AIR QUALITY EFFECTS ANALYSIS
FOR
PERMIT TO CONSTRUCT
ACP-18296 v1.0

Applicant:

Applied Digital Corporation
S3811 Turtle Creek Blvd. Suite 2100
Dallas, TX 75219

Facility Location:

ELN Generation Plant
9663 87th Ave. SE
Ellendale, ND 58436

Introduction:

Applied Digital Corporation (Applied Digital) submitted a permit to construct (PTC) application to the North Dakota Department of Environmental Quality – Division of Air Quality (Department) on December 4, 2024. Upon request from the Department, Applied Digital submitted supplemental information on June 28, 2025. The supplemental information contained an air dispersion modeling analysis. The application was for the construction of new diesel emergency power generators to provide back-up power to a computer processing and data preparation and processing services facility (facility) located in Dickey County, North Dakota.

As shown in Table 1-1 of ACP-18296 v1.0, emission units from the facility will be housed in four generator buildings (ELN Building 1 through ELN Building 4). Each building will contain fifteen Caterpillar 3516E emergency diesel generator engines rated 4,393 horsepower (hp) and capable of producing 3,000 kilowatts (kW) of power, for a total of sixty (60) generator engines.

The facility is subject to a federally enforceable limit on gallons per year (gal/yr) fuel usage (ACP-18296 v1.0 Condition 2.C.2) during non-emergency operations to remain below major source permit thresholds established by the Title V Permit to Operate (PTO) program, meaning the facility is classified as a synthetic minor source of air pollution.

In addition to the fuel usage limit, ACP-18296 v1.0 Condition 2.D.1 establishes conditions that restrict operations during non-emergency situations. These operational restrictions provide for apparent protection of, or compliance with, the 1-hour nitrogen dioxide (NO_2) national ambient air quality standard (NAAQS) during non-emergency operations of the facility.

Facility Wide Emissions Profile

Table 1 - Various Emissions Scenarios (tons per year) [A]

Emission Scenario Description [B]	Parameter	NO_X	CO	SO_2	VOCs	PM_F	PM_C	Total HAPs	Benzene (Largest HAP)
Permit limited fuel use during low-load (10%) non-emergency operations	525,729 gal/yr [C]	99.5	24.2	0.1	2.5	0.3	0.6	0.1	0.0
Permit limited fuel use during high-load (100%) non-emergency operations		68.8	8.1	0.1	0.5	0.6	0.9	0.1	0.0
Rated based for 1 generator engine at low-load (10%)	100 hours per year [D]	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Rated based for 1 generator engine at max-load (100%)		2.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Rate based for 60 generator engines at low-load (10%)		41.7	10.1	0.0	1.1	0.1	0.1	0.0	0.0
Rate based for 60 generator engines at max-load (100%)		163.6	19.2	0.1	1.2	1.5	0.7	0.0	0.0
Rated based for 1 generator engine at max-load (100%)	8,760 hours per year [E]	238.8	28.0	0.2	1.7	2.1	1.0	0.2	0.1
Rate based for 60 generator engines at max-load (100%)		14,329.5	1,679.8	11.3	101.8	127.3	57.6	11.8	5.8

[A] Abbreviations:
PM_F: filterable particulate matter of all sizes (PM, PM_{10}, and $PM_{2.5}$)
PM_C: condensable particulate matter
SO_2: sulfur dioxide
NO_X: oxides of nitrogen
CO: carbon monoxide
VOCs: volatile organic compounds
HAPs: hazardous air pollutants as defined in Section 112(b) of the Clean Air Act

[B] Various emissions scenarios are included for informational purposes.

[C] Limiting scenario included under ACP-18296 v1.0 Condition 2.C to ensure minor source status is maintained. Operating a generator engine at low-load (10%) results in increased emissions per unit of energy (less efficient) and represents a conversative approach to calculating fuel restricted potential emissions.

[D] Scenario included to show potential emissions while maintaining emergency engine classification (ACP-18296 v1.0 Condition 2.D.2).

