ADEQ Arizona Department of Environmental Quality DRAFT TECHNICAL SUPPORT DOCUMENT

TECHNICAL REVIEW AND EVALUATION OF APPLICATION FOR AIR QUALITY PERMIT No. 97559

I. INTRODUCTION

This Class I renewal permit is issued to Novo BioPower, LLC for the continued operation of a nominal 24-megawatt (MW) biomass fired electric generating facility. Permit No. 97559 renews and supersedes Permit No. 69960.

A Class I permit is required because the facility's potential to emit (PTE) for particulate matter (PM), sulfur dioxide (SO₂), nitrogen oxides (NO_x) and carbon monoxide (CO) is above major source thresholds per Arizona Administrative Code (A.A.C.) R18-2-101.75, and they have accepted voluntarily emissions limits to avoid prevention of significant deterioration (PSD). Permit No. 69960 had an expiration date of July 26, 2023, and the Permittee submitted the application for this permit renewal on January 26, 2023 and made an amendment to it on January 27, 2023. The submission of the application met the permit condition requiring that a complete and timely application be submitted by the Permittee at least six (6) months, but no earlier than eighteen (18) months, prior to the expiration date of the current permit.

A. Company Information

Facility Name:	Novo BioPower, LLC
Mailing Address:	P.O. Box 2649, Snowflake, AZ 85937
Facility Location:	15 Miles West of Snowflake on Spur Route 277, Snowflake, AZ 85937

B. Attainment Classification

The facility is located in Navajo County, an area that is either unclassified or classified as being in attainment for all criteria air pollutants.

II. PROCESS DESCRIPTION

A. Process Description

The facility is fueled by bark, biomass and waste wood from nearby forest salvage operations. It generates power using a nominal 340 million British thermal unit per hour (MMBtu/hr) boiler. The fuel is fired in the boiler to produce steam that is used to operate the steam turbine to generate electricity. The spent steam from the turbine is sent to a condenser to condense the steam back to water for reuse in the boiler. Water from the cooling towers is used to condense the steam in the condenser. Natural gas is used as a supplemental fuel during startups, shutdowns and malfunctions.

B. Control Devices

The boiler stack is the primary source of air pollutant emissions. The pollutants released in the stack emissions are PM, SO₂, NO_x, CO, volatile organic compounds (VOCs) and

hazardous air pollutants (HAPs). Particulate matter emissions are controlled using fabric filters and multiclone dust collector. The boiler is equipped with selective non-catalytic reduction (SNCR) technology to control NO_x emissions and a sodium bicarbonate injection system to control hydrogen chloride (HCl) emissions.

C. Process Flow Diagram

The process flow diagram of this facility can be found in Appendix A.

III. COMPLIANCE HISTORY

A. Physical Inspections and Compliance Certification Reviews

During the 5-year permit term under Permit No. 69960, the facility had eight (8) physical inspections and nine (9) compliance certification reviews. No deficiencies were noted during the physical inspections or compliance certification report reviews.

B. Permit Deviation and Excess Emissions Report Reviews

During the 5-year permit term under Permit No. 69960, this facility had one (1) deviation report review and no excess emissions report review.

Inspection ID 385659

On November 1, 2021, it was reported that the facility unknowingly used an expired calibration gas cylinder from July 15, 2021 to October 27, 2021 for the calibration of the HCl CEMS. After the calibration gas cylinder was replaced with a certified calibration gas cylinder, all calibrations passed.

C. Performance Tests Conducted and Results

During the 5-year permit term under Permit No. 69960, the performance tests conducted and results are shown in Table 1: **Performance Test Results**.

The PM performance test conducted in August 2022 failed because it was not conducted under normal and representative operating conditions. In the past, the biomass boiler at this facility used to burn a wide variety of fuels and would lead to potentially high HCl emissions. Therefore, this facility began to operate and maintain a sodium bicarbonate injection system to reduce HCl emissions in 2013. In 2016, a continuous emissions monitoring system (CEMS) was installed and started to operate to more accurately monitor and report HCl emissions. Since then, the fuel being burned in the boiler has been controlled and limited to a very small range of sources and the chlorine content in these fuels is much lower and consistent. Thus, the facility has been able to significantly reduce its HCl emissions to a steadily low level. When the time comes to conduct their annual Relative Accuracy Test Audit (RATA), it is nearly impossible to pass the RATA within the 20% rolling-average limit of 9 tons/yr due to the current low HCl emissions. In order to pass the RATA, as well as to demonstrate controlled emissions at an elevated level, the facility had to use a kind of fuel from the green waste site at the Salt River Landfill with significantly higher levels of chlorine in the boiler.

