 3a, PS-3	10	21
		Moisture Content	EPA 4	3	60
		NO_X	EPA 7e, PS-2	10	21
		CO	EPA 10, PS-4a	10	21
		PM	CARB 5	3	60
		Fuel Sample	ASTM D2015	1	Grab
Wed./Thurs Sept. 14-15, 2022	Boiler B	Vol. flow rate	EPA 1&2/19	3	60
		O_2, CO_2	EPA 3a, PS-3	10 (up to 12)	21
		Moisture Content	EPA 4	3	60
		NO_X	EPA 7e, PS-2	10 (up to 12)	21
		CO	EPA 10, PS-4a	10 (up to 12)	21
		PM	CARB 5	3	60
		Fuel Sample	ASTM D2015	1	Grab
Thursday Sept. 15, 2022	Boiler A	Vol. flow rate	EPA 1&2/19	3	60
		O_2, CO_2	EPA 3a, PS-3	10 (up to 12)	21
		Moisture Content	EPA 4	3	60
		NO_X	EPA 7e, PS-2	10 (up to 12)	21
		CO	EPA 10, PS-4a	10 (up to 12)	21
		PM	CARB 5	3	60
		Fuel Sample	ASTM D2015	1	Grab
--	--	Post-test meter calibration check	EPA ALT-009	--	--
--	--	Post-test thermocouple calibration check	EPA ALT-011	--	--

To simplify this report, a list of Units and Abbreviations is included in Appendix D.1. Throughout this report, chemical nomenclature, acronyms, and reporting units are not defined. Please refer to the list for specific details.

This report presents the test results and supporting data, descriptions of the testing procedures, descriptions of the facility and sampling locations, and a summary of the quality assurance procedures used by Montrose. The average emission test results are summarized and compared to their respective permit limits in Table 1-2. The RA test results are summarized in Table 1-3. Detailed results for individual test runs can be found in Section 4.0. All supporting data can be found in the appendices.

The testing was conducted by the Montrose personnel listed in Table 1-4. The tests were conducted according to the test plan (protocol) dated August 9, 2022 that was submitted to and approved by the NCUAQMD.

TABLE 1-2
SUMMARY OF AVERAGE COMPLIANCE RESULTS - BOILERS A, B, AND C
SEPTEMBER 14-15, 2022

Parameter/Units	Boiler A Avg. Results	Boiler B Avg. Results	Boiler C Avg. Results	Emission Limits
Carbon Monoxide (CO)				
ppmvd	196	322	215	--
lb/MMBtu	0.32	0.37	0.27	1.2[1] / 0.8[2]
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	57	90	97	--
lb/MMBtu	0.15	0.17	0.20	0.20[1]/ 0.22[2]
Total Particulate Matter (TPM)				
gr/dscf	0.0279	0.0139	0.0200	--
lb/hr	18.9	6.80	9.83	--
lb/MMBtu	0.091	0.032	0.049	0.04

Notes: [1] Tier One, base limit, 24-hr average for Boilers A and B.
[2] Tier One, base limit, 24-hr average for Boiler C.

TABLE 1-3
SUMMARY OF PART 60 RA TEST RESULTS - BOILERS A, B, AND C
SEPTEMBER 14-15, 2022

Parameter/Units	Regulatory Reference	Boiler A RA	Boiler B RA	Boiler C RA	Allowable
Part 60					
Oxygen (O_2)					
% volume dry	PS-3	0.2	0.4	0.5	≤ 1.0% O_2
Nitrogen Oxides (NO_x as NO_2)					
lb/MMBtu	PS-2	12.3	12.4	17.4	≤ 20% of RM
Carbon Monoxide (CO)					
lb/MMBtu	PS-4	0.5	2.1	3.7	≤ 5% of AS

1.2 KEY PERSONNEL

A list of project participants is included below:

Facility Information

Source Location:	Humboldt Redwood Company, LLC PO Box 37 169 Main St. Scotia, CA 95565	
Project Contact:	Krista Ranstrom	Jeffery Miller
Role:	EH&S Manager	Power Plant Superintendent
Company:	Humboldt Redwood Comp., LLC	Humboldt Redwood Comp., LLC
Telephone:	[redacted]	[redacted]
Email:	[redacted]	[redacted]

Agency Information

Regulatory Agency:	Lloyd Green
Agency Contact:	NCUAQMD
Telephone:	[redacted]

Testing Company Information

Testing Firm:	Montrose Air Quality Services, LLC (Montrose)
Contact:	Robert Odell
Title:	Vice President, Technical
Telephone:	[redacted]
Email:	[redacted]

Laboratory Information

Laboratory:	Montrose-Antioch
City, State:	Antioch, California
Method:	CARB 5
Laboratory:	Hazen Research, Inc.
City, State:	Golden, Colorado
Method:	ASTM D2015

Test personnel and observers are summarized in Table 1-4.

TABLE 1-4
TEST PERSONNEL AND OBSERVERS

Name	Affiliation	Role/Responsibility
Robert Odell	Montrose	Project Manager/Field Team Leader/Qualified Individual (QI)/Trailer operator/Sample recovery
Nishad Patel	Montrose	Sample train operator
Jimmy Vreeland	Montrose	VE observations, project support
Dan Duncan	Montrose	Calculations and report preparation
Krista Ranstrom	HRC	Test Coordinator
Jeffery Miller	HRC	Observer
Lloyd Green	NCUAQMD	Observer

2.0 PLANT AND SAMPLING LOCATION DESCRIPTIONS

2.1 PROCESS DESCRIPTION, OPERATION, AND CONTROL EQUIPMENT

The HRC facility in Scotia, CA is a redwood lumber mill operation. The facility has several emission sources that include the following:

1) Three 150M lb/hr-steam Riley Stoker cogeneration boilers. The boilers produce steam for the mill and kiln operations as well as generate electricity for the mill and distribution to the power grid. The boilers are equipped with General Electric electrostatic precipitators (ESP) for control of particulate matter emissions.

2) Two cyclones incorporated into the waste-wood handling system for the Knife Planer and Gang Trimmer operations.

3) One 100 ton/hr portable hot mix asphalt plant. The plant is equipped with a parallel flow rotary drying/mixing drum and a 41 MMBtu/hr diesel-fired burner. Control of particulate matter emissions is accomplished with the use of a baghouse.

The three boilers were the only units tested during this mobilization.

2.2 FLUE GAS SAMPLING LOCATIONS

Information regarding the sampling locations is presented in Table 2-1.

TABLE 2-1
SAMPLING LOCATIONS

Sampling Location	Stack Inside Dimensions	Distance from Nearest Disturbance: Downstream EPA "B" (in./dia.)	Distance from Nearest Disturbance: Upstream EPA "A" (in./dia.)	Number of Traverse Points
Boilers A & B	84" dia.	~175 / ~2.1	~48 / ~0.6	Isokinetic: 24 pts (12/port) Gaseous: Initial 12 pt, 3 pts if no stratification
Boiler C	84" dia.	~175 / ~2.1	~48 / ~0.6	Isokinetic: 24 pts (12/port) Gaseous: Initial 12 pt, 3 pts if no stratification

See Appendix A.1 for more information regarding the sample locations.

2.3 OPERATING CONDITIONS AND PROCESS DATA

Emission tests are performed while the source units, and applicable abatement units, are operating at the conditions required by the permit. Tests are performed at each of the following conditions:

MONTROSE AIR QUALITY SERVICES

- TPM emissions compliance tests are performed while the units are operating at or above 90 percent of rated capacity.
- RATA tests are performed while the units are operating at or above 50 percent of rated capacity.

Plant personnel were responsible for establishing the test conditions and collecting all applicable unit-operating data. The CEMS and process data that was provided is presented in Appendix B. Data collected includes the following parameters:

- Steam production rate, Mlb/hr
- Electrical generation rate, MW
- ESP operating parameters – kV and amps
- Plant CEMs emission data

3.0 SAMPLING AND ANALYTICAL PROCEDURES

3.1 TEST METHODS

The test methods for this test program were presented previously in Table 1-1. Additional information regarding specific applications or modifications to standard procedures is presented below.

3.1.1 EPA Method 1, Sample and Velocity Traverses for Stationary Sources

EPA Method 1 is used to assure that representative samples or measurements of volumetric flow rate are obtained by dividing the cross-section of the stack or duct into equal areas, and then locating a traverse point within each of the equal areas. Acceptable sample locations must be located at least two stack or duct equivalent diameters downstream from a flow disturbance and one-half equivalent diameter upstream from a flow disturbance.

Pertinent information regarding the performance of the method is presented below:

- Method Options: N/A
- Method Exceptions: N/A

3.1.2 EPA Method 2, Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)

EPA Method 2 is used to measure the gas velocity using an S-type pitot tube connected to a pressure measurement device, and to measure the gas temperature using a calibrated thermocouple connected to a thermocouple indicator. Typically, Type S (Stausscheibe) pitot tubes conforming to the geometric specifications in the test method are used, along with an inclined manometer. The measurements are made at traverse points specified by EPA Method 1. The molecular weight of the gas stream is determined from independent measurements of O_2, CO_2, and moisture. The stack gas volumetric flow rate is calculated using the measured average velocity head, the area of the duct at the measurement plane, the measured average temperature, the measured duct static pressure, the molecular weight of the gas stream, and the measured moisture.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - S-type pitot tube coefficient is 0.84
- Method Exceptions: N/A

3.1.3 EPA Methods 3A, 7E, and 10, Determination of Oxygen, Carbon Dioxide, Nitrogen Oxides, and Carbon Monoxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedures)

Concentrations of O_2, CO_2, NO_x, and CO are measured simultaneously using EPA Methods 3A, 7E, and 10, which are instrumental test methods. Conditioned gas is sent to a series of analyzers to measure the gaseous emission concentrations. The performance requirements of the method must be met to validate the data.

Pertinent information regarding performance of the method is presented below and in table 3-1:

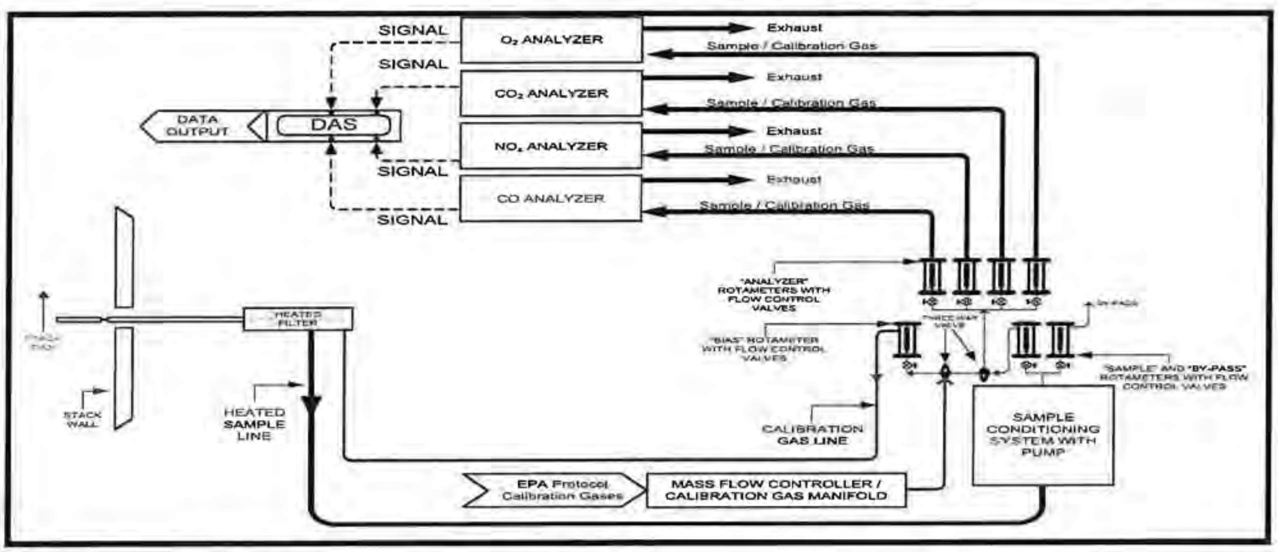
TABLE 3-1
MAQS CEMS INFORMATION

Analyzer Type	Manufacturer	Model No.	Range	Serial No.
O_2	CAI	110P	25%	S05007
CO_2	CAI	110P	25%	Y4T59SH8
CO	Thermo	48C	1000 ppm & 2500 ppm	0508110944
NO_X	CAI	700CLD	250 ppm	2001034

- Method Options:
  - A dry extractive sampling system is used to report emissions on a dry basis
  - A paramagnetic analyzer is used to measure O_2
  - A nondispersive infrared analyzer is used to measure CO_2
  - A chemiluminescent analyzer is used to measure NO_x
  - A gas filter correlation nondispersive infrared analyzer is used to measure CO
- Method Exceptions: N/A
- Minimum Required Sample Duration: 21 minutes

The typical sampling system is detailed in Figure 3-1.

FIGURE 3-1
EPA METHODS 3A (O_2/CO_2), 7E, 10 SAMPLING TRAIN



3.1.4 EPA Method 4, Determination of Moisture Content in Stack Gas

EPA Method 4 is a manual, non-isokinetic method used to measure the moisture content of gas streams. Gas is sampled at a constant sampling rate through a probe and impinger train. Moisture is removed using a series of pre-weighed impingers containing methodology-specific liquids and silica gel immersed in an ice water bath. The impingers are weighed after each run to determine the percent moisture.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - Condensed water is measured gravimetrically
  - Moisture sampling is performed as part of the pollutant sample trains
  - Since it is theoretically impossible for measured moisture to be higher than psychrometric moisture, the psychrometric moisture is also calculated, and the lower moisture value is used in the calculations
- Method Exceptions:
  - If moisture sampling is performed as a stand-alone method, sample may be extracted from a single point in the centroid of the stack
- Target Sample Duration: 30 minutes
- Target Sample Volume: 21 scf

3.1.5 CARB Method 5, Determination of Particulate Matter from Stationary Sources

CARB Method 5 is a manual, isokinetic method used to measure TPM emissions. The samples are analyzed gravimetrically. This method is performed in conjunction with EPA Methods 1 through 4. The stack gas is sampled through a nozzle, probe, filter, and impinger train. TPM results are reported in emission concentration and emission rate units.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - Glass sample nozzles and probe liners are used
  - Condensed water is measured gravimetrically
- Method Exceptions:
  - An unheated flexible probe extension is used to connect the sample probe to the impinger box
- Target Sample Duration: 120 minutes
- Target Sample Volume: 70.6 dscf (2 dscm)
- Analytical Laboratory: MAQS – Antioch, CA

The typical sampling system is detailed in Figure 3-2.

3.1.6 EPA Method 19, Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxide Emission Rates

EPA Method 19 is a manual method used to determine emission rates. EPA Method 19 is used to calculate mass emission rates in units of lb/MMBtu. EPA Method 19, Table 19-2 contains a list of assigned fuel factors for different types of fuels, which can be used for these calculations.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - F factor is calculated from analysis of fuel samples collected on the test day

3.1.7 ASTM D2015, Standard Test Method for Gross Calorific Value of Coal and Coke by the Adiabatic Bomb Calorimeter

ASTM Method D2015 is an instrumental method used to measure the chemical composition of solid fuels which can be applied to wood biomass mixtures. This test method is used to calculate the physical properties of a sample, such as heating values, relative density, and fuel factors. Sample is typically collected in a bag and then shipped to a laboratory where it is analyzed using gas chromatography and appropriate detectors.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - A composite sample was collected.
- Method Exceptions: N/A
- Analytical Laboratory: Hazen Research, Inc., Golden, CO

3.1.8 EPA Performance Specification 2, Specifications and Test Procedures for SO_2 and NO_X for Continuous Emission Monitoring Systems in Stationary Sources

EPA Performance Specification 2 is a specification used to evaluate the acceptability of SO_2 and NO_X CEMS. The evaluation is conducted at the time of installation or soon after, and whenever specified in the regulations. The CEMS may include, for certain stationary sources, a diluent (O_2 or CO_2) monitor. The RA and CD tests are conducted to determine conformance of the CEMS to the specification.