[E] Scenario included to show potential emissions if generator engines were to run continuously year round at maximum load. If generators were to be run continuously it would be at, or near to, max load and stem from an emergency situation that would cause grid power to be lost for a full year. This is a highly unlikely scenario.

As shown in Table 1 row 1, the facility wide potential to emit (PTE) during non-emergency operations is limited to below 100 tons per year (tpy) for all criteria air pollutants, below 10 tpy for any single hazardous air pollutant (HAP), and below 25 tpy for the combined HAP emissions. Detailed calculations have been provided in the permit application received on December 4, 2024. The Department has reviewed these calculations and believes they accurately represent the proposed facility operations during non-emergency operations.

The facility PTE is based on enforceable emissions restrictions put in place on the 60 diesel generator engines, limiting the fuel usage during non-emergency operations to 525,729 gallons per year. The fuel use restriction means the facility will be a synthetic minor source of air pollution, as the emissions are limited to below major source thresholds for the prevention of significant deterioration (PSD) program, Title V program, and the national emissions standards for hazardous air pollutant (NESHAP) standards. Limiting total fuel consumption, regardless of the load placed on the engine, ensures emissions will be restricted to minor source levels. The diesel generator engines are less efficient[1] during low-load (10%) operations, meaning any operations between low-load and max-load (100%) will result in NOx emissions between 69 tpy and 99.5 tpy.

Table 1 also displays various other emissions scenarios for informational purposes. The next scenario displayed are the emissions profiles when the diesel generator engines are limited to 100 hours per year of operation.[2] The following four 100 hour per year scenarios are displayed: one engine low-load, one engine at max-load, 60 engines at low-load, and 60 engines at max-load. Of note for these scenarios, the 60 engines at max-load scenario for 100 hours per year is not allowable since it would violate the fuel consumption restriction.

[1] More emissions per gallon of fuel burned.

[2] To remain classified as emergency engines, 40 CFR 60.4211(f) limits operating hours to 100 hours per calendar year.

Lastly, and for information purposes, Table 1 shows the PTE if one engine and all 60 engines were to run continuously year-round, or 8,760 hours, at max-load. This is displayed to help show the magnitude of emissions these engines could produce under a scenario that is more typical when permitting stationary sources of air pollution. This permit does not allow for this operation during non-emergency situations.

Example of fuel usage-based emission calculation at low-load:

$$\frac{0.38 \text{ lb } NO_X}{\text{gallon of fuel}} \text{ x } \frac{525{,}729 \text{ gallons of fuel}}{\text{year}} \text{ x } \frac{1 \text{ ton}}{2000 \text{ lb}} = 99.5 \text{ tons per year of } NO_X$$

Example of rate-based emission calculation at max-load:

$$\frac{5.63 \text{ g } NO_X}{\text{hp} - \text{hour}} \text{ x } 4{,}393 \text{ hp x } \frac{1 \text{ lb}}{453.59 \text{ g}} = 54.53 \text{ lb } NO_x \text{ per hour}$$

$$\frac{54.53 \text{ lb } NO_X}{\text{hour}} \text{ x } \frac{100 \text{ hours}}{year} \text{ x } 1 \text{ engine x } \frac{1 \text{ ton}}{2000 \text{ lb}} = 2.73 \text{ tons per year of } NO_x$$

Rules Analysis
Potentially Applicable Rules and Expected Compliance Status

A. NDAC 33.1-15-01 – General Provisions:

Multiple topics are included in the General Provisions chapter: entry onto premises - authority, variances, circumvention, severability, land use plans and zoning regulations (only to provide air quality information), measurement of air contaminants, shutdown and malfunction of an installation - requirements for notification, time schedule for compliance, prohibition of air pollution, confidentiality of records, enforcement, and compliance certifications.

Applicability and Expected Compliance

Based on the review of the information provided, the facility will comply with all applicable sections of this rule.

B. NDAC 33.1-15-02 – Ambient Air Quality Standards:

The facility must comply with the North Dakota and Federal Ambient Air Quality Standards (AAQS) and the "Criteria Pollutant Modeling Requirements for a Permit to Construct" guidelines[3].