Usually, the performance test for all the other pollutants was not conducted on the same day when HCl RATA was conducted because the fuel from the green waste site at the Salt River Landfill with significantly higher levels of chlorine had to be used in the biomass boiler in order to pass the HCl RATA as mentioned above, which does not represent normal operating conditions. In August 2022, a new company was contracted to conduct the performance test and HCl RATA, and conducted the performance test for all the other pollutants and HCl RATA on the same day with the fuel from the green waste site at the Salt River Landfill. This fuel not only has significantly higher levels of chlorine, but also caused higher emissions of condensable PM, so the PM performance test did not pass. In November 2022, the PM performance test was conducted again under normal operating conditions and passed.

Emission Unit	Pollutant	Date of Test	Results of Performance Test
Boiler	HCl RATA	August 9, 2018	Pass
Boiler	PM, Opacity,		
	Single HAP,	August 21-22, 2018	Pass
	Total HAPs		
Boiler	HCl RATA	August 8, 2019	Pass
Boiler	PM, Opacity,		
	Single HAP,	August 20-21, 2019	Pass
	Total HAPs		
Boiler	HCl RATA	August 12, 2020	Pass
Boiler	PM, Opacity,		
	Single HAP,	August 18-19, 2020	Pass
	Total HAPs		
Boiler	HCl RATA	HCl RATA August 17, 2021	
Boiler	PM, Opacity,		
	Single HAP,	August 25-26, 2021	Pass
	Total HAPs		
Boiler	Opacity,		
	Single HAP,	August 22 24 2022	Doog
	Total HAPs,	August 23-24, 2022	rass
	HCl RATA		
Boiler	PM	August 23-24, 2022	Failed*
Boiler	PM	November 1, 2022	Pass

Table 1: Performance Test Results

* Retested and passed on November 1, 2022.

IV. EMISSIONS

The potential to emit (PTE) was calculated based on the emission limits in the permit, the EPA's Compilation of Air Pollution Emission Factors (AP-42 Section 3.3), emission factors from State & Local Emissions Inventory System (SLEIS), and performance test results. This facility is not a categorical source listed in A.A.C. R18-2-101.23. Therefore, the PTE only includes non-fugitive emissions and is provided in Table 2 below. The facility has a PTE more than major source

thresholds of PM, NO_X , SO_2 , and CO. The emission changes from the last permit action are not because of physical or operational changes and are due to the changes in calculation methodologies.

Pollutant	PTE from (LTF No. 87253)	Change in PTE	РТЕ	Permitting Exemption Threshold	Minor NSR Triggered?
NO _X	242.7	- 1.4	241.3	20	No
PM	126.6 ¹	0	126.6 ¹	N/A	N/A
PM ₁₀	34.5 ²	- 3.4	37.9 ²	7.5	No
PM _{2.5}	34.1 ²	- 3.4	37.5 ²	5	No
СО	243.9	- 0.6	243.3	50	No
SO_2	225.1	- 0.1	225.0	20	No
VOCs	24.2	- 0.1	24.1	20	No
Single HAP	< 9	0	< 9	N/A	N/A
Total HAPs	< 22.5	0	< 22.5	N/A	N/A
GHG (CO ₂ e)	314,505	0	314,505	N/A	N/A

 Table 2: Potential to Emit (tpy)

1 – From emission limit in the permit.

2 – From performance test results.

V. MINOR NEW SOURCE REVIEW (NSR)

Minor new source review is required if the emissions of any physical change or change in the method of an operation of an emission unit or stationary source results in an increase in emissions of any regulated minor NSR pollutant by an amount equal to or greater than the permitting exemption threshold (PET). As shown in Table 2 above, the emission increases resulting from this permit renewal are all below the permitting exemption thresholds and thus, minor NSR is not triggered at this time.