Pertinent information regarding the performance of the specification is presented below:

- Method Options:
  - Three traverse points located at 16.7, 50.0, and 83.3% of the measurement line are utilized
  - More than nine sets of RM tests are performed. A maximum of three sets of the test results may be rejected so long as the total number of test results used to determine the RA is greater than or equal to nine. All data is reported, including the rejected data.
  - EPA Method 3A is utilized as the reference method
  - EPA Method 7E is utilized as the reference method
  - Integrated sampling is performed
- Method Exceptions:
  - None
- Applicable Performance Specifications:
  - When average RM results are $\geq$ 50% of the AS, RA calculated with RM in the denominator must be < 20%

- When average RM results are < 50% of the AS, RA calculated with AS in the denominator must be < 10%

3.1.9 EPA Performance Specification 3, Specifications and Test Procedures for O_2 and CO_2 Continuous Monitoring Systems in Stationary Sources

EPA Performance Specification 3 is a specification used to evaluate the acceptability of O_2 and CO_2 CEMS. The evaluation is conducted at the time of installation or soon after, and whenever specified in the regulations. This specification applies to O_2 or CO_2 monitors that are not included under PS-2. The RA and CD tests are conducted to determine conformance of the CEMS to the specification.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - Three traverse points located at 16.7, 50.0, and 83.3% of the measurement line are utilized
  - EPA Method 3A is utilized as the reference method procedure
  - Integrated sampling is performed
  - More than nine sets of RM tests are performed. A maximum of three sets of the test results may be rejected so long as the total number of test results used to determine the RA is greater than or equal to nine. All data is reported, including the rejected data.
- Method Exceptions:
  - None
- Applicable Performance Specifications:
  - When RA is calculated with RM in the denominator, the RA must be less than or equal to 20.0%
  - When RA is calculated as the absolute average difference between the RM and CEMS, the RA must be within 1.0% O_2

3.1.10 EPA Performance Specification 4, Specifications and Test Procedures for Carbon Monoxide Continuous Emission Monitoring Systems in Stationary Sources

EPA Performance Specification 4 is a specification used to evaluate the acceptability of CO CEMS. The evaluation is conducted at the time of installation or soon after, and whenever specified in the regulations. This specification was developed primarily for CEMS having span values of 1,000 ppmv CO. The RA and CD tests are conducted to determine conformance of the CEMS to the specification.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - Three traverse points located at 16.7, 50.0, and 83.3% of the measurement line are utilized
  - More than nine sets of RM tests are performed. A maximum of three sets of the test results may be rejected so long as the total number of test results

used to determine the RA is greater than or equal to nine. All data is reported, including the rejected data.
  - EPA Method 10 is utilized as the reference method procedure
  - Integrated sampling is performed
- Method Exceptions:
  - None
- Applicable Performance Specifications:
  - When average RM results are ≥ 50% of the AS, RA calculated with RM in the denominator must be < 10%
  - When average RM results are < 50% of the AS, RA calculated with AS in the denominator must be < 5%

3.1.11 EPA Method ALT-009, Alternative Method 5 Post-Test Calibration

EPA Approved Alternative Method 009 (ALT-009) is used as an alternative to a two-point post-test meter box calibration. This procedure uses a calculation to check the meter box calibration factor rather than requiring a physical post-test meter box calibration using a standard dry gas meter. The average calculated meter box percent (%) error must result in a percent error within ±5% of Y. If not, a full calibration is performed, and the results are presented using the Y factor that yields the highest emissions.

3.1.12 EPA Method ALT-011, Alternative Method 2 Thermocouple Calibration

EPA Approved Alternative Method 011 (ALT-011) is used as an alternative to the EPA Method 2 two-point thermocouple calibration. This procedure involves a single-point in-field check using a reference thermometer to confirm that the thermocouple system is operating properly. The temperatures of the thermocouple and reference thermometers shall agree to within ±2 °F.

3.2 PROCESS TEST METHODS

The test plan did not require that process samples be collected during this test program; therefore, no process sample data are presented in this test report.

4.0 TEST DISCUSSION AND RESULTS

4.1 FIELD TEST DEVIATIONS AND EXCEPTIONS

The following deviations or exceptions from the test plan or test methods occurred during this test program:

- The first run performed on Sept. 13 on Boiler C was voided and repeated because the first run was performed after an extended outage. An unusally large amount of PM was observed on the filter for that run. It is suspected that PM had accumulated in the stack during the outage, and much of the accumulation was emitted during the first run. Four additional runs were performed, and the average of those runs presented in the results tables.
- Steam production data available throughout the test consists of screen shots from the process computer display. Since the data is available only in graphs and not in digital form, we have included estimates of the ranges of the data in our results tables.

4.2 PRESENTATION OF RESULTS

The average results are compared to the permit limits and performance specifications in Tables 1-2 through 1-5. The results of individual compliance test runs performed are presented in Tables 4-1 through 4-4 (Boiler A), 4-5 through 4-8 (Boiler B), 4-9 through 4-12 (Boiler C), 4-13 (Cyclone 1A/1B), 4-14 (Cyclone 2), and 4-15 (HMA Plant). Emissions are reported in units consistent with those in the applicable regulations or requirements. Additional information is included in the appendices as presented in the Table of Contents.

TABLE 4-1
PM EMISSIONS RESULTS -
BOILER A

Run Number	1-PM-A	2-PM-A	3-PM-A	Average
Date	9/15/22	9/15/22	9/15/22	--
Time	1015-1118	1144-1248	1317-1420	--
Process Data				
steam production, klb/hr	--	--	--	~140-150
Sampling & Flue Gas Parameters				
sample duration, minutes	60	60	60	--
sample volume, dscf	36.678	38.552	37.472	37.567
isokinetic rate, %	96	99	98	--
O_2, % volume dry	11.8	11.9	11.9	11.9
CO_2, % volume dry	8.9	8.8	8.8	8.8
flue gas temperature, °F	322	327	324	324
moisture content, % volume	14.3	14.2	13.4	14.0
volumetric flow rate, dscfm	78,151	79,664	78,383	78,733
Filterable Particulate Matter (PM)				
mg	59.74	72.69	67.90	66.78
gr/dscf	0.0251	0.0291	0.0280	0.0274
lb/hr	16.83	19.87	18.78	18.50
lb/MMBtu	0.081	0.095	0.091	0.089
Condensable PM				
mg	<1.33	<1.33	<1.33	<1.33
gr/dscf	0.0006	0.0005	0.0005	0.0005
lb/hr	0.4	0.4	0.4	0.4
lb/MMBtu	0.002	0.002	0.002	0.002
Total PM				
mg	61.07	74.02	69.23	68.11
gr/dscf	0.0257	0.0296	0.0285	0.0279
lb/hr	17.2	20.2	19.2	18.9
lb/MMBtu	0.083	0.097	0.093	0.091

TABLE 4-2
CO AND NO_X EMISSIONS RESULTS -
BOILER A

Run Number	Compliance R1 RATA R1,2,3	Compliance R2 RATA R4,5,6	Compliance R3 RATA R7,8,9	Average
Date	09/15/22	09/15/22	09/15/22	--
Time	1015-1145	1156-1317	1327-1450	--
Process Data				
steam production, klb/hr	--	--	--	~140-150
Flue Gas Parameters				
O_2, % volume dry	11.8	11.9	11.8	11.8
CO_2, % volume dry	8.9	8.8	8.8	8.8
Carbon Monoxide (CO)				
ppmvd	205	189	195	196
lb/MMBtu	0.34	0.31	0.32	0.32
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	57	57	57	57
lb/MMBtu	0.15	0.16	0.15	0.15

TABLE 4-3
OXYGEN (PERCENT VOL. DRY) RATA RESULTS - BOILER A

Run #	Date	Time	RM	CEMS	Difference	Run Used (Y or N)
1	9/15/22	1015-1043	11.8	12.0	-0.2	N
2	9/15/22	1053-1114	11.8	11.9	-0.1	Y
3	9/15/22	1124-1145	11.8	11.9	-0.2	Y
4	9/15/22	1156-1217	11.9	12.0	-0.1	Y
5	9/15/22	1226-1247	11.9	12.1	-0.2	Y
6	9/15/22	1256-1317	11.9	12.0	-0.1	Y
7	9/15/22	1327-1348	11.8	12.0	-0.2	Y
8	9/15/22	1358-1419	11.9	12.1	-0.2	Y
9	9/15/22	1429-1450	11.7	11.8	-0.1	Y
10	9/15/22	1459-1520	11.8	11.9	-0.1	Y
Averages			11.8	12.0	-0.2	

Standard Deviation	0.030	
Confidence Coefficient (CC)	0.023	
RA based on absolute difference	0.2	%

TABLE 4-4
CO (LB/MMBTU) RATA RESULTS -
BOILER A

Run #	Date	Time	RM	CEMS	Difference	Run Used (Y or N)
1	9/15/22	1015-1043	0.389	0.376	0.013	N
2	9/15/22	1053-1114	0.326	0.322	0.004	Y
3	9/15/22	1124-1145	0.294	0.292	0.002	Y
4	9/15/22	1156-1217	0.329	0.325	0.004	Y
5	9/15/22	1226-1247	0.315	0.312	0.003	Y
6	9/15/22	1256-1317	0.297	0.295	0.002	Y
7	9/15/22	1327-1348	0.301	0.298	0.003	Y
8	9/15/22	1358-1419	0.297	0.294	0.003	Y
9	9/15/22	1429-1450	0.361	0.351	0.010	Y
10	9/15/22	1459-1520	0.316	0.315	0.001	Y
Averages			0.315	0.312	0.003	

Applicable Standard (AS)	1.20	lb/MMBtu
Standard Deviation	0.003	
Confidence Coefficient (CC)	0.002	
RA based on AS	0.5	%

TABLE 4-5
NO_x (LB/MMBTU) RATA RESULTS -
BOILER A

Run #	Date	Time	RM	CEMS	Difference	Run Used (Y or N)
1	9/15/22	1015-1043	0.150	0.131	0.019	Y
2	9/15/22	1053-1114	0.158	0.138	0.020	N
3	9/15/22	1124-1145	0.156	0.137	0.019	Y
4	9/15/22	1156-1217	0.155	0.137	0.018	Y
5	9/15/22	1226-1247	0.156	0.137	0.019	Y
6	9/15/22	1256-1317	0.154	0.137	0.017	Y
7	9/15/22	1327-1348	0.154	0.136	0.018	Y
8	9/15/22	1358-1419	0.158	0.138	0.020	Y
9	9/15/22	1429-1450	0.149	0.131	0.018	Y
10	9/15/22	1459-1520	0.155	0.136	0.019	Y
Averages			0.1541	0.1356	0.0185	

Applicable Standard (AS)	0.20	lb/MMBtu
Standard Deviation	0.0006	
Confidence Coefficient (CC)	0.0005	
RA based on mean RM value	12.3	%

TABLE 4-6
PM EMISSIONS RESULTS -
BOILER B

Run Number	1-PM-B	2-PM-B	3-PM-B	Average
Date	9/14/22	9/14/22	9/15/22	--
Time	1304-1410	1422-1528	0634-0749	--
Process Data				
steam production, klb/hr	--	--	--	~130-145
Sampling & Flue Gas Parameters				
sample duration, minutes	60	60	60	--
sample volume, dscf	37.243	35.749	40.086	37.692
isokinetic rate, %	98	95	103	--
O_2, % volume dry	8.1	8.1	8.3	8.2
CO_2, % volume dry	12.3	12.3	12.1	12.2
flue gas temperature, °F	366	365	364	365
moisture content, % volume	17.8	17.9	18.6	18.1
volumetric flow rate, dscfm	57,096	56,177	58,496	57,256
Filterable Particulate Matter (PM)				
mg	45.31	18.81	23.71	29.28
gr/dscf	0.0188	0.0081	0.0091	0.0120
lb/hr	9.19	3.91	4.58	5.89
lb/MMBtu	0.043	0.019	0.021	0.027
Condensable PM				
mg	5.92	5.16	2.42	4.50
gr/dscf	0.0025	0.0022	0.0009	0.0019
lb/hr	1.20	1.07	0.47	0.91
lb/MMBtu	0.006	0.005	0.002	0.004
Total PM				
mg	51.23	23.97	26.13	33.78
gr/dscf	0.0212	0.0103	0.0101	0.0139
lb/hr	10.39	4.98	5.04	6.80
lb/MMBtu	0.049	0.024	0.023	0.032

TABLE 4-7
CO AND NO_X EMISSIONS RESULTS -
BOILER B

Run Number	Compliance R1 RATA R1,2,3	Compliance R2 RATA R4,5,6	Compliance R3 RATA R7,8,9	Average
Date	09/14/22	09/14/22	09/15/22	--
Time	1250-1423	1433-1601	0634-0758	--
Process Data				
steam production, klb/hr	--	--	--	130-145
Flue Gas Parameters				
O_2, % volume dry	8.1	8.0	8.3	8.1
CO_2, % volume dry	12.3	12.3	12.1	12.2
Carbon Monoxide (CO)				
ppmvd	233	164	568	322
lb/MMBtu	0.27	0.19	0.65	0.37
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	98	101	71	90
lb/MMBtu	0.19	0.19	0.13	0.17

TABLE 4-8
OXYGEN (PERCENT VOL. DRY) RATA RESULTS - BOILER B

Run #	Date	Time	RM	CEMS	Difference	Run Used (Y or N)
1	9/14/22	1250-1317	8.1	8.4	-0.3	Y
2	9/14/22	1328-1349	8.0	8.3	-0.3	Y
3	9/14/22	1402-1423	8.1	8.5	-0.4	Y
4	9/14/22	1433-1454	8.0	8.4	-0.4	Y
5	9/14/22	1504-1525	8.1	8.5	-0.4	Y
6	9/14/22	1540-1601	8.0	8.4	-0.4	Y
7	9/15/22	0634-0655	7.8	8.3	-0.5	Y
8	9/15/22	0706-0727	8.9	9.4	-0.5	Y
9	9/15/22	0737-0758	8.3	8.8	-0.5	Y
10	9/15/22	0810-0831	8.6	9.1	-0.5	N
Averages			8.1	8.6	-0.4	

Standard Deviation	0.087
Confidence Coefficient (CC)	0.067
RA based on absolute difference	0.4 %

TABLE 4-9
CO (LB/MMBTU) RATA RESULTS -
BOILER B

Run #	Date	Time	RM	CEMS	Difference	Run Used (Y or N)
1	9/14/22	1250-1317	0.343	0.334	0.009	Y
2	9/14/22	1328-1349	0.284	0.273	0.011	Y
3	9/14/22	1402-1423	0.191	0.193	-0.002	Y
4	9/14/22	1433-1454	0.241	0.231	0.010	Y
5	9/14/22	1504-1525	0.158	0.161	-0.003	Y
6	9/14/22	1540-1601	0.174	0.177	-0.003	Y
7	9/15/22	0634-0655	0.937	1.099	-0.162	N
8	9/15/22	0706-0727	0.386	0.380	0.006	Y
9	9/15/22	0737-0758	0.611	0.686	-0.075	Y
10	9/15/22	0810-0831	0.423	0.409	0.014	Y
Averages			0.312	0.316	-0.004	

Applicable Standard (AS)	1.20	lb/MMBtu
Standard Deviation	0.027	
Confidence Coefficient (CC)	0.021	
RA based on AS	2.1	%