Applicability and Expected Compliance

The facility is not subject to PSD however the facility's PTE triggers the modeling thresholds listed in the "Criteria Pollutant Modeling Requirements for a Permit to Construct," therefore, preconstruction modeling for this facility was required. Based on the facility PTE, proposed stack parameters, and restrictions on fuel usage and hours of operation, compliance with the ambient air quality standards during non-emergency operations has been demonstrated through dispersion modeling, for further details see ACP-18296 v1.0 AQIA.

ACP-18296 v1.0 is not written to ensure protection of the NAAQS during emergency situations when grid power is unavailable. The current regulatory framework states[4] "There is no time limit on the use of emergency stationary internal combustion engines (ICE) in emergency situations.".

[3] See October 6, 2014, Criteria Pollutant Modeling Requirements for a Permit to Construct. Available at: https://www.deq.nd.gov/publications/AQ/policy/Modeling/Criteria_Modeling_Memo.pdf
[4] 40 CFR 60.4211(f)(1), see: https://www.ecfr.gov/current/title-40/part-60/subpart-IIII#p-60.4211(f)(1)

C. NDAC 33.1-15-03 – Restriction of Emission of Visible Air Contaminants:

This chapter requires all non-flare sources from new facilities to comply with an opacity limit of 20% except for one six-minute period per hour when 40% opacity is permissible. This chapter also requires facility flares to comply with an opacity limit of 20% except for one six-minute period per hour when 60% opacity is permissible. Lastly, this chapter restricts the opacity of fugitive emissions transported off property to 40% except for one six-minute period per hour when 60% opacity is permissible. This chapter also contains exceptions under certain circumstances and provides the method of measurement to determine compliance with the referenced limits.

Applicability and Expected Compliance

Based on Department experience with diesel fired emergency generator engines, the facility is expected to comply with the 20% opacity limit.

D. NDAC 33.1-15-04 – Open Burning:

No person may dispose of refuse and other combustible material by open burning, or cause, allow, or permit open burning of refuse and other combustible material, except as provided for in Section 33.1-15-04-02 or 33.1-15-10-02, and no person may conduct, cause, or permit the conduct of a salvage operation by open burning.

Applicability and Expected Compliance

The facility is subject to this chapter and will comply with all open burning regulations.

E. NDAC 33.1-15-05 – Emissions of Particulates Matter Restricted:

This chapter establishes particulate matter emission limits and restrictions for industrial process equipment and fuel burning equipment used for indirect heating.

Applicability and Expected Compliance

The facility will not emit any particulate matter which results from industrial process equipment, nor will the facility operate any fuel burning equipment used for indirect heating.

The diesel fired emergency generator engines are subject to the Tier 2 emissions standards for particulate matter under 40 CFR Part 1039 and compliance with this standard is more restrictive than this chapters requirements, therefore, compliance with this chapter is expected.

F. NDAC 33.1-15-06 – Emissions of Sulfur Compounds Restricted:

This chapter applies to any installation in which fuel is burned and the SO_2 emissions are substantially due to the sulfur content of the fuel; and in which the fuel is burned primarily to produce heat. This chapter is not applicable to installations which are subject to an SO_2

emission limit under Chapter 33.1-15-12, Standards for Performance for New Stationary Sources, or installations which burn pipeline quality natural gas.

Applicability and Expected Compliance

The diesel fired emergency generator engines are subject to the sulfur standard in new source performance standard (NSPS) Subpart IIII. The engines will burn diesel fuel with a maximum sulfur content of 15 parts per million by weight (ppmw) and are thus compliant with sulfur restrictions in this chapter.

G. NDAC 33.1-15-07 – Control of Organic Compounds Emissions:

This chapter establishes requirements for the construction of organic compound facilities and the disposal of organic compounds gas and vapor generated as waste resulting from storage, refining, or processing operations at the facility.

Applicability and Expected Compliance

The facility is not subject to the requirements of this chapter since it is not an organic compound facility and will not produce any organic compounds subject to the disposal requirements.

H. NDAC 33.1-15-08 – Control of Air Pollution from Vehicles and Other Internal Combustion Engines:

This chapter restricts the operation of internal combustion engines which emit from any source unreasonable and excessive smoke, obnoxious or noxious gas, fumes or vapor. This chapter also prohibits the removal or disabling of motor vehicle pollution control devices.