VI. VOLUNTARILY ACCEPTED EMISSION LIMITATIONS AND STANDARDS

The facility has accepted the following emission limits in Table 3 for the boiler to avoid triggering new source review for criteria pollutants and the major source threshold for HAP emissions. The permit numbers and years when the emission limits were incorporated are also shown in Table 3.

Table 3: Voluntarily Accepted Emission Limits for Boiler

Pollutants	Emission Limits	Permit No.	Year
NO _X	240 tpy	36183	2006
SO_2	225 tpy	36183	2006
СО	243 tpy	87253	2021
Single HAP	< 9 tpy	36183	2006
Total HAPs	< 22.5 tpy	36183	2006

VII. APPLICABLE REGULATIONS

Table 4 identifies applicable regulations and verification as to why that standard applies. The table also contains a discussion of any regulations the emission unit is exempt from.

Unit & Year	Control Device	Rule	Discussion
Boiler (Reconstructed 2006)	Fabric Filters, Multiclone Dust Collector, SNCR	NSPS 40 CFR Part 60 Subpart Db	The regulation is applicable to boilers that are new, modified or reconstructed after June 19, 1984, and that have a heat input capacity greater than 100 MMBtu/hr. This is applicable to the boiler because it was reconstructed in 2006 and has a maximum heat input capacity of 340 MMBtu/hr.

Table 4: Applicable Regulations

Unit & Year	Control Device	Rule	Discussion	
		NESHAP 40 CFR Part 63 Subpart JJJJJJ	The regulation is applicable to existing area sources that have boilers with a maximum heat input capacity greater than 10 MMBTU/hr and that are constructed before June 4, 2010. This is applicable to the boiler because it is in an area source, was reconstructed in 2006 and has a maximum heat input capacity of 340 MMBtu/hr.	
Cooling Tower	N/A	A.A.C. R18-2-702.B R18-2-702.C R18-2-730.A.1	The regulations listed are applicable to unclassified sources.	
Material Handling Operations	Control Measures	A.A.C.: R18-2-702.B R18-2-702.C R18-2-730.A.1	The regulations listed are applicable to unclassified sources.	
Internal Combustion Engine	N/A	A.A.C. R18-2-306 R18-2-719 NESHAP 40 CFR Subpart ZZZZ	The regulations are applicable to stationary reciprocating internal combustion engines manufactured before June 12, 2006.	
Fugitive Dust Sources	Water Trucks, Dust Suppressants	A.A.C. R18-2 Article 6 A.A.C. R18-2-702	These standards are applicable to all fugitive dust sources at the facility.	
Abrasive Blasting	Wet blasting; Dust collecting equipment; Other approved methods	A.A.C. R-18-2-702 A.A.C. R-18-2-726	These standards are applicable to any abrasive blasting operation.	
Spray Painting	Enclosures	A.A.C. R18-2-702 A.A.C. R-18-2-727	These standards are applicable to any spray painting operation.	
Demolition/Renovation	N/A	A.A.C. R18-2- 1101.A.12	This standard is applicable to any asbestos related demolition or renovation operations.	

VIII. PREVIOUS PERMIT REVISIONS AND CONDITIONS

A. Previous Permit Revisions

Table 5 provides a description of the permit revisions made to Permit No. 69960 during the previous permit term.

Table 5: Permit Revisions to Per	rmit No. 69960
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Permit Revision No.	Permit Revision Type	Brief Description
87253	Significant Permit Revision (SPR)	This SPR authorized the facility to increase the CO emission limit from the boiler stack from 240 tons per year to 243 tons per year on a 365-day rolling total, and required the facility to hire a third-party vendor to conduct a study on the root cause analysis of the increase in CO emissions and methods to optimize CO emissions.