TABLE 4-10
NO_X (LB/MMBTU) RATA RESULTS -
BOILER B

Run #	Date	Time	RM	CEMS	Difference	Run Used (Y or N)
1	9/14/22	1250-1317	0.190	0.169	0.021	Y
2	9/14/22	1328-1349	0.185	0.165	0.020	Y
3	9/14/22	1402-1423	0.188	0.168	0.020	Y
4	9/14/22	1433-1454	0.186	0.165	0.021	Y
5	9/14/22	1504-1525	0.197	0.175	0.022	Y
6	9/14/22	1540-1601	0.196	0.174	0.022	N
7	9/15/22	0634-0655	0.128	0.115	0.013	Y
8	9/15/22	0706-0727	0.143	0.131	0.012	Y
9	9/15/22	0737-0758	0.132	0.120	0.012	Y
10	9/15/22	0810-0831	0.144	0.130	0.014	Y
Averages			0.166	0.149	0.017	

Applicable Standard (AS)	0.2	lb/MMBtu
Standard Deviation	0.0045	
Confidence Coefficient (CC)	0.0034	
RA based on mean RM value	12.4	%

TABLE 4-11
PM EMISSIONS RESULTS -
BOILER C

Run Number	2-PM-C	3-PM-C	4-PM-C	5-PM-C	Average
Date	9/13/22	9/14/22	9/14/22	9/14/22	--
Time	1221-1328	0740-0845	0903-1009	1022-1127	--
Process Data					
steam production, lb/hr	--	--	--	--	~130-155
Sampling & Flue Gas Parameters					
sample duration, minutes	60	60	60	60	--
sample volume, dscf	37.891	40.335	38.192	38.754	38.793
isokinetic rate, %	100	104	101	101	102
O_2, % volume dry	8.8	8.7	8.8	9.3	8.9
CO_2, % volume dry	11.6	11.7	11.6	11.2	11.5
flue gas temperature, °F	377	364	366	365	368
moisture content, % vol.	17.3	17.3	17.2	16.6	17.1
volumetric flow rate, dscfm	56,596	58,014	56,502	57,796	27,227
Filterable Particulate Matter (PM)					
mg	18.85	42.17	37.72	54.96	38.43
gr/dscf	0.0077	0.0161	0.0152	0.0219	0.0152
lb/hr	3.72	8.02	7.38	10.84	7.49
lb/MMBtu	0.018	0.039	0.037	0.055	0.037
Condensable PM					
mg	10.93	8.06	7.85	20.96	11.95
gr/dscf	0.0045	0.0031	0.0032	0.0083	0.0048
lb/hr	2.16	1.53	1.54	4.13	2.34
lb/MMBtu	0.011	0.007	0.008	0.021	0.012
Total PM					
mg	29.78	50.23	45.57	75.92	50.38
gr/dscf	0.0121	0.0192	0.0184	0.0302	0.0200
lb/hr	5.88	9.56	8.92	14.97	9.83
lb/MMBtu	0.029	0.046	0.044	0.076	0.049

TABLE 4-12
CO AND NO_X EMISSIONS RESULTS -
BOILER C

Run Number	**Compliance R1 RATA R1,2,3**	**Compliance R2 RATA R4,5,6**	**Compliance R3 RATA R7,8,9**	**Average**
Date	09/14/22	09/14/22	09/14/22	--
Time	0641-0805	0816-0939	0950-1118	--
Process Data				
steam production, klb/hr	--	--	--	~130-155
Flue Gas Parameters				
O_2, % volume dry	8.9	8.9	9.1	9.0
CO_2, % volume dry	11.5	11.6	11.3	11.5
Carbon Monoxide (CO)				
ppmvd	215	281	149	215
lb/MMBtu	0.26	0.35	0.19	0.27
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	96	96	98	97
lb/MMBtu	0.19	0.19	0.20	0.20

**TABLE 4-13
OXYGEN (PERCENT VOL. DRY) RATA RESULTS -
BOILER C**

Run #	Date	Time	RM	CEMS	Difference	Run Used (Y or N)
1	9/14/22	0641-0702	9.1	8.5	0.6	N
2	9/14/22	0713-0734	9.1	8.6	0.5	Y
3	9/14/22	0744-0805	8.5	8.0	0.5	Y
4	9/14/22	0816-0837	8.9	8.4	0.5	Y
5	9/14/22	0847-0908	9.1	8.5	0.6	Y
6	9/14/22	0918-0939	8.6	8.1	0.5	Y
7	9/14/22	0950-1011	8.8	8.3	0.5	Y
8	9/14/22	1023-1044	9.3	8.8	0.5	Y
9	9/14/22	1057-1118	9.3	8.8	0.5	Y
10	9/14/22	1129-1150	8.6	8.1	0.5	Y
Averages			8.9	8.4	0.5	

Standard Deviation	0.026	
Confidence Coefficient (CC)	0.020	
RA based on absolute difference	0.5	%

TABLE 4-14
CO (LB/MMBTU) RATA RESULTS -
BOILER C

Run #	Date	Time	RM	CEMS	Difference	Run Used (Y or N)
1	9/14/22	0641-0702	0.263	0.241	0.022	Y
2	9/14/22	0713-0734	0.232	0.216	0.016	Y
3	9/14/22	0744-0805	0.300	0.275	0.025	Y
4	9/14/22	0816-0837	0.272	0.251	0.021	Y
5	9/14/22	0847-0908	0.358	0.309	0.049	Y
6	9/14/22	0918-0939	0.409	0.350	0.059	N
7	9/14/22	0950-1011	0.176	0.169	0.007	Y
8	9/14/22	1023-1044	0.138	0.129	0.009	Y
9	9/14/22	1057-1118	0.249	0.225	0.024	Y
10	9/14/22	1129-1150	0.184	0.174	0.010	Y
Averages			0.241	0.221	0.020	

Applicable Standard (AS)	0.8	lb/MMBtu
Standard Deviation	0.013	
Confidence Coefficient (CC)	0.010	
RA based on AS	3.7	%

TABLE 4-15
NO_X (LB/MMBTU) RATA RESULTS -
BOILER C

Run #	Date	Time	RM	CEMS	Difference	Run Used (Y or N)
1	9/14/22	0641-0702	0.198	0.164	0.034	Y
2	9/14/22	0713-0734	0.199	0.165	0.034	Y
3	9/14/22	0744-0805	0.188	0.156	0.032	Y
4	9/14/22	0816-0837	0.196	0.162	0.034	Y
5	9/14/22	0847-0908	0.198	0.163	0.035	N
6	9/14/22	0918-0939	0.191	0.157	0.034	Y
7	9/14/22	0950-1011	0.202	0.168	0.034	Y
8	9/14/22	1023-1044	0.209	0.175	0.034	Y
9	9/14/22	1057-1118	0.198	0.164	0.034	Y
10	9/14/22	1129-1150	0.192	0.160	0.032	Y
Averages			0.197	0.163	0.034	

Applicable Standard (AS)	0.22	lb/MMBtu
Standard Deviation	0.0008	
Confidence Coefficient (CC)	0.0006	
RA based on mean RM value	17.4	%

5.0 INTERNAL QA/QC ACTIVITIES

5.1 QA/QC AUDITS

The meter boxes and sampling trains used during sampling performed within the requirements of their respective methods. All post-test leak checks, minimum metered volumes, minimum sample durations, and percent isokinetics met the applicable QA/QC criteria.

EPA Methods 3A, 7E, and 10 calibration audits were all within the measurement system performance specifications for the calibration drift checks, system calibration bias checks, and calibration error checks.

The NO_2 to NO converter efficiency check of the analyzer was conducted per the procedures in EPA Method 7E, Section 8.2.4. The conversion efficiency met the criteria.

CARB Method 5 analytical QA/QC results are included in the laboratory report. The method QA/QC criteria were met.

ASTM Method D2015 analytical QA/QC results are included in the laboratory report. The method QA/QC criteria were met.

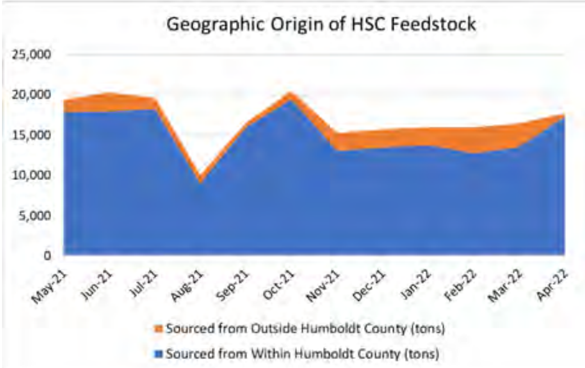
5.2 QA/QC DISCUSSION

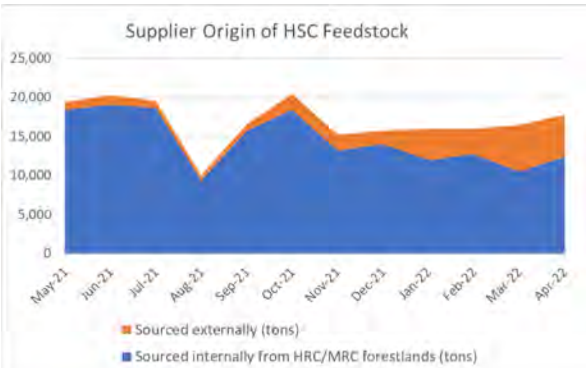
All QA/QC criteria were met during this test program.

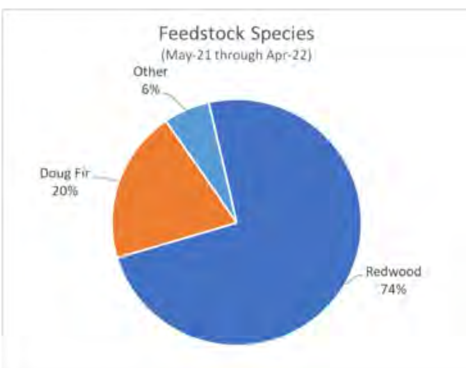
5.3 QUALITY STATEMENT

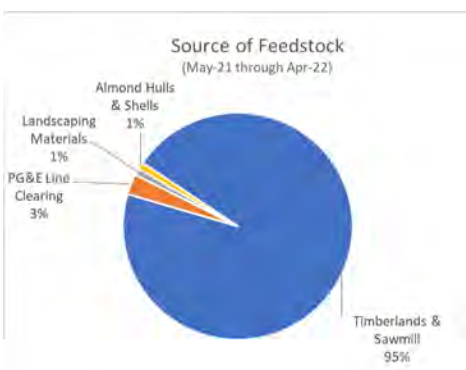
Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is included in the report appendices. The content of this report is modeled after the EPA Emission Measurement Center Guideline Document (GD-043).

Previous (May 2021--April 2022 Reporting)

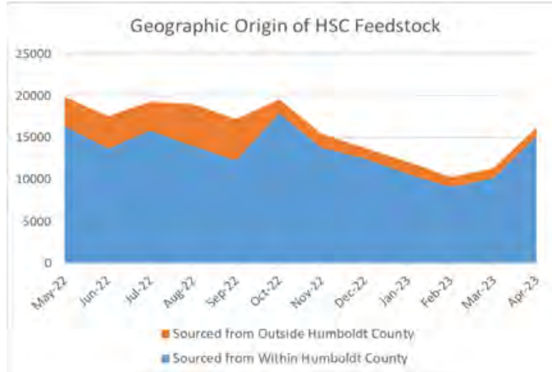


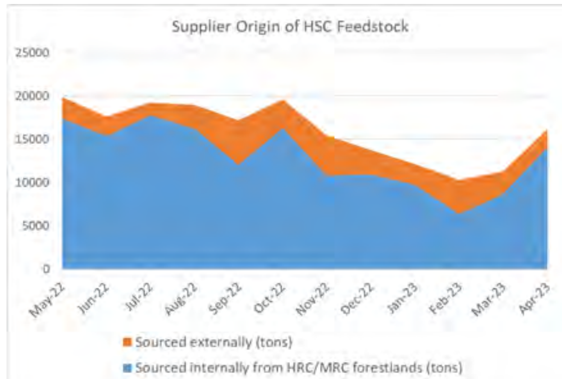


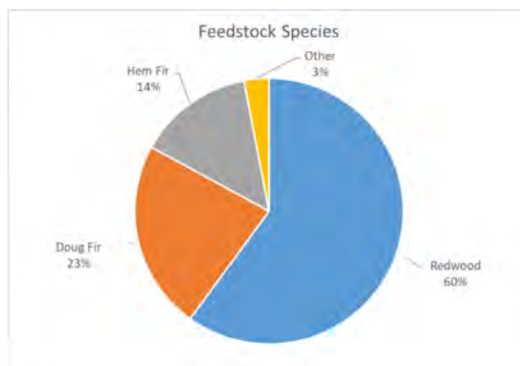


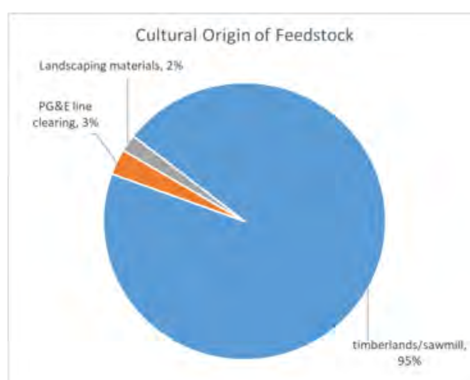


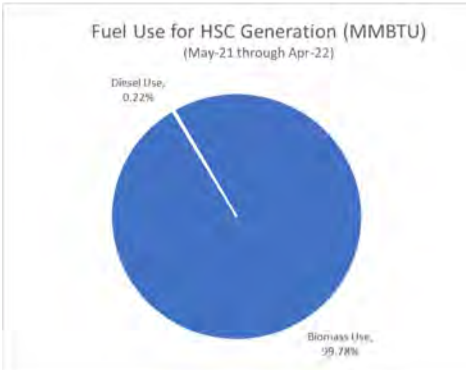
Current (May 2022--April 2023 Reporting)

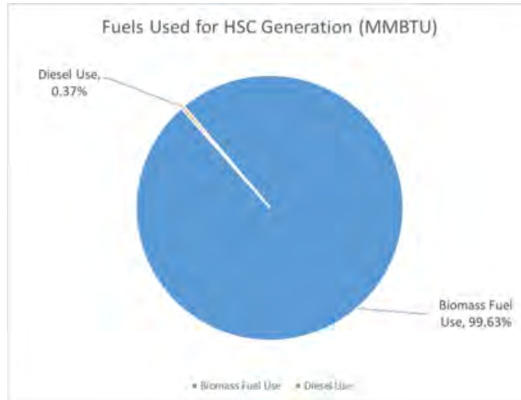


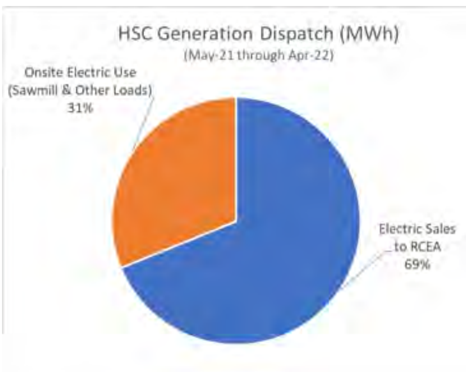


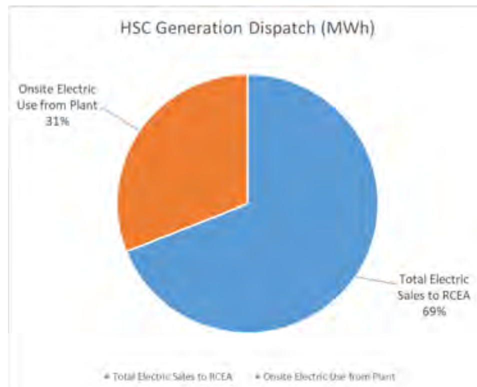


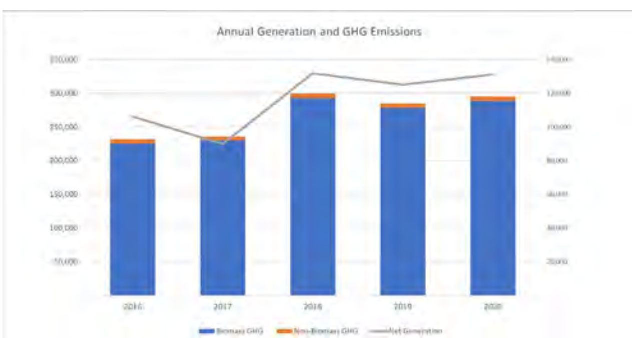


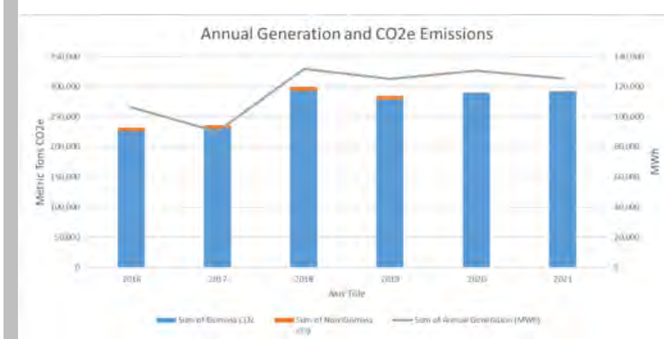

Fuel Use for HSC Generation (MMBTU)
(May-21 through Apr-22)
Diesel Use, 0.22%
Biomass Use, 99.78%