Applicability and Expected Compliance

The diesel fired emergency generator engines are also subject to opacity requirements under NDAC 33.1-15-03-02 and subject to the requirements of NSPS Subpart IIII. As a result of expected compliance with these provisions, the engines are not expected to emit any unreasonable and excessive smoke, obnoxious or noxious gases, fumes, or vapor.

I. NDAC 33.1-15-09 – [repealed]

J. NDAC 33.1-15-10 – Control of Pesticides:

This chapter provides restrictions on pesticide use and restrictions on the disposal of surplus pesticides and empty pesticide containers.

Applicability and Expected Compliance

The facility is subject to this chapter and is expected to comply with all applicable requirements should pesticides be used.

K. NDAC 33.1-15-11 – Prevention of Air Pollution Emergency Episodes:

When an air pollution emergency episode is declared by the Department, the facility shall comply with the requirements in Chapter 33.1-15-11 of the North Dakota Air Pollution Control (NDAPC) rules.

L. NDAC 33.1-15-12 – Standards of Performance for New Stationary Sources [40 Code of Federal Regulations Part 60 (40 CFR Part 60)]:

This chapter adopts most of the Standards of Performance for New Stationary Sources (NSPS) under 40 CFR Part 60. The facility is subject to the following subparts under 40 CFR Part 60 which have been adopted by North Dakota as of July 1, 2019:

Subpart A – General Provisions

Subpart A contains general requirements for plan reviews, notification, recordkeeping, performance tests, reporting, monitoring and general control device requirements.

Applicability and Expected Compliance

The facility will comply with the general provisions of Subpart A through submission of timely notifications, performance testing, reporting, and following the general control device and work practice requirements under Subpart A. In addition, any changes to the facility after it is built will be evaluated with respect to this subpart as well as others.

Subpart IIII – Standards of Performance for Stationary Compressor Ignition Internal Combustion Engines

This subpart applies to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines. It covers provisions and requirements related to emission standards, certification, labeling and recordkeeping, performance tests, monitoring requirements, and compliance with standards and maintenance requirements. The subpart also includes definitions and general provisions that apply to the regulations.

Applicability and Expected Compliance

The diesel fired emergency generator engines are subject to Subpart IIII. The engines will have a maximum rating capacity of 4,393 horsepower (HP) and are capable of producing 3,000 kilowatts (kW) of power. The model year of the engines is post 2011, the engines are certificated, and will be installed, configured, operated, and maintained according to the manufacture's emission related written instructions. The facility will maintain applicable records for the emergency engines that will serve as demonstration of compliance with the following emission standards from 40 CFR Appendix I to Part 1039(b)[5]:

[5] See: https://www.ecfr.gov/current/title-40/appendix-Appendix%20I%20to%20Part%201039#p-Appendix-I-to-Part-1039(b)

- NOx + NMHC of 6.4 g/KW-hr
- CO: 3.5 g/KW-hr
- PM: 0.20 g/KW-hr

If the engines are not operated according to manufacturer's recommendations, compliance with the limits must be demonstrated consistent with 40 CFR 60.4211(g)(3) requirements.[6]

To remain classified as emergency engines, each diesel generator engine is restricted to operating no more than 100 hours per year on a calendar year basis and shall operate in accordance with 40 CFR 60.4211(f).[7] Note per 40 CFR 60.4211(f)(1), there is no time limit on the use of emergency stationary ICE in emergency situations.

The facility is required to submit an annual report according to the requirements of 40 CFR 60.4214.

M. NDAC 33.1-15-13 – Emission Standards for Hazardous Air Pollutants [40 Code of Federal Regulations Part 61 (40 CFR Part 61)]:

This chapter discusses emission standards for hazardous air pollutants. It specifically incorporates a majority of the subparts and appendices of the National Emission Standards for Hazardous Air Pollutants (NESHAP) under 40 CFR Part 61 as of July 2, 2010.

Applicability and Expected Compliance

The facility does not appear to have any applicable requirements under this chapter.