B. Changes to Current Permit

Table 6 addresses the changes made to the sections and conditions from Permit No. 69960:

Table 6:	Previous	Permit	Conditions

Section	Determination		on	Commonte	
No.	Added	Revised	Deleted	Comments	
A ++ ·· A "		v		General Provisions:	
Au. A		Λ		Revised to represent the most recent template language	
				Facility-Wide Requirements:	
Att. "B"		v		Revised to represent the most recent template language,	
Section I		Λ		added more frequent fuel chlorine content analysis	
				requirement.	
				Boiler Requirements:	
				Updated A.A.C. R18-2-306.A.2 citation and some other	
Att. "B" Section II		X		citations, replaced the HCl CEMS requirements with	
				performance test requirements, reduced the HCl emission	
				limit, added initial test requirement for oxygen CMS if a	
				new CMS will be installed.	
Att "B"				Other Periodic Activities:	
Section VI		Х		Added visible emissions monitoring to abrasive blasting	
Section VI				and spray painting activities.	
Att "D"				Internal Combustion Engines:	
All. D		Х	Х	Updated the fuel limitation to match the emission factor	
Section VII				used in emission calculations.	
	Equipment List:			Equipment List:	
A ++ "C"		Х		Revised to reflect the most recent equipment operating at	
Au. C				the facility and to include equipment information	
				provided.	

IX. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS

Table 7 contains an inclusive but not an exhaustive list of the monitoring, recordkeeping and reporting requirements prescribed by the air quality permit. The table below is intended to provide insight to the public for how the facility is required to demonstrate compliance with the emission limits in the permit. Records are required be kept for a minimum of five (5) years as outlined in Section XII of Attachment "A" of the permit.

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Boiler	РМ	0.085 lb/MMBtu	Maintain and operate a continuous opacity	Maintain logs of all	
	Opacity	20% (6-minute average); 27% (one 6-minute period)	monitoring system (COMS), conduct inspections and perform maintenance on the baghouse and multicyclone dust collector, conduct annual performance tests for particulate matter and opacity.	keep a written copy of the manufacturer's recommended inspection and maintenance schedule on the baghouse and multicyclone dust collector. Keep data and test reports for continuous monitoring.	Submit electronic semiannual reports for emissions of opacity. If there is an excursion, report it.
	NO _X	240 tons/yr	Calibrate, maintain, and operate a CEMS, calibrate, maintain, and operate a flow measurement sensor to measure the stack gas volumetric flow rate.	Maintain a 365-day rolling total of NO _x emissions, keep data for continuous monitoring.	Submit semiannual compliance monitoring report and electronic semiannual reports for emissions.
	СО	243 tons/yr	Calibrate, maintain, and operate a CEMS, calibrate, maintain, and operate a flow	Maintain a 365-day rolling total of CO emissions, keep	Submit semiannual compliance monitoring report and

Table 7: Permit No. 97559

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			measurement sensor to measure the stack gas volumetric flow rate.	data for continuous monitoring.	electronic semiannual reports for emissions.
	SO ₂	225 tons/yr	Calibrate, maintain, and operate a CEMS, calibrate, maintain, and operate a flow measurement sensor to measure the stack gas volumetric flow rate.	Maintain a 365-day rolling total of SO ₂ emissions, keep data for continuous monitoring. Maintain records of fuel supplier certifications of sulfur content of the natural gas being combusted.	Submit semiannual compliance monitoring report and electronic semiannual reports for emissions.
	Total HAPs	22.5 tons/yr	Conduct annual performance tests.	Keep data and test reports.	Report performance test results.
	Single HAP	9 tons/yr	Conduct annual performance tests.	Keep data and test reports.	Report performance test results.
	HCl	9 tons/yr	Calibrate, maintain, and operate a CEMS, calibrate, maintain, and operate a flow measurement sensor to measure the stack gas volumetric flow rate.	Maintain a 365-day rolling total of HCl emissions, keep data for continuous monitoring.	Submit semiannual compliance monitoring report and electronic semiannual reports for emissions.
Cooling Tower	Opacity	20%	Conduct monthly EPA Reference Method 9 visible emission observation.	Keep records of the name of the observer, date and time of observation, and the results of the observation.	If there is an exceedance, take corrective action and log all such actions, and report exceedances.