Fuels Used for HSC Generation (MMBTU)
Diesel Use, 0.37%
Biomass Fuel Use, 99.63%


HSC Generation Dispatch (MWh)
(May-21 through Apr-22)
Onsite Electric Use (Sawmill & Other Loads) 31%
Electric Sales to RCEA 69%


HSC Generation Dispatch (MWh)
Onsite Electric Use from Plant 31%
Total Electric Sales to RCEA 69%


Annual Generation and GHG Emissions


Annual Generation and CO2e Emissions
Metric Tons CO2e
MWh

Comments received from Kevin Fingerman, Ph.D., Associate Professor - Energy & Climate, Cal Poly Humboldt:

1. "Timberlands and sawmill" make up 95% of their feedstock. It would be really useful if they could separate these two feedstock sources in reporting, since they have different climate and operational characteristics and since their alternate fate also differs.
2. I'd like to know what's included in their forest operations feedstock bucket. Is it tops and branches? Pre-commercial thinning or removal of non-merchantable species? What happens in the absence of the power plant? Does the fact of the plant change their forest operations decision-making or is it more like a waste incinerator?
3. What heat demands are the "recovered thermal energy for onsite use" satisfying? How do mills without biomass plants satisfy that heat demand?
4. How are the GHG emissions being calculated?

Comments received from Roberto Beltran, RPF # 2914, District Ranger, U.S. Forest Service, Klamath National Forest, Happy Camp-Oak Knoll Ranger District

I have reviewed all of the materials and wish to provide comments on the MOU and the first annual report on consultations with Humboldt Sawmill Company regarding alternative biomass uses.
I think the draft MOU looks good. I suggest that if environmental and public health impacts of local generation of biomass power are to be considered in the MOU, then defining how they will be
considered would be good. Considering the environmental and public health impacts of the local biomass power could be broadly or narrowly defined and there may be considerable difference of opinion as to what this means. Perhaps the health impacts could be defined as meeting regulatory standards, as the standards are in place for a reason.
The annual report is a good overview of Humboldt Sawmill Company’s operation. I do have one question: what is the “other” in feedstock species? Is it hardwoods? If it is, I am somewhat surprised to see that hardwoods make up such a small proportion of the biomass feedstock. Thank
you for accepting my comments.

June 23, 2023

Richard Engel
Director of Power Resources
Redwood Coast Energy Authority
Per Email

Cc: Matthew Marshall, Technical Advisory Group members.

Dear Richard,

Thank you for appointing us to the important position of helping RCEA evaluate the environmental and public health impacts of local generation of biomass power and explore alternative lower impact uses of the feedstock material currently used by the plant.
We have several requests that will make it possible for us to be helpful to you in fulfilling RCEA's part of the MOU.

1. Members of the Technical Advisory Group need an extension of time to reply to the Humboldt Sawmill data that was supplied. Four working days to evaluate documents that are highly technical and come with no explanation or context (and mislabeling[1]) is insufficient.
2. The extra time should not be a problem, because the process should actually be slowed down. As a result of inquiries and fact-finding by Wendy Ring, MD, MPH, there are current investigations of Humboldt Sawmill being conducted by the North Coast Unified Air Quality Management District, the results of which should be presented to the Technical Advisory Group before our recommendations can be formulated. In terms of air pollution and public health, a determination about the contract at this point is premature.
3. Because of the highly technical nature of air quality monitoring and health assessments, we request that RCEA contract with an air quality/public health expert who can review the history of emissions and regulation at the Humboldt Sawmill and provide an authoritative report on the public health impact of the local generation of biomass power. RCEA previously contracted for a report by Michael Furniss regarding the climate impacts of the biopower plant and alternatives. The reactions of the RCEA Board to this report – in the context of staff asking for a ten-year contract – was the reason for creating the MOU asking for information about alternatives uses of the biopower plant feedstock. An air quality/public health expert would, as Michael Furniss did, present

[1] One document is called an "Emissions Report." It is not. We would greatly appreciate receiving the actual emissions reports for the years since the new contract was signed and for three years previous so we can see trends in particulate matter and toxic emissions.

her/his findings to the RCEA Board. Here are two experts that we believe would be highly credible. Anyone you choose should be of the same stature:

- Dr. Seth Shonkoff[2]
- Dr. John Balmes[3]

4. We also need more information from Humboldt Sawmill:
   - The reports combine two categories of feedstock that should be kept separate as the policy implications for the two are quite different: feedstock from timberlands and sawmill waste. For timberland material we would like to know its source, and if possible, the alternative disposition had it not been burned for electricity. In particular, we think it is highly relevant to know how much was due to fire prevention clearing and what the nature of the clearing was and who conducted it. Obviously this is a level of detail that may not be available for all feedstocks, but the broad outlines should be available. The MOU should be modified so that in future years the detail is available.
   - Most important of all, the consultant reports regarding alternative uses of the biomass that the MOU requires of HSC are not included.[4] This includes the reports from 2021-2022 as well as those from this last year. The whole purpose of the MOU was for RCEA to be able to terminate the contract if there are alternative uses of the feedstock which would be less polluting and have a smaller climate impact. These reports must be public. There is certainly no way for the Technical Advisory Group, the CAC or the RCEA Board to fulfill their functions without access to this information.
5. Finally, at some point before anything goes to the CAC, it would be useful to have an in-person meeting of the members of the Technical Advisory Group where questions could be asked of Humboldt Sawmill Company and the North Coast Unified Air Quality Management District, as well as other Technical Advisory Group experts on the uses and impacts of biomass, such as Kevin Fingerman.

Sincerely,

Caroline Griffith
Executive Director, Northcoast Environmental Center
[redacted]

Tom Wheeler
Executive Director, Environmental Protection Information Center
[redacted]

Daniel Chandler
Steering Committee, 350 Humboldt
[redacted]

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[2] https://www.psehealthyenergy.org/about/staff/seth-shonkoff/
[3] https://publichealth.berkeley.edu/people/john-balmes/
[4] The MOU specifically says HSC will "share feedstock supply and plant operation data helpful in assessing alternative biomass uses, and that the assessment consider both financial and non-financial benefits of such alternative uses, including avoided carbon emissions."

July 5, 2023

Richard Engel
Director of Power Resources
Redwood Coast Energy Authority
Per Email

Cc: Matthew Marshall, Technical Advisory Group members.

Dear Richard,

Please find attached our analysis of the Humboldt Sawmill contract and our recommendations.

Thank you for giving us the opportunity to present this information to you, the CAC and the Board.

Sincerely,

Caroline Griffith
Executive Director, Northcoast Environmental Center
[redacted]

Tom Wheeler
Executive Director, Environmental Protection Information Center
[redacted]

Daniel Chandler
Steering Committee, 350 Humboldt
[redacted]

Technical Advisory Group Report from 350 Humboldt, NEC and EPIC

A betrayal of public trust

The Redwood Coast Energy Authority has taken many actions to make Humboldt County a leader in the transition to clean renewable energy. The prize-winning micro-grid at the airport, the two large long-term solar contracts, and the new 17MW battery storage at the old Fairhaven plant are clear examples. RCEA has also led the effort to get floating offshore wind. At the same time, it has foisted onto the public biomass power, an inefficient, polluting and greenhouse gas-intensive anomaly – the flaw in the diamond.

In 2019 the Arcata City Council, the Eureka City Council, the Humboldt County Board of Supervisors, and the Redwood Coast Energy Authority each passed a resolution – proposed by 350 Humboldt – committing to use only "clean, renewable" energy starting in 2025. All of those public officials believed that this would be possible. It would have meant eliminating biomass power when the current contract expired. Instead, in 2021 RCEA proposed to the RCEA Board that a ten-year contract with Humboldt Sawmill Company (HSC)[1] provide biomass electricity through 2031. Not only did RCEA go back on its commitment to clean, renewable energy by 2025, but by doing so they violated their trust with customers and voters.

There are several key facts that support this view. They are stated here and documented in the body of our comments.

- The ten-year contract was not required. Richard Engel stated in the RCEA Board meeting that the state's requirement for long-term renewable energy could have been achieved by adding more solar power.
- The HSC electricity thus replaced energy that is actually clean and renewable.
- The reason the state allows biomass power to be called "renewable" is that if the wood burned is replaced from sustainable forests the carbon cycle will sequester the CO2 that is released by burning the biomass. However, it is not renewable in a way that will help mitigate the climate crisis in the timeframe needed. Reductions in emissions are most critical between now and 2030 according to the International Panel on Climate Change and have to be at net zero by 2050. Emissions from burning biomass to make electricity will not be paid back by CO2 uptake for many years after those dates, if at all. In essence, burning biomass creates a carbon debt that cannot be repaid within the time limits the climate crisis requires. There are lucrative alternative uses for biomass that the Humboldt Sawmill Company (HSC) has turned down that have far lower greenhouse gas emissions and far less air pollution.
- In the context of the energy revolution, "clean" energy means both a) it produces only very small amounts of greenhouse gases, and b) it does not produce the air pollution associated with fossil fuels, which cause seven million premature deaths a year around the world.[2] It seems very clear that the government entities that signed the resolution committing to clean, renewable energy by 2025 could not have intended it to mean emitting annually as much greenhouse gases as 75% of our passenger vehicles[3] and

emitting more particulate matter and other "criteria pollutants" than coal would for an equivalent amount of electricity produced.
- Not only does HSC produce massive amounts of air pollution in the normal course of its operation, but it has also violated the Clean Air Act and other public health regulations multiple times. Again, HSC biopower cannot be considered "clean" renewable energy.

As a response to this betrayal of public trust we propose the RCEA Board take three actions:

Recommendation 1: No other biomass shall be contracted for beyond the HSC contract.

Recommendation 2: The HSC contract shall not be extended.

Recommendation 3: Due to the numerous air quality violations of HSC, the HSC contract should be cancelled as soon as the long-term renewable energy that it provides in the RCEA portfolio can be replaced by additive solar or wind. If this is not legally possible, the RCEA Board should modify the contract to require the HSC equipment be upgraded to Best Available Control Technology, which would significantly reduce both greenhouse gas and air pollution.

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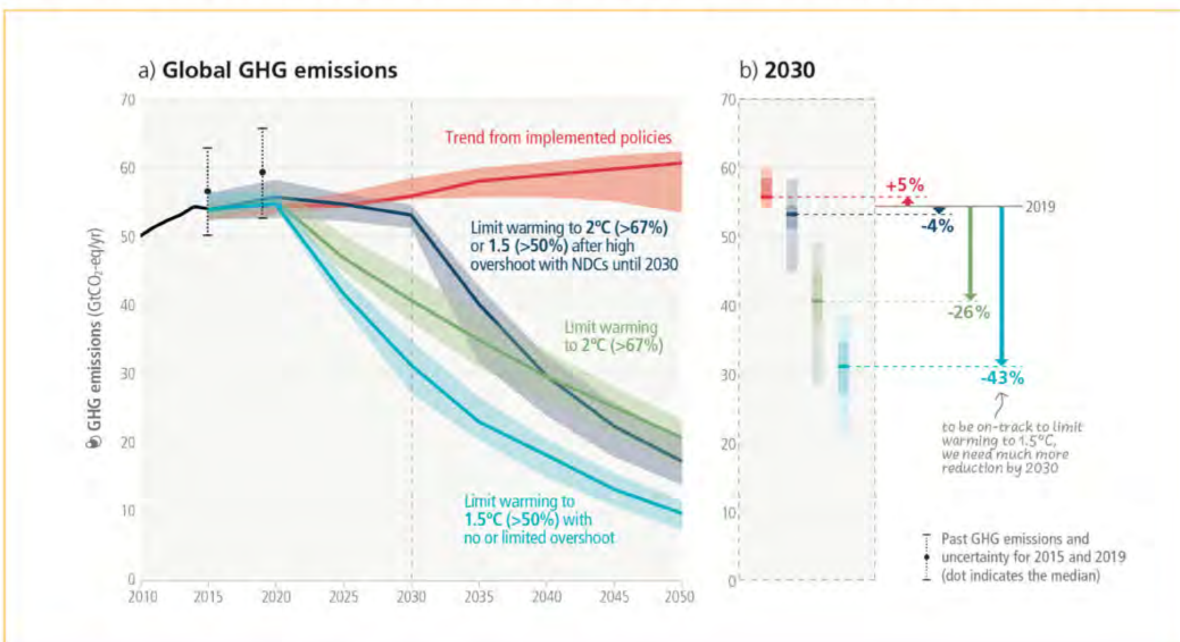
The greenhouse gas emissions from Humboldt Sawmill must be eliminated before 2030 because the next seven years are the most crucial humanity and other living things have ever faced.

Climate scientists have calculated how much more CO2e (CO2 or its equivalent in warming potential from another gas like methane or nitrous oxide) can be emitted without committing the earth to more than 1.5°C (2.7°F) warming. That is to say, they have calculated a carbon "budget" that is compatible with 1.5°C. If we exceed this emissions budget, warming will exceed 1.5°C.

The graph below from the 2022 IPCC AR6 report shows different warming trajectories depending on how much we cut emissions. The red line at the top indicates an increase of emissions of 5%, which is where we are with current implementation of the pledges all countries have made. The possible trajectories on the left are translated into how large a reduction there would have to be to achieve 2°C or 1.5°C. If we only reduce 4% by 2030, we will have a very steep reduction after 2030 and still only be able to limit warming to 2°C (unless we pull huge amounts of CO2 out of the atmosphere). To limit warming to 1.5°C the world must cut emissions by 43% before 2030. Climate scientists have found that every one year of delay before the world reverses the growth of emissions reduces by two years the time we have to

Figure 1: Projected global GHG emissions from NDCs announced prior to COP26 would make it likely that warming will exceed 1.5°C and also make it harder after 2030 to limit warming to below 2°C.