N. NDAC 33.1-15-14 – Designated Air Contaminant Sources, Permit to Construct, Minor Source Permit to Operate, Title V Permit to Operate:

This chapter designates that federally regulated sources are required to obtain a Permit to Construct and a Permit to Operate and comply with specific emission control and air quality standards.

Applicability and Expected Compliance

The facility has submitted an application for a permit to construct and has met all requirements necessary to obtain a permit to construct. The facility will be considered a synthetic minor source via federally enforceable restrictions limiting criteria air pollutant PTE below 100 tons per year for NOx. The restriction is placed on fuel usage per year during non-emergency operations.

The permit must undergo public comment per NDAC 33.1-15-14-06.5.a.

[6] See: https://www.ecfr.gov/current/title-40/part-60/subpart-IIII#p-60.4211(g)
[7] See: https://www.ecfr.gov/current/title-40/part-60/subpart-IIII#p-60.4211(f)

Once the facility completes construction and meets the permit to construct requirements, a facility inspection will be performed by the Department. Pending a satisfactory facility inspection, the facility will be issued a synthetic minor source permit to operate by the Department.

O. NDAC 33.1-15-15 – Prevention of Significant Deterioration of Air Quality [40 CFR 52.21]:

This chapter adopts the federal provisions of the Prevention of Significant Deterioration of air quality (PSD) program (40 CFR 52.21). A facility is subject to PSD review if it is classified as a "major stationary source" under Chapter 33.1-15-15.

Applicability and Expected Compliance

This facility is not classified as a "major stationary source" under 40 CFR 52.21(b)(1)(i)(a) and is therefore only subject to PSD review if emissions of a regulated new source review (NSR) pollutant[8] exceed 250 tpy (excluding fugitive emissions). The PTE for this facility, as shown in Table 1, is below the 250 tpy threshold and therefore not subject to PSD review.

P. NDAC 33.1-15-16 – Restriction of Odorous Air Contaminants:

This chapter restricts the discharge of objectionable odorous air contaminants which measures seven odor concentration units or greater outside the property boundary. The emission of hydrogen sulfide is also addressed with strict concentration limitations. The chapter also establishes the method of measurement using certified inspectors, scentometers, and other approved instruments.

Applicability and Expected Compliance

Based on Department experience with sources having similar emission units, processes, and low hydrogen sulfide concentrations, the facility is expected to comply with this chapter.

Q. NDAC 33.1-15-17 – Restriction of Fugitive Emissions:

This Chapter restricts fugitive emissions from particulate matter or other visible air contaminates and gaseous emissions that would violate Chapter 2 (ambient air quality standards), Chapter 15 (PSD), Chapter 16 (odor), or Chapter 19 (visibility).

Applicability and Expected Compliance

The facility will be required to take reasonable precautions to prevent fugitive emissions in violation of the above referenced NDAC chapters.

[8] See 40 CFR 52.21(b)(50). Available at: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-52/subpart-A/section-52.21#p-52.21(b)(50)

R. NDAC 33.1-15-18 – Stack Heights:

This chapter restricts the use of stack heights above good engineering practices (GEP). The chapter primarily adopts federal regulations listed under 40 CFR 51.100(ii). This chapter also restricts the use of dispersion techniques to affect the concentration of a pollutant in the ambient air. Demonstrations of good engineering practice stack heights must be made available for review.

Applicability and Expected Compliance

The proposed stacks at the facility do not exceed GEP and will not use dispersion techniques to affect the pollutant concentration in the ambient air.

The stack heights at the facility are listed in the following table:

Emission Point (EP)	Stack Height (Feet)
GA1-GA15, GB1-GB15, GC1-GC15, GD1-GD15	32

S. NDAC 33.1-15-19 – Visibility Protection:

This chapter outlines regulations regarding visibility protection and applies to new major stationary sources as defined in Section 33.1-15-15-01. It contains provisions regarding visibility impact analysis, visibility models, notification requirements for permit applications, review by federal land managers, permit issuance criteria, and visibility monitoring.