Emission Unit	Pollutant	Emission Limit	MonitoringRecordkeepingRequirementsRequirements		Reporting Requirements
Material Handling	Opacity	20%	Conduct monthly EPA Reference Method 9 visible emission observation.	Keep records of the name of the observer, date and time of observation, and the results of the observation.	If there is an exceedance, take corrective action and log all such actions, and report exceedances.
	РМ	≤1.02Q ^{0.769} (the heat input in MMBtu/hr)	1.02Q ^{0.769} (the heat input in MMBtu/hr)N/A		N/A
Internal Combustion Engines	Opacity	40%	Conduct monthly EPA Reference Method 9 visible emission observation.	Keep visible emission observation records.	If there is an exceedance, take corrective action and log all such actions, and report exceedances.
	SO_2	1.0 lb/MMBtu	N/A	Keep daily records of the sulfur content of the fuel oil being fired.	Report any daily period when the sulfur content of the fuel being fired exceeds 0.8 percent.
Fugitive Dust	РМ	40% Opacity	A Method 9 observer is required to conduct a monthly survey of visible emissions.		N/A
Abrasive Blasting	РМ	20% Opacity	If abrasive blasting is conducted, monitor visible emissions. Record the date, duration and pollution control measures of any abrasive blasting project.		N/A

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Spray Painting	VOC	20% Opacity Control 96% of Overspray	If spray painting is conducted, monitor visible emissions.	Maintain records of the date, duration, quantity of paint used, any applicable material safety data sheets, and pollution control measures of any spray painting project.	N/A
Demolition/ Renovation	Asbestos	N/A	N/A	Maintain records of all asbestos related demolition or renovation projects including the "NESHAP Notification for Renovation and Demolition Activities" form and all supporting documents.	N/A

X. COMPLIANCE ASSURANCE MONITORING (CAM)

- **A.** The CAM rule applies to pollutant-specific emission units (PSEU) at a major Title V source if the unit meets all of the following criteria:
 - 1. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;
 - 2. The unit uses a control device to achieve compliance with the emission limit or standard; and
 - 3. The unit has "potential pre-control device emissions" of the applicable regulated air pollutant equal to or greater than 100% of the amount (tons/year) required for a source to be classified as a major source. "Potential pre-control device emissions" means potential to emit (PTE, as defined in Title V) except emissions reductions achieved by the applicable control device are not taken into account.

The general purpose of monitoring required by the CAM rule is to assure compliance with emission standards by ensuring that control devices meet and maintain the assumed control efficiencies. Compliance is ensured through requiring monitoring of the operation and maintenance of the control equipment and, if applicable, operating conditions of the pollutant-specific emissions unit. For the PSEUs that have post control potential to emit equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source, for each parameter monitored, facilities are required to collect four or more data values equally spaced over each hour. Such units are defined as "large" PSEUs. For all other PSEUs ("small" PSEUs), the monitoring shall include some data collection at least once per 24-hour period. In this specific case, the facility's PSEU has post control emission above the major source threshold for particulate matter and therefore, requires to collect four or more data values equally spaced over each hour. Table 8 provides a list of the PSEU.

S. No.	Equipment	Pollutant	Control Device	Emission Limit
1	Boiler	PM	Baghouse and Multiclone Dust Collector	0.085 lb/MMBtu

Table 8: CAM Applicable Units

B. Monitoring Approach

The facility uses multiclone dust collector and baghouses for controlling the emissions of particulate matter (both PM and PM_{10}) from the boiler. The monitoring approach for these devices is detailed in Table 9 below.

Table 9: Monitoring Approach

Indicator	Monitoring Approach			
Opacity	Maintain and operate COMS in accordance with the			
	manufacture's specifications.			
Indicator Range	The appropriateness of indicator range for the opacity			
	limits shall be verified at the time of PM_{10} or PM			
	performance tests. The opacity indicator range is equal to			
	or lower than 7.5 percent on a 3-hour rolling average. This			
	indicator range was determined based on historical			
	operating data and performance test results. The historical			
	operating data and performance test results can be found in			
	Figure 1 and Table 10. These show that the indicator range			
	is reasonable. If failure to achieve compliance with an			
	emission limitation or standard for which the approved			
	monitoring did not provide an indication of an excursion or			
	exceedance while providing valid data is identified, or the			
	results of compliance or performance testing document the			
	need to modify the existing indicator range or designated			
	conditions, the facility is expected to promptly notify the			
	Department, and if necessary, submit a proposed			
	modification to this permit to address the necessary			
	monitoring changes, which may include, but is not limited			
	to, re-establishing indicator range or designated conditions,			
	modifying the frequency of conduction monitoring and			
	collecting data, or the monitoring of additional parameters.			
Excursion Danca	Opacity readings above 7.5 percent on a 3-hour rolling			
	average.			