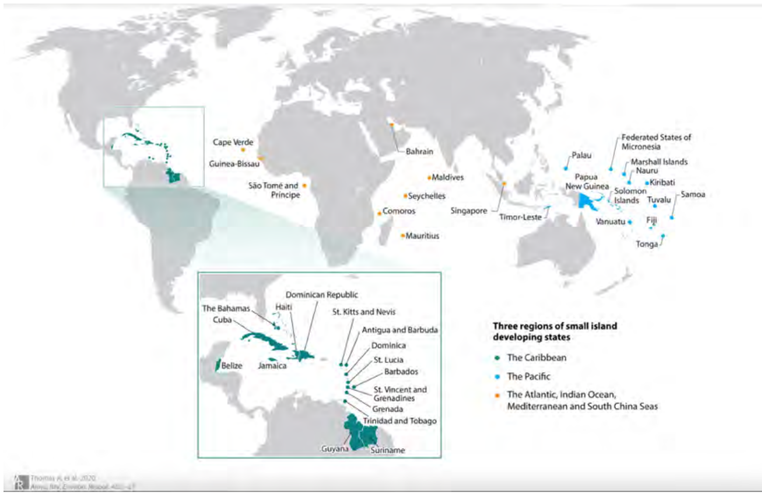
reach net zero at or below 1.5°C.[4]

Why is 1.5°C the IPCC's standard?

The IPCC has determined we must meet 1.5°C in order avoid potentially disastrous consequences.[5] What are these consequences?

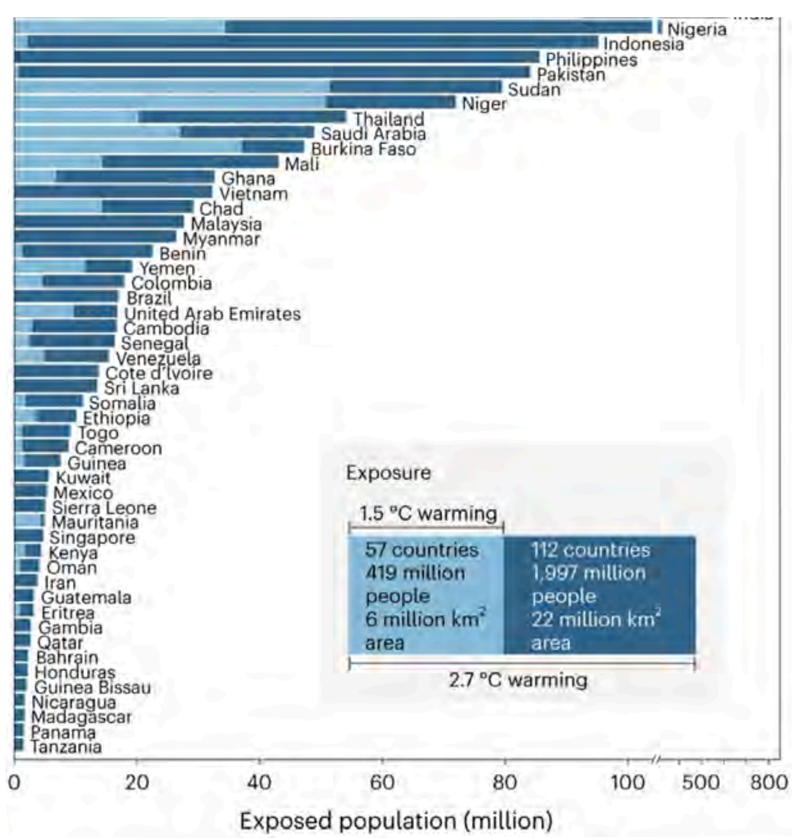
- We lose our island nations.[6]

Figure 2.



- If we continue on our current trajectory to 2.7°C, the number of people who will be living outside of the human-survivable climate niche of average temperatures of 12.7° to 27.2°C. (55° to 81°F.) will almost quadruple over a 1.5°C. increase: from 419 million.to two billion people. That is, a billion and a half more people in an additional 55 countries will be living at average temperatures over 81°F. Please see the graph below.[7] Dark bars are the increase over 1.5°C.

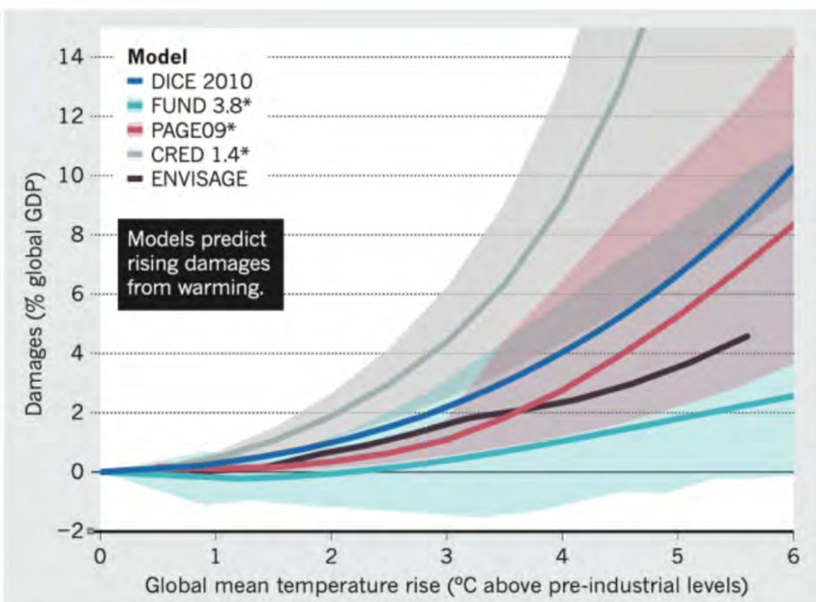
Figure 3.



- We increase the likelihood of passing "tipping points." Melting of the permafrost is already irreversible and two other tipping points may have already occurred. Such events are increasingly likely when warming over preindustrial times exceeds 1.5°C.[8]
    - Melting of the Greenland Ice Sheet
    - Melting of Arctic Sea Ice
    - Melting of the West Antarctic ice sheet
    - Melting and thawing of East Antarctic sub-glacial basins
    - Melting East Antarctic ice sheet
    - Shifting of the North Atlantic sub-polar gyre / Labrador Sea convection
    - Changes in the Atlantic meridional overturning circulation
    - Death of boreal forests
    - Extinction of low-latitude coral reefs
    - The end of the Amazon rainforest's ability to sequester carbon
    - Massive CO2 and methane releases from melting permafrost – already passed the tipping point

- Climate models show damage from global warming increases at a much faster rate than warming; some climate models show a near exponential rate.[9]

Figure 4.



This disproportionality has at least two consequences:

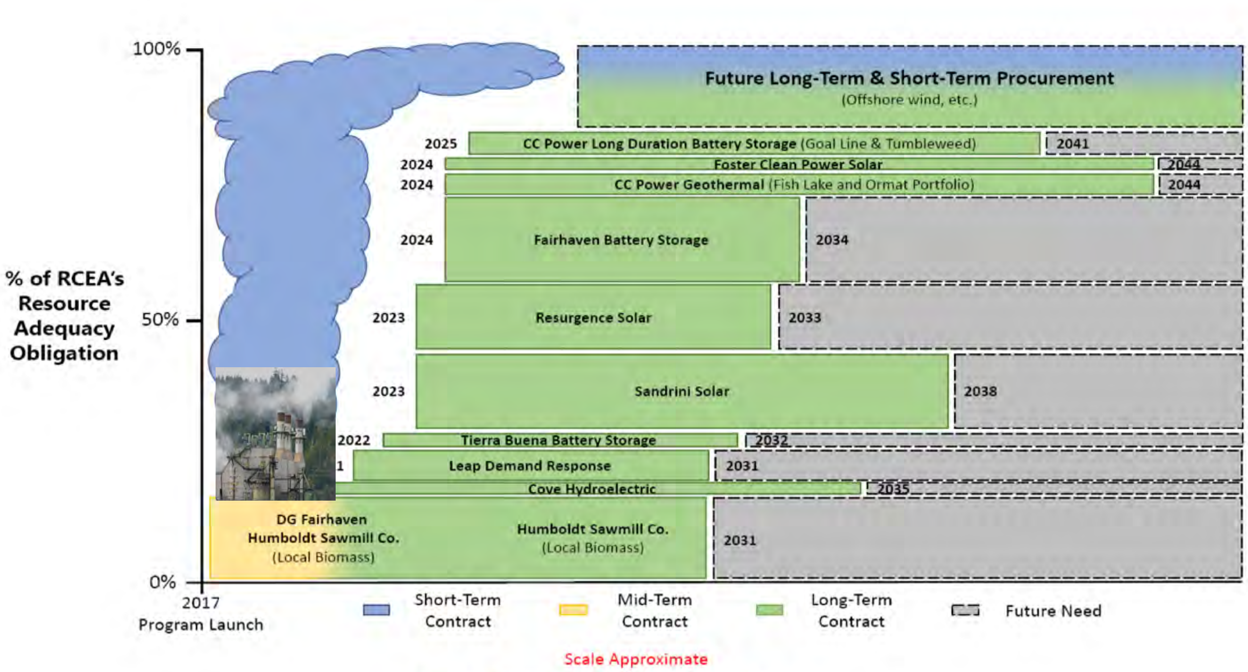
a) We must frontload our major efforts for climate mitigation, not push them off past 2030; and,

b) If we don't act rapidly, paying for adaptation and reconstruction after climate disasters is going to take up more and more of our resources leaving far too little for mitigation. The Bezos 10 billion dollar Earth Fund CEO, Andrew Steer, warned in a May interview: "This is the decisive decade....if we don't get it right this decade, actually next decade it will be impossibly expensive to do anything and will quite frankly be too late."[10]

How do RCEA's resource procurement plans align with the need to drastically (at least 43%[11]) reduce emissions by 2030?

RCEA recently held two community workshops on their projections of sources of energy for 2030 and later. From the report used for the workshops[12] we find this illustration of how RCEA plans to provide adequate resources (we have added the likely source of the peculiar cloud running up the side of the graph).

Figure 5. RCEA Resource Adequacy Timeline



The text says: "RCEA has set out to provide our customers with 100% renewable and carbon-free energy by 2025 and 100% local renewable energy by 2030. Specifically, our Strategic Plan states that 'By 2030 Humboldt County will be a net exporter of renewable electricity and RCEA's power mix will consist of 100% local, net-zero-carbon- emission renewable sources.'"

That is, RCEA uses some misleading phrasing to avoid saying that they will continue to use the highly polluting Humboldt sawmill through at least 2030. They do this by relying on the word "renewable" and putting it in the same sentence as "carbon free." While some forms of renewable energy, like solar, are almost carbon free, "renewable" itself has no implications for carbon intensity, certainly not in the timeframe of 2030 or even 2050. See page 10 below.

When RCEA staff asked the RCEA Board to approve a new ten-year contract, this is the rationale they gave:

> If RCEA does not extend its contract with HSC, we will need to seek other means of ensuring SB 350 compliance. This will likely involve issuing a new solicitation for long-term renewable energy that can begin delivering within the next few years. Given our strategic goal of procuring 100% of our energy from local, renewable resources by 2030, and the long lead times for developing new renewable energy projects, it is unlikely that a solicitation issued by RCEA this year would lead to a new local project coming online in time to ensure SB 350 compliance by at least a 10% margin. *The most likely outcome would be a contract for an existing renewable energy project outside of Humboldt County*, constituting a missed opportunity for RCEA to pursue its strategic local energy development goal.[13] [Our italics.]

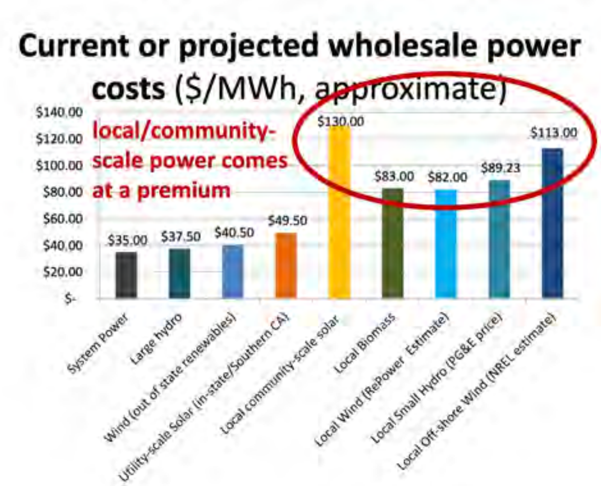
In short, the staff admit that compliance with the state's requirement for a source of long-term renewable energy could be met with clean renewable energy from outside Humboldt, which means the biomass plant is supplanting solar in the supply of long-term renewable energy.

The answer to the question of how RCEA's plans line up with the need to reduce emissions drastically by 2030, is that despite being able to meet long-term procurement standards with solar, RCEA plans to continue to put 295,000 metric tons of CO_2e into the environment annually from biomass power. That is approximately two million metric tons of warming emissions, before 2031.

Does it matter that biomass power is "local?"

RCEA staff have always made a point of saying the Board wanted our power to be local. Strikingly, in the new 2023 report the staff have backed off this notion of local procurement. They point out that procuring local renewable energy is often incompatible with other state requirements. Only when floating offshore wind comes on-line would the predominance of "local" actually be achievable.[14] The graph below is from a 2017 RCEA presentation and shows that the commitment to "local" procurement cost us a lot of money when the preference for local power was adopted. The preference for "local" was a political choice that made limited sense in 2017 and that RCEA administrators have found not to be workable in any case.

Figure 6.



In 2020 biomass accounted for roughly $15 million a year, by far the biggest among local RCEA expenditures. In fact, in 2020, 96% of local payments went to biomass. Please see the table of local expenditures below. It almost looks as if the purpose of RCEA is to keep biomass power afloat.

Figure 7.

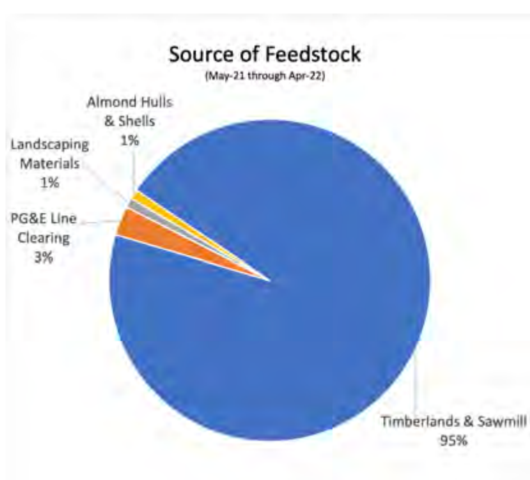
Expense Category	Sum of 2020 Spend
Power Purchase - Biomass	$ 14,941,751.87
Professional Services	$ 369,124.40
Net Energy Metering customer payouts	$ 115,442.80
RCEA facility costs	$ 86,972.05
Electric Bike incentives	$ 41,350.00
Electric Vehicle Charging Network	$ 31,222.24
Supplies	$ 31,050.55
Outreach	$ 7,861.87
Grand Total	**$ 15,624,775.78**

Although RCEA staff say the price paid Humboldt Sawmill is now competitive, the base price actually has only been reduced from $83 per MWh in 2017 to $63 in the 2021 Power Purchase Agreement and if demand increases, there is an $11 per MWh bonus. We don't know what RCEA is paying for the Sandrini utility-scale solar because it is redacted from the Power Purchase Agreement available to the public, but it is likely about $20 per MWhour.[15] So replacing biomass with solar would give RCEA roughly $10 million more to spend on local incentives and assistance in meeting the goals of our Climate Action Plan.[16]

Does Humboldt Sawmill burn mill waste or forest residues? Answer: Both

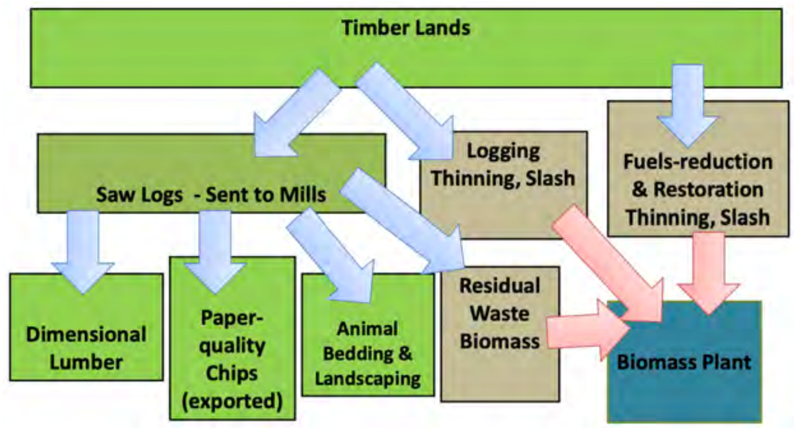
Since 2019 we have heard that Humboldt Sawmill burns "mill waste." This is potentially important because some of the greenhouse gas emissions attributable to forest residues may not accrue to mill waste. In general, about half of a sawlog becomes residue at a sawmill, some of which is made into useful products; about 15% to 20% is waste that must be disposed of.[17] Here is a graph that was supplied to the Technical Advisory Group in June 2023 by Humboldt Sawmill. It shows that a combination of forest residues ("timberlands") and mill waste make up 95% of the feedstock in 2022.