Applicability and Expected Compliance

The facility is not a new major stationary source and therefore is not subject to the requirements of this chapter. Given the minor source levels of the visibility impairing air pollutants, such as NO_X, SO_2, and $PM_{2.5}$, it is expected that the facility will not adversely contribute to visibility impairment within the three units of the Theodore Roosevelt National Park, the Lostwood National Wildlife Refuge, Badlands National Park in South Dakota, or Wind Cave National Park in South Dakota (nearest federal Class I areas).

T. NDAC 33.1-15-20 – Control of Emissions from Oil and Gas Well Production Facilities:

The facility is not an oil or gas well facility and is therefore not subject to the requirements of this chapter.

U. NDAC 33.1-15-21 – Acid Rain Program:

This chapter adopts the acid rain provisions of the Clean Air Act specified under 40 CFR Parts 72-78. The facility is not subject to the acid rain provision as they are not an electric utility.

V. NDAC 33.1-15-22 – Emissions Standards for Hazardous Air Pollutants for Source Categories [40 Code of Federal Regulations Part 63 (40 CFR Part 63)]:

This chapter adopts most of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Source Categories under 40 CFR Part 63. These standards typically apply to major sources of air pollution that are in a regulated source category. In addition to the major source requirements, some of the regulations have "area source" standards (for non-major sources). Some of the area source standards have not been adopted by the Department and compliance will be determined by the United States Environmental Protection Agency (USEPA) (i.e. 40 CFR 63, Subpart ZZZZ area source provisions have not been adopted by the Department).

Applicability

The facility's potential HAP emissions are less than 10 tons/year of any single HAP and are less than 25 tons/year of any combination of HAPs, so the facility is an area (minor) source of HAPs. As shown in the Table 1, total potential HAPs from the facility are less than 1 ton per year.

Subpart A – General Provisions

Subpart A contains general requirements for prohibited activities and circumvention, preconstruction review and notification, standards and maintenance requirements, performance tests, monitoring, recordkeeping, reporting, and control device work practice requirements.

Applicability and Expected Compliance

The facility will comply with the general provisions of Subpart A through submission of timely notifications, performance testing, monitoring, recordkeeping, reporting, and following the control device work practice requirements under Subpart A.

Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emissions from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

Applicability and Expected Compliance

The diesel fired emergency generator engines are subject to the requirements under this subpart. The requirements of Subpart ZZZZ for the diesel fired emergency generator engines are met by complying with the requirements of NDAC 33.1-15-12 [40 CFR 60], Subpart IIII.

W. NDAC 33.1-15-23 – Fees:

This chapter requires a filing fee of $325 for permit to construct applications, plus any additional fees based on actual processing costs. The additional fees based on processing costs will be assessed upon issuance of the draft permit to construct. The annual operating permit fee is also applicable.

The applicant has paid the $325 filing fee and may be required to pay the additional fees associated with the permit processing.

X. NDAC 33.1-15-24 – Standards for Lead-Based Paint Activities:

The facility will not perform any lead-based painting and is therefore not subject to this chapter.

Y. NDAC 33.1-15-25 – Regional Haze Requirements:

This chapter is specific to existing stationary sources or groups of sources which have the potential to "contribute to visibility impairment" as defined in Section 33.1-15-25-01.2. Existing stationary sources or groups of sources determined to contribute to visibility impairment may be required to implement emissions reduction measures to help the Department make reasonable progress toward North Dakota's reasonable progress goals established in accordance with 40 CFR 51.308.

Applicability and Expected Compliance

The facility is a new source and based on low PTE of visibility impairment pollutants is not expected to contribute to visibility impairment. Therefore, the facility is not subject to the requirements of this chapter.

Summary:

A complete review of the proposed project indicates that the facility is expected to comply with the applicable federal and state air pollution rules and regulations. The Department will make a final recommendation on the issuance of a Permit to Construct for the Applied Digital diesel emergency power generators following completion of a 30-day public comment period. The public comment period will run from September 11, 2025, through October 11, 2025.

Update post comment period:
[Reserved]

Date of Draft Analysis: September 10, 2025
Date of Final Analysis: [Reserved]

Analysis By:

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