Figure 1 – COMS 3-Hour Rolling Average (%) for 2020 – 2023

Pollutant	2018	2019	2020	2021	2022	Emission Limit/Indicator Range
PM (lb/MMBtu)	0.00045	0.012	0.023	0.018	0.021	0.085
Opacity (%)	0	0	0	0	0	20
COMS 3-Hour Rolling Average	0.2	0.7	2.7	0.3	2.7	7.5

 Table 10: Boiler Performance Test Results for 2018 – 2022

C. Pollutants Not Subject to CAM Requirements

Table 11 shows the main pollutants from the boiler that are not subject to CAM requirements as well as the reason.

Equipment	Pollutant	Reason Not Subject to CAM		
Boiler	NO _X	It has control device, but they have a CEMS. Hence, it is exempt from CAM requirements.		
Boiler	СО	It does not have a control device and has CEMS.		
Boiler	SO_2	It does not have a control device and has CEMS.		
Boiler	HCl	The potential pre-control emission is less than major source threshold. It has control device, but they have a CEMS.		

Table 11: Pollutants Not Subject to CAM Requirement

XI. ENVIRONMENTAL JUSTICE ANALYSIS

The Environmental Protection Agency (EPA) defines Environmental Justice (EJ) to include the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and polices. The goal of completing an EJ assessment in permitting is to provide an opportunity for overburdened populations or communities to allow for meaningful participation in the permitting process. Overburdened is used to describe the minority, low-income, tribal and indigenous populations or communities that potentially experience disproportionate environmental harms and risks due to exposures or cumulative impacts or greater vulnerability to environmental hazards. This permit renewal has emission increases significantly below the permitting exemption thresholds and thus, it will not result in any additional impacts.

XII. LEARNING SITE EVALUATION

In accordance with ADEQ's Environmental Permits and Approvals near Learning Sites Policy, the Department is required to conduct an evaluation to determine if any nearby learning sites would be adversely impacted by the facility. Learning sites consist of all existing public schools, charter schools and private schools the K-12 level, and all planned sites for schools approved by the Arizona School Facilities Board. The learning sites policy was established to ensure that the protection of children at learning sites is considered before a permit approval is issued by ADEQ.

The Department did not identify any learning sites within two miles of this facility.

XIII. LIST OF ABBREVIATIONS

A.A.C	Arizona Administrative Code
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emissions Monitoring System
CFR	
СО	
CO ₂	Carbon Dioxide
CO ₂ e	
COMS	Continuous Opacity Monitoring System
EJ	
EPA	Environmental Protection Agency
GHG	Greenhouse Gases
HAP	
HCl	
IC	Internal Combustion
MMBtu/hr	Million British Thermal Unit Per Hour
MW	
NESHAP	
NO _X	Nitrogen Oxides
NSPS	
PJ	Pinyon-Juniper
PM	Particulate Matter
PM ₁₀	Particulate Matter less than or equal to 10 µm Nominal Aerodynamic Diameter
PM _{2.5}	Particulate Matter less than or equal to 2.5 µm Nominal Aerodynamic Diameter
PSD	Prevention of Significant Deterioration
PSEU	Pollutant-Specific Emission Units
PTE	
RATA	Relative Accuracy Test Audit
PET	Permitting Exemption Threshold
SNCR	Selective Non-Catalytic Reduction
SO ₂	
SPR	Significant Permit Revision
TPY	
VOCs	
yr	

Appendix A. Process Flow Diagram

NOVO BIOPOWER FLOW DIAGRAM