Figure 8.



Although no proportions between forest residues and mill waste have been supplied by Humboldt Sawmill, a presentation to the RCEA Board at the time the 2017 Power Purchase Agreement was signed makes it very clear that both mill waste and forest residues (slash) plus fuel load reduction make up the feedstock for the biomass power plant.[18] The amount of biomass used for biopower in April 2022 – May 2023 was 191,624 tons.[19] However, we need HSC to specify the current proportions of mill waste, forest residues and fuel load reduction.

Figure 9.



Why burning biomass for electricity is not carbon-free and being "renewable" will not help us by 2030 or 2045.

California classifies biomass power as "renewable" and the CPUC echoes the outdated idea that it is not carbon intensive – although perhaps not for long.[20] California policymakers lag the science on this issue because, although renewable in theory, scientists find that biomass power is carbon intensive in a 50 to 100-year time frame, and much more intensive in the IPCC's 2030 – 2050 time frame.

Mary S. Booth wrote in 2018:

> [O]n one aspect of bioenergy carbon accounting there is wide agreement: that when biomass is sourced from residues from forestry, wood products manufacturing, or agriculture, net carbon emissions are properly assessed as the difference between emissions from their use as fuel (which can include emissions from fuel manufacturing and transport), and emissions from an alternative fate, such as leaving material on-site to decompose or burning it without energy recovery. Studies using this approach generally conclude net bioenergy emissions are not zero over varying periods of time. Nonetheless, many policies still treat bioenergy as having zero or negligible emissions.[21]

Kevin Fingerman's research at Cal Poly Humboldt on the greenhouse gas emissions of California biopower is an excellent example of the approach which compares biopower to alternative uses of forest residues or fuel load reduction. This information is from the peer-reviewed 2023 overview article presenting his research.[22]

> "[Recent] literature has called this assumption [biomass carbon neutrality] into question, pointing out that near-term emissions lead to increased climate forcing over policy-relevant time frames even if it is assumed that the CO2 emitted is eventually re-sequestered in forest regrowth or, as in the case of residues, would have been emitted later by decay or wildfire." [Specifically,] "We find that the life cycle 'carbon footprint' of biopower from woody residues generated by recent forest treatments in California ranges widely—from comparable with solar photovoltaic on the low end to comparable with natural gas on the high end."

This research focuses on forest treatments for fuel load reduction and shows that burning woody biomass for power is carbon intensive, <u>not</u> carbon neutral or negative *over a 100 year period*. In the aggregate, the only alternative that produces more greenhouse gases in the 100 years than biopower in Fingerman's and other models is burning the forest residues on site.[23]

An analysis of bioenergy in Oregon found:

> Wood bioenergy production is interpreted as being carbon-neutral by assuming that trees regrow to replace those that burned. However, this does not account for reduced forest carbon stocks that took decades to centuries to sequester, degraded productive capacity, emissions from transportation and the production process, and biogenic/direct emissions at the facility….[In this study] utilizing harvest residues for bioenergy production instead of leaving them in forests to decompose increased emissions in the short-term (50 y).[24]

Fingerman's model is designed to consider multiple variables, including those specific to local sites all over California. Other models are more general. John D. Sterman, a MIT professor, says: "A molecule of CO_2 emitted today has the same impact on radiative forcing whether it comes from coal or biomass…. Assuming biofuels are carbon neutral may worsen irreversible impacts of climate change before benefits accrue." For forest thinning, he calculates that after 100 years 62% of the carbon debt caused by burning the biomass for electricity is unrecovered. "Because combustion and processing efficiencies for wood are less than coal, the immediate impact of substituting wood for coal is an increase in atmospheric CO_2 relative to coal. The payback time for this carbon debt ranges from 44 –104 years after clearcut, depending on forest type—assuming the land remains forest."[25]

And Laganiere finds, looking only at the emissions from biomass power that exceed those from natural gas, that the carbon debt for burning forest waste for electricity is not made up within 100 years.[26] In contrast the early, less sophisticated, Manomet study found it only took 35 years for the excess emissions over natural gas to be made up.[27] These sources, and there are many others,[28] indicate that burning biomass is not carbon neutral within a climate-policy relevant time frame. Yet in Humboldt we are talking about a "carbon debt" of 2 million metric tons from burning biomass in the next eight years of the Humboldt Sawmill contract that, impossibly, would have to be paid back by 2030 or at latest 2045.[29]

Exactly how carbon intensive the Humboldt Sawmill plant is can only be determined by a Life Cycle Assessment of this particular plant. There are numerous variables that affect such an analysis including those relating to harvest of the timber or thinning of fuel load, transportation, storage of materials, sustainability of the forestry, and the efficiency of the plant. A potentially large, but unmeasured, factor is the amount of methane produced during storage of the wood chips and sawdust.[30] 350 Humboldt first asked RCEA to conduct such a study in 2019 and 350 Humboldt members have requested it at other points in time, to no avail.

A number of political entities have reversed their policies on biomass recently.

Biomass power in California is subsidized and supported by the government in multiple ways: by requiring investor-owned utilities to buy 125 megawatts of biopower; by the bioMAT program for small biopower facilities; by the CPUC exempting biopower from greenhouse gas requirements; and by including biomass power in the Renewable Portfolio Standard. All of these policies are holdovers from when it was assumed bioenergy to be carbon neutral. In other places, these government supports have started to be challenged and eliminated.

- In 2022 Massachusetts passed *An Act Driving Clean Energy and Offshore Wind*, which will expand clean energy development and end renewable energy subsidies for wood-burning power plants. The new law also makes Massachusetts the first state in the nation to remove woody biomass from its Renewable Energy Portfolio Standard.[31]
- The Australian Government has acted to exclude electricity generated from burning native forest wood waste from eligibility under the Renewable Energy Target.[32]
- In 2021 five hundred environmental scientists from around the world wrote an open letter to President Biden, the European Council, and Japan and South Korea opposing the use of biomass electricity generation. The letter said, “Regrowing trees and displacement of fossil fuels may eventually pay off this carbon debt, but regrowth takes time the world does not have to solve climate change. As numerous studies have shown, this burning of wood will increase warming for decades to centuries. That is true even when the wood replaces coal, oil or natural gas.” It called for governments, including the United States, to “end subsidies and other incentives that today exist for the burning of wood whether from their forests or others.”[33]
- In March of 2023 the Hawaiian Supreme Court unanimously turned down an appeal from a biomass power plant owner whose application for a license had been denied by the Hawaiian public utilities commission. The grounds for the denial were the high emissions (8 million tons over 30 years) and the added costs to electricity consumers.

Humboldt Sawmill emits large amounts of CO2e and much more per kilowatt hour than natural gas.

We have been considering whether emissions from biomass electricity can be considered to be carbon neutral or negative. Since that is not the case in any time frame that is relevant to the climate crisis, we need to compare the biomass emissions with those of other sources of electricity. Figure 10 shows that using the IPCC carbon intensity values, burning biomass for power is far less efficient and far more carbon intensive than either coal or natural gas.

Figure 10. CO2 emissions for biopower, coal and gas[34]

Fuel	IPCC data on CO2 per mmbtu	Power plant efficiency	mmbtu/ MWh	kg CO2/MWh	lb CO2/MWh	Wood % greater than fossil fuels
Wood and Wood Residuals at 22.7% effic.	93.8	0.227	3.143	1,299	2,863	
Anthracite coal at 34% effic.	103.69	0.341	3.143	956	2,107	**36%**
Bituminous coal at 34% effic.	93.28	0.341	3.143	860	1,895	**51%**
Natural gas at 45.5% effic.	52.07	0.455	3.143	360	793	**261%**
Natural gas at 63% effic.	52.07	0.63	3.143	260	573	**400%**

Both biomass power and natural gas power have far more greenhouse gas emissions than the other renewable and carbon free sources in RCEA's resource plan (Figure 5). However, when compared to the natural gas-fired Humboldt Bay Generating Station, HSC 2020 greenhouse gas emissions are 30% greater for the biomass plant despite the fact that Humboldt Sawmill produced only 27% as much power (130,427 vs 484,333 megawatt hours).[35] That translates to 2.27 tons of CO2e for Humboldt Sawmill per megawatt hour vs. 0.47 for the Humboldt Bay Generating station. It is true these local figures omit upstream emissions for both natural gas and biopower, but they are a small proportion of the total emissions locally.[36] The local data accurately represent the contributions specific to Humboldt County. As Sterman noted, biomass power creates more CO2 in the present than even coal and "payback" times go well beyond 2050.

Whether and how much closing the Humboldt Sawmill biopower plant (or cuttings its emissions significantly) would help the climate over the crucial next 7 to 32 years depends in part on what the RCEA Board would do instead. We have suggested that the biopower should be replaced by the purchase of new wind or solar, even if it is necessary to wait a couple of years for additional resources to come online. That would be a net reduction in emissions of about 2 million metric tons of CO2e by 2030. But if RCEA chooses to use more natural gas as dispatchable power to replace the biopower, it would reduce the climate benefits in the long-term (40 to 100+ years) though mnimaly in the crucial years until 2030 (and 2045).

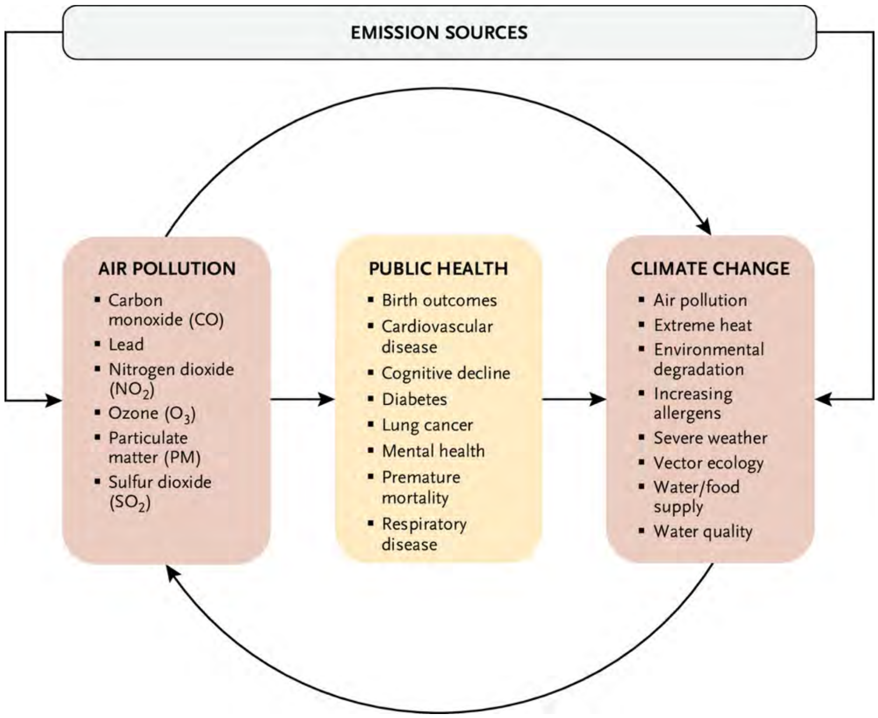
Air pollution and public health consequences of local biomass power

"Criteria pollutants" consist of particulate matter, carbon monoxide, nitrogen oxide, sulfur dioxide, lead, and reactive organic gases. They are regulated by the US Environmental Protection Agency under the National Ambient Air Quality Standards (NAAQS).

> Although there is some variability among the health effects of the six NAAQS pollutants, each has been linked to multiple adverse health effects including, among others, premature death, hospitalizations and emergency department visits for exacerbated chronic disease, and increased symptoms such as coughing and wheezing.[37]

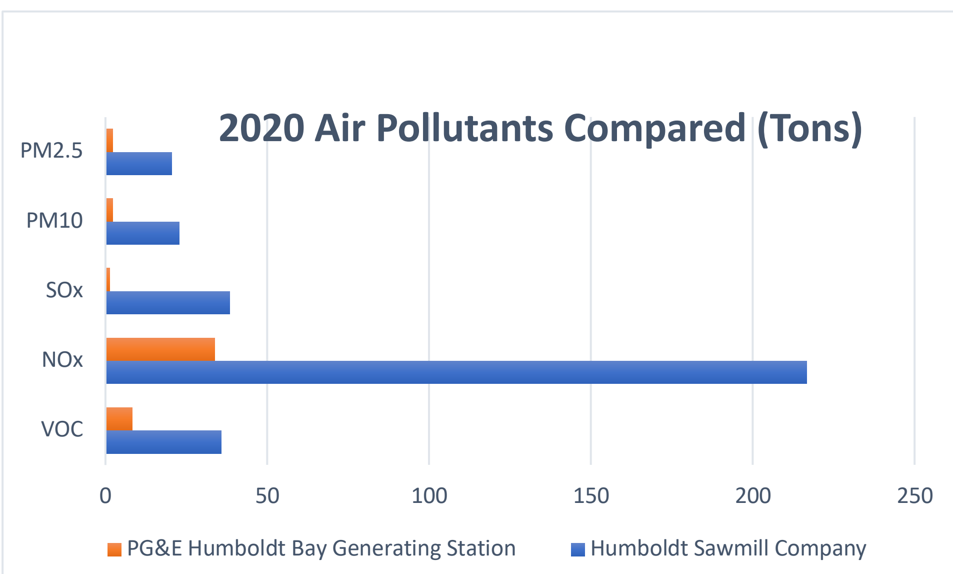
The figure below, from the New England Journal of Medicine, shows some of the ways critical pollutants harms health and are related to climate change in a feedback loop.[38]

Figure 11



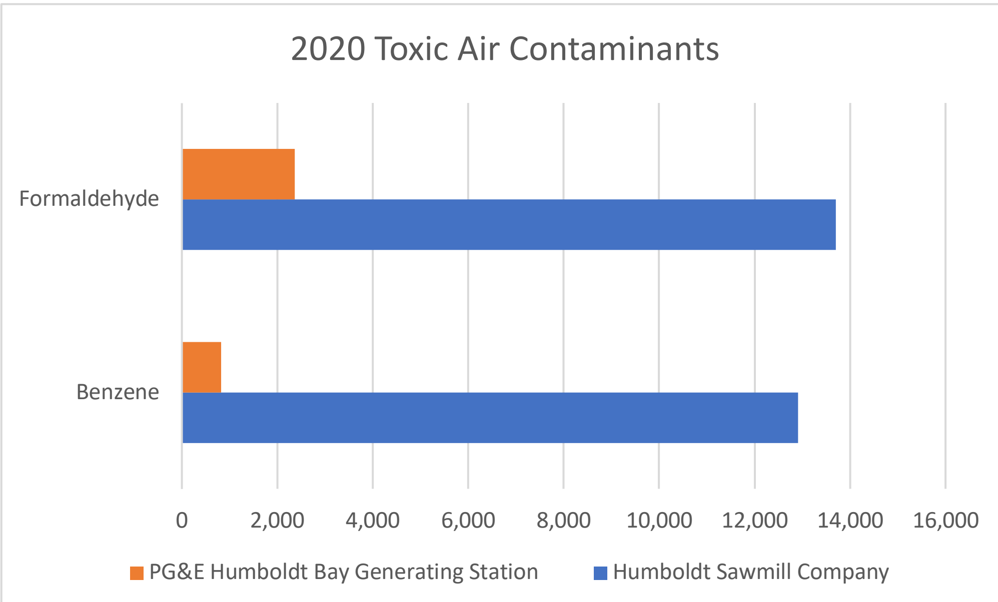
The graph below shows how the HBGS compares to the HSC in particulate matter, sulfur dioxide, nitrogen oxide, and volatile organic gases. (Lead is not part of CARB's data.[39]) Recall that although all the pollutants are emitted at far higher rates by HSC, HSC produces only 26% as much power.

Figure 12.



Another category of pollutants is Toxic Air Contaminants. The two chief ones emitted by HBGS and HSC are benzene and formaldehyde. Toxic Air Contaminants are defined by CARB as "an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health."[40] HSC emits thousands of metric tons of each per year: 5.8 times the formaldehyde and 15.6 times the benzene emitted by HBGS, despite producing far less electricity.[41]

Figure 13. Metric Tons of Toxic Air Contaminants



It is no wonder biomass power is considered a public health threat. Locally the Humboldt Del Norte Medical Society has called on RCEA to drop biomass from its energy mix. In 2016 a number of health organizations sent a letter to every member of Congress opposing the burning of biomass.[42] These included the Allergy & Asthma Network, the American Academy of Pediatrics, the American Lung Association, the American Public Health Association, the Asthma and Allergy Foundation of America, the National Association of County & City Health Officials, the National Environmental Health Association, and Physicians for Social Responsibility.

Although these criteria pollutants and toxic contaminants are the main public health threat from HSC, a pattern of violations of Clean Air Act and other public health and safety regulations by HSC call into question the capacity of the plant to meet even the minimal regulatory standards that apply to it. A 2022 investigation by Wendy Ring, MD, MPH, found the following.

> When the biomass plant bid for its original contract with RCEA in 2016, it reported only 1 air quality violation. From November 2015 through November 2016 the plant failed to submit monthly monitoring reports to the air district. When submitted, these reports subsequently showed over 700 violations of emissions limits.[43] While the plant has been under contract with RCEA, it has received 10 notices of violation of the Clean Air Act,[44] one settlement order for multi-year violations of the Clean Water Act,[45] and three serious OSHA violations resulting in worker injury.[46] Reviewing public documents

> obtained from the North Coast Unified Air Quality Management District I found multiple longstanding failures to enforce state and federal pollution laws at the biomass plant.[47]

Through a public records request, Dr. Ring obtained an April 14, 2017 letter from NCUAQMD Director Brian Wilson to Matthew Marshall, Director of RCEA, explaining the Humboldt Sawmill violations.[48] This letter was received just about a month *after* the approval of the Power Purchase Agreement contract between RCEA and HSC. The contract included an appendix in which HSC reported only one emissions violation and two others going back to 2013. Here are a number of quotations from Brian Wilson's letter:

- To date, HRC has over 1,044 violations since its restart which are available to the public through a Public Records Request….
- The District has many concerns about the nature and pattern of these multiple violations and the ability of HRC to continue to operate the biomass boilers in compliance with District permits and applicable air quality regulations, as these violations span an entire year for both boilers. In addition, the District has received over 60 complaints of ash and soot fallout from citizens in the towns of Scotia and Rio Dell just since December 2016.
- In accordance with EPA policy, the EPA has been notified of HRC's High Priority Violations of numerous federally enforceable regulations authorized by the Clean Air Act. In order to resolve the various violations, the District has provided a Settlement Agreement to HRC to settle and provide a path to ensure compliance. If HRC cannot come to agreement with the District that will bring them into compliance, the District will be forced to pursue alternate enforcement remedies. These may include action to suspend HRC's permits, obtain injunctive relief, obtain an abatement order and/or civil penalty recoveries.

Should RCEA be persuaded that continuing the contract with HSC is not in the public's interest, the fact that the contract was obtained by concealing multiple serious violations should allow a default without penalty. The full letter is attached as an Appendix.

In 2020 RCEA contracted with Michael Furniss, from Cal Poly Humboldt, for a report to the Board on biomass power. It concludes with this statement:[49]

> Ideally, the biomass plants would use the Best Available Control Technology (BACT) to limit air pollution effects. This is not currently the case as the plants were built and permitted long ago. Implementing state-of-the-art control of air pollution is a reasonable goal for any power purchased by RCEA, as the emissions are directly connected to the purchases, and public health is an agency responsibility. RCEA could consider adding financial incentives and contract language to provide air quality protection beyond what the State requires and be able to cancel contracts if emissions performance is substandard.

To the best of our knowledge this advice was not followed then but should be now.

Can the Humboldt Sawmill biopower plant be made cleaner?

First, how does HSC compare to other California biomass plants in terms of pounds of CO2 per net megawatt hour?[50] In Figure 14, there are two outliers with very high emissions per MWh. Of the other facilities, HSC is the third highest. Thus, there is reason to think HSC could improve its emissions performance.

Figure 14.

Biomass power plant emissions in 2018	Capacity (MW)	Total CO_2e (pounds) per net MWh
Ampersand Chowchilla Biomass Power	12.5	2,996
Burney Forest Products (BioRAM) (cogen)	31	3,768
Collins Pine Biomass Power (cogen)	12	19,120
DG Fairhaven	15	3,877
DTE Stockton Biomass Power (cogen)	50	3,298
HL Power (BioRAM)	35.5	2,980
Humboldt Sawmill Company (cogen)	32.5	5,016
Merced Power	12.5	3,220
Mt. Poso Cogeneration (cogen)	63.6	2,507
Pacific Ultrapower Chinese Station (BioRAM)	25.7	4,418
Rio Bravo Fresno Biomass Power (BioRAM)	27.8	3,150
Rio Bravo Rocklin Biomass Power (BioRAM)	27.8	3,435
Roseburg Forest Products (cogen)	13.4	4,967
SPI Anderson Biomass Power II (cogen)	30.1	4,480
SPI Burney Biomass Power (cogen)	20	4,736
SPI Lincoln Biomass Power (cogen)	19.2	5,314
SPI Quincy Biomass Power (cogen)	35.3	6,215
SPI Sonora Standard Biomass Power (cogen)	7.5	11,540
Wheelabrator Shasta Energy (BioRAM)	62.8	3,900
Woodland Biomass Power	28	3,464
Average for non-cogeneration plants		**3,515**

SB 1109 (Caballero) of 2022 required electrical corporations, including community choice aggregators like RCEA, to contract for electrical power from biomass plants. RCEA says the law does not apply to the RCEA/HSC contract. If it did the following provision would be applicable: "For purposes of this section, any incremental procurement of electricity products from bioenergy resources by a new contract or contract extension of five years or longer in duration shall be from a resource that meets emission limits equivalent to, or more stringent than, the applicable best available retrofit control technology, as determined by the local air pollution control district or air quality management district."[51] This is an attempt to at modestly clean-up emissions from the generally ancient fleet of biomass plants. But RCEA dodged the bullet.

It is not clear what such a retrofit control technology would look like. HSC uses the oldest of biopower technologies to create electricity from combusting woody biomass, called Riley Stoker travelling grate stoker boilers.[52] One step up is a technology called "fluidized bed technology." A much higher degree of emissions control is possible with gasification, as gasification heats at a very high temperatures without combustion to create syngas, which can be converted to vehicle fuel or combusted to make electricity.[53] In Dr. Fingerman's model, the biopower technology includes three options: a) current generation combustion plant, b) current generation integrated gasification and combustion plant, and c) next generation thermochemical plant.[54]

Figure 15 provides detailed data on different technology options.[55] "Just switching from a direct fired boiler to an integrated gasification combustion unit, criteria pollutant emissions are reduced by an order of magnitude."[56]

Figure 15.

Characteristic	*Current-Generation Biomass Combustion Power Plant*	Current-Generation Integrated Gasification/ *Combustion Power Plant*	*Next-Generation Thermochemical Conversion Power Plant*	*Next-Generation Thermochemical Conversion Bioalcohol and Power Plant*
Plant size (BDT/day)	450	450	450	450
Electricity (kWhr/BDT)	1000	1200	1400	550
Alcohol fuel (gallons/BDT)	—	—	—	80
Diesel fuel	—	—	—	50
Average net energy efficiency	20%	22%	28%	50%
Emissions (lb/MMBTU output)				
NOx	0.329	0.067	0.008	0.005
SOx	0.125	0.01	0.002	0.001
PM	0.269	0.03	0.032	0.018
CO	0.897	0.07	0.042	0.023
VOC	0.085	0.018	0.003	0.002
CO2	972	884	694	389

Alternative uses for biomass.

In 2021 the RCEA Board, clearly uncomfortable with a ten-year contract extension for biomass power, voted to create an MOU between RCEA and HSC that would ensure HSC considered alternatives to burning biomass that would emit fewer pollutants and be less warming.

So far the only response to this requirement was in 2022 – there was no response in the 2023 submission by HSC – when HSC said:[57]

> *Biofuels Opportunity*
>
> • In July 2021 consultant ICF provided HSC's sister company Humboldt Redwood Company with a proposal to perform a study on using forest biomass to make energy products as a Low Carbon Fuel Standard (LCFS) business opportunity and issue a follow-up request for information (RFI) to identify interested developers
> • HSC's sister company Mendocino Forest Products issued an RFI in February 2022 seeking interest in development of a biofuels facility using feedstock from the company's Mendocino and/or Humboldt County operations
> • They received several responses but consider most of them to require too much capital investment to be viable
> • They are in discussions with the companies with the most attractive offers

Because RCEA has offered such a sweet deal over ten years, HSC has little incentive to consider alternatives. The MOU has no requirements specifying when HSC would need to choose an alternative. It doesn't even contain a list of alternatives to be evaluated each year, such as the one in the Michael Furness report to the Board.

We have compiled a list of references to projects or processes which provide alternative uses for woody biomass. The endnotes contain several links to existing projects for each alternative.

1. Grant incentivized alternatives: The US Department of Agriculture has made a number of grants under the Inflation Reduction Act for bioenergy projects. Projects, some in California, include biochar, a gasification plan in Placer County, hydrogen from biomass, a kiln and boiler system upgrade.[58] California is investing $3 million in awards for projects in the Sierra Nevada that will create a Biomass Carbon Removal and Storage system that creates hydrogen, produce biofuels from forest waste using thermochemical conversion, a gasification plant on tribal land that produces carbon-negative liquid hydrogen fuel, and other biomass to hydrogen projects.[59]

2. Woody biomass for compost[60]

3. Bio-Char in conjunction with existing biopower plants.[61]

4. Biofuels. These are heavily incentivized by the Low Carbon Fuel Standard and the Inflation Reduction Act.[62]

5. Biomass to hydrogen.[63]

6. Durable wood products like GluLam and Oriented Strand Board.[64]

7. Nano-cellulose[65]

8. Biomass to plastics[66]

Recommendations

In order not to have RCEA, and all of us who are its customers, allowing HSC to continue to put 300,000 metric tons of CO2e into the atmosphere each year the RCEA Board needs to act.

Recommendation 1: No other biomass shall be contracted for beyond the HSC contract.

Recommendation 2: The HSC contract shall not be extended.

Recommendation 3: Due to the numerous air quality violations of HSC, the HSC contract should be cancelled as soon as the long-term renewable energy that it provides in the RCEA portfolio can be replaced by additive solar or wind. If this is not legally possible, the RCEA Board should modify the contract to require the HSC equipment be upgraded to Best Available Control Technology, which would significantly reduce both greenhouse gas and air pollution.

APPENDIX: Humboldt Sawmill Violations Described in 2017 Letter by the NCUAQMD

North Coast Unified
Air Quality Management District

707 L Street, Eureka, CA 95501
Telephone (707) 443-3093 FAX (707) 443-3099
http://www.ncuaqmd.org

April 14, 2017

Mr. Matthew Marshall Executive
Director
Redwood Coast Energy Authority (RCEA) 633
3rd Street
Eureka, CA 95501

Re: Status of HRC Non-Compliance and Notice of Violations

Dear Mr. Marshall:

This correspondence is in response to your inquiry as to the compliance status of the Humboldt Redwood Company (HRC) Title V Operating Permit #NCU 060-12 for the Scotia Sawmill (SSM) facility.

To date, the North Coast Unified Air Quality Management District (District) has issued numerous Notices of Violations (NOVs) to HRC for violations of its federally enforceable Title V Operating Permit at the SSM facility and additionally for its Hot Mix Asphalt Plant (#00974-1). To date, HRC has over 1,044 violations since its restart which are available to the public through a Public Records Request and are summarized as follows:

- 54 violations for exceeding Carbon Monoxide (CO) emission limitations from Boiler A (November 2015 through November 2016)
- 7 violations for exceeding CO emission limitations from Boiler A (December 2016 through February 2017)
- 45 violations for exceeding CO emission limitations from Boiler B (November 2015 through November 2016)
- 9 violations for exceeding CO emission limitations from Boiler A (December 2016 through February 2017)
- 407 violations for exceeding opacity limitations from Boiler A (April 2016 through December 2016)
- 57 violations for exceeding opacity limitations from Boiler A (January 2017 through February 2017)
- 318 violations for exceeding opacity limitations from Boiler B (April 2016 through December 2016)
- 88 violations for exceeding opacity limitations from Boiler B (January 2017 through February 2017)
- Violations for failure to maintain an operation COMS for both Boiler A and Boiler B (from November 2015 through February 2016)

- Violations for failure to provide semi-annual compliance certification for both Boiler A and Boiler B (for January 2016 to June 2016 period)
- Violations for failure to provide monthly monitoring reports (November 2015 through November 2016)
- Violation for failure to conduct a source test of the package-type natural gas fueled boiler
- Violation for failure to maintain an hourly log of the pressure drop across the baghouse of the HMA plant (April 5, 2016)
- Violation for failure to continuously record the temperature at the outlet of HMA plant mixing drum ((April 5, 2016 through June 15, 2016)
- Violation for failure to log and maintain the finished HMA temperature (June 10, 2016)
- Violations for three separate failures to maintain the finished HMA temperature (June 14, 2016)
- Violations for beginning construction of the Dry Kilns #4 & #5 without an ATC permit (September 1, 2016 through October 12, 2016)

The District has many concerns about the nature and pattern of these multiple violations and the ability of HRC to continue to operate the biomass boilers in compliance with District permits and applicable air quality regulations, as these violations span an entire year for both boilers. In addition, the District has received over 60 complaints of ash and soot fallout from citizens in the towns of Scotia and Rio Dell just since December 2016.

In accordance with EPA policy, the EPA has been notified of HRC's High Priority Violations of numerous federally enforceable regulations authorized by the Clean Air Act. In order to resolve the various violations, the District has provided a Settlement Agreement to HRC to settle and provide a path to ensure compliance. If HRC cannot come to agreement with the District that will bring them into compliance, the District will be forced to pursue alternate enforcement remedies. These may include action to suspend HRC's permits, obtain injunctive relief, obtain an abatement order and/or civil penalty recoveries.

If you have any further questions or need additional information, please feel free to contact me.

Sincerely,

Brian Wilson
Air Pollution Control Officer

Endnotes:

[1] The relationships between Humboldt Sawmill Company, Humboldt Redwood Company, and Mendocino Redwood Company are explained at: https://www.getredwood.com/our-story#:~:text=Humboldt%20Redwood%20Company%2C%20LLC%20(HRC,timberlands%20in%20Humboldt%20County%2C%20California. And: https://www.hrcllc.com/palco-press-articles/scotia-back-lumber-business-former-pacific-lumber-sawmill-returns-work

[2] https://www.who.int/health-topics/air-pollution#tab=tab_1

[3] Humboldt County 2015 Emissions Inventory data show 819,212 metric tons of mobile transportation emissions, of which 48.1% is emitted by passenger vehicles, which equals: 394,041 metric tons. The 2020 Humboldt Sawmill emissions of 295,562 is 75% of all passenger vehicle emissions. Fun fact: all 34 Los Angeles police helicopters, which fly 365 days 24 hours a day "burned more than 1.2 million gallons of fuel, thereby releasing approximately 11,100 metric tons of carbon dioxide [in a year]." Humboldt Sawmill released 27 times more CO2 than the helicopters. https://heated.world/p/the-climate-cost-of-las-police-choppers

[4] Nicholas J. Leach, et al. "Current level and rate of warming determine emissions budgets under ambitious mitigation." Nature Geoscience 11, no. 8 (2018): 574-579.

[5] Allen, Myles, Mustafa Babiker, Yang Chen, and Heleen C. de Coninck. "IPCC SR15: Summary for policymakers." In *IPCC Special Report Global Warming of 1.5 ºC*. Intergovernmental Panel on Climate Change, 2018.

[6] Thomas, Adelle, April Baptiste, Rosanne Martyr-Koller, Patrick Pringle, and Kevon Rhiney. "Climate change and small island developing states." *Annual Review of Environment and Resources* 45 (2020): 1-27. https://www.annualreviews.org/doi/pdf/10.1146/annurev-environ-012320-083355

[7] https://www.nature.com/articles/s41893-023-01132-6/figures/5

[8] https://www.science.org/doi/abs/10.1126/science.abn7950 A full-text preprint is available at: https://ore.exeter.ac.uk/repository/bitstream/handle/10871/131584/Tipping%20points.pdf?sequence=1 Note that to have avoided tipping points the authors say we would have had to limit warming to 1.0°C.

[9] Revesz, Richard L., Peter H. Howard, Kenneth Arrow, Lawrence H. Goulder, Robert E. Kopp, Michael A. Livermore, Michael Oppenheimer, and Thomas Sterner. "Global warming: Improve economic models of climate change." *Nature* 508, no. 7495 (2014): 173-175. https://www.nature.com/articles/508173a

[10] https://www.bloomberg.com/news/articles/2023-05-04/transcript-zero-episode-37-how-the-bezos-earth-fund-spends-its-billions#xj4y7vzkg

[11] 43% is the figure the world must reduce emissions. The US is the second largest emitter and California the second largest state emitter of greenhouse gases. The Paris Accord agreed that developing countries would not be held to the same standard as the developed countries that have caused global warming through fossil fuel use. So countries like the US have to reduce more than the average.

[12] Humboldt's Electric Future: How the Redwood Coast Energy Authority is Buying and Building Local Renewable Power Resources...and How You Can Participate. RCEA. April 2023

[13] Staff Report. Agenda Item # 5.2, February 25, 2021, to RCEA Board of Directors from Richard Engel, Director of Power Resources, Biomass Power Purchase Agreement with Humboldt Sawmill Company.

[14] See page 9 of Humboldt's Electric Future: How the Redwood Coast Energy Authority is Buying and Building Local Renewable Power Resources...and How You Can Participate. RCEA. April 2023.

[15] "Prices from a sample of recent contracts average around $20/MWh (levelized) in the West and $30-40/MWh elsewhere in the continental US." Lawrence Berkeley National Laboratory, 2022 Utility Scale Solar. https://emp.lbl.gov/utility-scale-solar#:~:text=Prices%20from%20a%20sample%20of,elsewhere%20in%20the%20continental%20US.

[16] Some additional dispatchable electricity from the gas-powered Humboldt Generating Station would also need to be purchased. However, as the 2023 RCEA report notes, it doesn't matter where the electrons come from in our electricity, it only matters what is in the grid. Buying new solar instead of biomass electricity puts that amount into the grid. See below for why even natural gas is preferable to biomass.

[17] Morris, G., 2000. *Biomass Energy Production in California: The Case for a Biomass Policy Initiative; Final Report* (No. NREL/SR-570-28805). National Renewable Energy Lab.(NREL), Golden, CO (United States). https://www.nrel.gov/docs/fy01osti/28805.pdf

[18] https://redwoodenergy.org/wp-content/uploads/2017/08/RCEA-Board-Meeting-Slides-3-20-17.pdf

[19] HSC RCEA MOU Data Reporting Template Feedstock, Reporting Period: May 1, 2022-April 30, 2023

[20] The CPUC's 15 year old "interim" provision of a waiver of greenhouse gas emissions for biomass power has recently been challenged by a legal petition requesting a rule-making on this issue. It argues that the exemption was based on erroneous data and cites multiple current sources that show no waiver is justified because biomass power is not carbon neutral. https://www.biologicaldiversity.org/programs/climate_law_institute/pdfs/23-06-20-Ctr-Biol-Div-Emission-Performance-Standard-Petition.pdf?_gl=1*1dg2y01*_gcl_au*MjA3MjQwNTg1My4xNjg4MDg4OTk0

[21] Mary S. Booth, *Not carbon neutral: Assessing the net emissions impact of residues burned for bioenergy*, 13 Env't Rsch. Letters 035001 (2018), https://doi.org/10.1088/1748-9326/aaac88

[22] Fingerman, K. R., et al. (2023). "Climate and air pollution impacts of generating biopower from forest management residues in California." Environmental Research Letters 18(3).

[23] Fingerman. Ibid. Also see Jerome Laganiere et al., Range and uncertainties in estimating delays in greenhouse gas mitigation potential of forest bioenergy sourced from Canadian forests, 9 GCB Bioenergy 358 (2017), https://doi.org/10.1111/gcbb.12327.

[24] Law, Beverly E., Tara W. Hudiburg, Logan T. Berner, Jeffrey J. Kent, Polly C. Buotte, and Mark E. Harmon. "Land use strategies to mitigate climate change in carbon dense temperate forests." *Proceedings of the National Academy of Sciences* 115, no. 14 (2018): 3663-3668. https://www.pnas.org/doi/epdf/10.1073/pnas.1720064115

[25] John Sterman et al., Does wood bioenergy help or harm the climate?, 78 Bulletin of the Atomic Scientists 128 (2022). Manomet Ctr. for Conservation Scis., *Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy Resources* (2010) at 103, https://www.mass.gov/doc/manometbiomassreportfullhirezpdf/download

[26] Laganiere, op cit.

[27] Manomet Center for Conservation Sciences. 2010. Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy Resources. Walker, T. (Ed.). Contributors: Cardellichio, P., Colnes, A., Gunn, J., Kittler, B., Perschel, R., Recchia, C., Saah, D., and Walker, T. Natural Capital Initiative Report NCI-2010- 03. Brunswick, Maine.

[28] A small sampling: IPCC, *Frequently Asked Questions*, *Intergovernmental Panel on Climate Change (IPCC) Task Force on National Greenhouse Gas Inventories*, http://www.ipcc-nggip.iges.or.jp/faq/faq.html.; Giuntoli, J., S. Searle, R. Jonsson, A. Agostini, N. Robert, Stefano Amaducci, L. Marelli, and A. Camia. "Carbon accounting of bioenergy and forest management nexus. A reality-check of modeling assumptions and expectations." *Renewable and Sustainable Energy Reviews* 134 (2020): 110368. Giuntoli, J., et al. (2021). "A systems perspective analysis of an increased use of forest bioenergy in Canada: Potential carbon impacts and policy recommendations." *Journal of Cleaner Production* 321. Morris, Gregory. "Bioenergy and greenhouse gases." *Green Power Institute, The Renewable Energy Program of the Pacific Institute* (2008). https://pacinst.org/wp-content/uploads/2008/05/Bioenergy_and_Greenhouse_Gases.pdf . Composting is a better alternative tan biopower: Silver, Whendee, Sintana Vergara, Allegra Mayer. (University of California, Berkeley). 2018. *Carbon Sequestration and Greenhouse Gas Mitigation Potential of Composting and Soil Amendments on California's Rangelands.* California's Fourth Climate Change Assessment, California Natural Resources Agency. Publication number: CCCA4-CNRA- 2018-002.

[29] A different metric than GWP100 would be necessary for these purposes. GWP20, which is in wide use for short-lived climate pollutants like methane, would be a possibility. See: Cooper, S. J. G., et al. (2020). "Exploring temporal aspects of climate-change effects due to bioenergy." Biomass and Bioenergy **142**.

[30] Geronimo, Carisse, Sintana E. Vergara, Charles Chamberlin, and Kevin Fingerman. "Overlooked Emissions: Methane Generation from Woody Biomass Storage." *Available at SSRN 3988712*.

[31] https://www.masslive.com/news/2022/08/wood-burning-power-plants-in-mass-wont-qualify-for-renewable-energy-credits-local-activists-are-celebrating.html

[32] https://minister.dcceew.gov.au/bowen/media-releases/native-forest-wood-waste-removed-renewable-energy-target

[33] https://www.wwf.eu/?2128466/500-scientists-tell-EU-to-end-tree-burning-for-energy

[34] https://forestdefenders.eu/biomass-plant-co2-emissions-an-explanation/

[35] The total GHG emissions are from California Air Resource Board Pollution Mapping Tool https://ww2.arb.ca.gov/capp-resource-center/data-portal/carb-pollution-mapping-tool. 2020 production of energy is from https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/quarterly-fuel-and-energy-report-qfer-1 These are direct annual smokestack emissions not the life cycle emissions relevant to carbon neutrality over years.

[36] "[T]he proportion of GHG emissions from each lifecycle stage differs by technology. For fossil-fueled technologies, fuel combustion during operation of the facility emits the vast majority of GHGs." *Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update. Life* 800: 1-000. https://www.nrel.gov/docs/fy21osti/80580.pdf The 2015 Humboldt County Emissions Inventory data show "upstream" emissions for natural gas as 11,162 metric tons, only 5 percent of the HBGS 227,214 emissions in 2020. Upstream emissions for 2020 could not be found.

[37] From https://ww2.arb.ca.gov/criteria-pollutant-emission-inventory-data

[38] Keswani, Anjeni, Hana Akselrod, and Susan C. Anenberg. "Health and clinical impacts of air pollution and linkages with climate change." *NEJM Evidence* 1, no. 7 (2022): EVIDra2200068. https://evidence.nejm.org/doi/pdf/10.1056/EVIDra2200068?download=true

[39] A more complete list of CARB toxics does show 147 lbs of lead emitted in 2020 for HSC; HBGS is not listed. https://www.arb.ca.gov/carbapps/pollution-map/?_ga=2.63244207.14248823.1687630012-431780188.1682796728

[40] https://ww2.arb.ca.gov/resources/documents/carb-identified-toxic-air-contaminants

[41] Data from: California Air Resource Board Pollution Mapping Tool https://ww2.arb.ca.gov/capp-resource-center/data-portal/carb-pollution-mapping-tool.

[42] https://www.naccho.org/uploads/downloadable-resources/Policy-and-Advocacy/Health-organizational-letter-health-impacts-of-biomass.pdf

[43] In the application for the initial contract with RCEA, HSC included a "Permit and notice of violation summary." It shows only one violation of emissions limits. In 2016 monthly reports of emissions were required by the NCUAQMD and were not submitted until the contract was signed. After submission the air quality district cited HSC for 700 emissions violations and many others. See the Appendix.

[44] NCUAQMD multiple Notices of Violation obtained via public record request by Wendy Ring MD, MPH

[45] North Coast Regional Water Board Settlement Agreement with Humboldt Sawmill Company https://www.waterboards.ca.gov/northcoast/board_decisions/tentative_orders/pdf/2022/220712%20Final%20Stipulated%20Agreement%20HSC.pdf November 2022

[46] US Department of Labor https://www.osha.gov/ords/imis/establishment.inspection_detail?id=1520807.015

[47] Multiple documents obtained by public record request and absence of requested documents (because they didn't exist but should have) from the North Coast Unified Air Quality Management District.

[48] Available at: https://acrobat.adobe.com/id/urn:aaid:sc:US:4b82b9c6-8bbd-40b5-b826-ac560aea223f

[49] Biomass Power in Humboldt County. Summary of Workshops, Consultations, and Research, Prepared by Michael J. Furniss, Climate and Forests Consultant to Redwood Coast Energy Authority, January 2020; updated October 2021.

[50] Overall average GHG Intensity of electricity generation in California comes from Cal. Air Res. Bd., 2000- 2018 Emissions Trends Report Data (2020 Edition), https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2018/2000_2018_ghg_inventory_trends_figures.xlsx.

[51] https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220SB1109 September 16, 2022 (Chapter 364, Statutes of 2022)
[52] https://www.calbiomass.org/facilities/greenleaf-eel-river-power/
[53] The process goes back at least to 1807 when syngas was used in London street lamps.
[54] https://cbrec.schatzcenter.org/forest/forestry.html
[55] Carreras-Sospedra, M., et al. (2016). "Assessment of the emissions and air quality impacts of biomass and biogas use in California." J Air Waste Manag Assoc **66**(2): 134-150.
https://www.tandfonline.com/doi/full/10.1080/10962247.2015.1087892?scroll=top&needAccess=true&role=tab
[56] Ibid.
[57] First Annual Report on Consultations with Humboldt Sawmill Company Regarding Alternative Biomass Uses. Presentation to RCEA Board of Directors June 23, 2022
[58] https://biomassmagazine.com/articles/20117/usda-funds-wood-energy-projects
[59] https://www.conservation.ca.gov/index/Pages/News/State-Invests-3-Million-Convert-Forest-Waste-into-Carbon-Negative-Fuel.aspx
[60] https://www.energy.ca.gov/sites/default/files/2019-11/Agriculture_CCCA4-CNRA-2018-002_ADA.pdf, https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf, **https://calrecycle.ca.gov/organics/erosion/firedamage/**, https://www.kelowna.ca/city-services/garbage-recycling-yard-waste/okanagan-compost/ogogrow/how-ogogrow-made, http://www.sawdustsupply.com/groco-soil-conditioner-mulch, https://nwbiosolids.org/whats-happening/member-spotlight/2015/january/city-arlington-wa, www.olyfish.com
[61] https://pacificbiochar.com/how-we-produce-biochar/
[62] https://www.canadianbiomassmagazine.ca/california-selects-8-projects-for-forest-biomass-to-biofuels-pilot-program/, https://velocys.com/projects/bayou-fuels/
[63] https://www.sgh2energy.com/technology/#techheader, https://www.yosemiteclean.com/, https://www.enr.com/articles/53219-california-plant-would-convert-wood-waste-into-hydrogen-fuel
[64] Cabiyo, B., et al. (2021). "Innovative wood use can enable carbon-beneficial forest management in California." Proc Natl Acad Sci U S A **118**(49). And https://www.apawood.org/osb. And https://www.naturallywood.com/projects/?projects_type=mass-timber-demonstration-program&projects_structural=all&projects_material=all&projects_location=all&tax=true. And https://www.millwoodinc.com/Wood-Products-Pallets-New-Pallets-Pressed-Wood
[65] https://www.fpl.fs.usda.gov/research/facilities/nanocellulose_pilot-plant.php
[66] https://bioplasticsnews.com/tecnaro/, https://woodly.com/products/, https://www.upmformi.com/biocomposite-products/upm-formi-ecoace/, https://www.treston.us/news/product-launch-treston-biox-first-sustainable-wood-based-bioplastic-storage-option-industry,https://www.sciencedaily.com/releases/2021/03/210325190243.htm#:~:text=Summary%3A,world's%20most%20pressing%20environmental%20issues.