



335 Inverness Drive South
Englewood CO 80112

July 10, 2023

Kenneth Houlden
Colorado Department of Public Health and Environment
Air Pollution Control Division
Construction Permits Unit, APCD-SSP-B1
4300 Cherry Creek Drive South
Denver, CO 80246-1530

Re: Synthetic Minor Construction Permit to Avoid Title V Permitting Requirements
Equinix, LLC
335 Inverness Drive South
Englewood, CO 80112
Construction Permit No. 99DG0880

Dear Mr. Houlden:

The following application is the Equinix, LLC request to modify construction permit, Permit No. 99DG0880, to reduce the maximum allowable operating hours for each emergency generator from 250 hours to 140 hours, to reduce facility wide emissions below Title V Permitting thresholds. Current permitted facility NOx emissions are 35.67 tons per year (tpy). With this reduction in operating hours, Equinix requests a new permit limit of 23.71 tpy of NOx emissions.

As discussed with Charlie Obermeyer and Ben Cappa with CDPHE, Equinix noted emission factors for the generators did not match previously submitted manufacturer data and is requesting engine emission factors be updated to match previously submitted vendor data.

Also of note, the engine model number previously submitted on prior APENs was the generator model number QSK60-G6, not the engine model number. The attached APENs have the appropriate engine model numbers.

Regulatory Review

Due to the reclassification of Denver's ozone attainment status to severe nonattainment, Equinix's facility operations' unrestricted potential to emit (PTE) emissions exceed the Title V Operating Permit program threshold of 25 tpy of any criteria pollutant for the criteria pollutant oxides of nitrogen (NOx) but are well below said thresholds for all other criteria pollutants. With this application Equinix is requesting a synthetic minor construction and operation permit to take reduced operating and emission limits.

Equinix is submitting a modeling determination request concurrently with this application to confirm that no modeling is required for this emission reduction project.

No changes to NSPS/NESHAP applicability to the generators will result from this permitting event.

Please find attached the following appendices:

Appendix A: APEN Updates

Appendix B: Supporting Emission Calculations and Vendor Data

Appendix C: Modeling Determination Request

Appendix D: APEN Fee Submittal

Should you have any questions regarding this application, please contact myself at rgurdikian@equinix.com and copy David Hart, the facility manager, at dhart@equinix.com, and our consultant Cathy Hawk at cathy.hawk@aecom.com.

Sincerely,

A handwritten signature in black ink, appearing to read 'R. Gurdikian', with a stylized flourish at the end.

Robert Gurdikian, CHMM
Sr. Manager AMER FLC EHS



Non-Oil & Gas Industry
Construction Permit Application Completeness Checklist
Form APCD-100a
Air Pollution Control Division

Company Name: Equinix, LLC
Source Name: VDC I LLC
Date: June 20, 2023

Are you requesting a facility wide permit for multiple emissions points? ☒ ☐

In order to have a complete application, the following attachments must be provided, unless stated otherwise.
If application is incomplete, it will be returned to sender and filing fees will not be refunded.

Attachment	Application Element	Attached?
A	APEN Filing Fee(s)	☒
B	Air Pollutant Emission Notice(s) (APENs) - APCD Form Series 200	☒
C	Emissions Calculations and Supporting Documentation	☒
D	Company Contact Information - Form APCD-101 ☐ Check here if there will only be one point of contact (Attachment D not required)	☒
E	Ambient Air Impact Analysis (One of the following MUST be selected in order for the application to be considered complete) ☐ Check here if source is exempt from modeling determination requirements per "Interim Colorado Modeling Guideline for Air Quality Permits" and/or "Permitting Section Addendum to the Modeling Guideline". ☐ Check here if operator submitted a request for modeling determination (Form APCD-114) to the Division's Permit Modeling Unit (PMU) prior to application submittal, and the Division determined that modeling was not required. (Include the version of form APCD-114 that was approved and returned by the PMU.) ☐ Check here if operator submitted a modeling analysis to the Division which was approved by the Division prior to application submittal. (Include form APCD-114, operator's approved modeling analysis, and the PMU Modeling Review Report provided by the Division which documents compliance with the NAAQS and conditions of approval for proposed source.) ☒ Check here if operator is submitting a modeling analysis to the Division concurrently with the application submittal, or if the already-submitted modeling analysis has not yet been approved by the Division.	☒
F	Facility Emissions Inventory - Form APCD-102a ☐ Check here if single emissions point source (Attachment F not required)	☒
G	Process description, flow diagram, plot plan of emissions unit and/or facility ☒ Check here if single emissions point source (Attachment G not required)	☐
H	Regulatory Analysis ☐ Check here to request APCD to complete regulatory analysis (Attachment H not required)	☒
Additional attachments		
Certain sources may require additional forms. Refer to https://www.colorado.gov/pacific/cdphe/air/air-permit to check if any APEN supplement forms are required for your source.		
Send Complete Application to: Colorado Department of Public Health & Environment APCD-SS-B1 4300 Cherry Creek Drive South Denver, Colorado 80246-1530 Check box if facility is an existing Title V source: ☐ Send an additional application copy Check box if refined modeling analysis included: ☐ Send an additional application copy Check box if application is for major NANSR or PSD permit: NANSR = Nonattainment Area New Source Review ☐ Send eight (8) total application copies PSD = Prevention of Significant Deterioration		



Company Contact Information Form

Ver. September 10, 2008

Company Name: Equinix, LLC

Source Name: Verizon Data Centers I LLC

Permit Contact¹:	Robert Gurdikian		
Address:	335 Inverness Drive South		
	Street		
	Englewood	CO	80112
	City	State	Zip
Phone Number:	720-518-8981		
Fax Number:			
E-mail:	rgurdikian@equinix.com		

Compliance Contact²:	David Hart		
Address:	335 Inverness Drive South		
	Street		
	Englewood	CO	80112
	City	State	Zip
Phone Number:	720 873 7203		
Fax Number:			
E-mail:	dhart@equinix.com		

Billing Contact: <i>(Permit Fees)³</i>	David Hart		
Address:	335 Inverness Drive South		
	Street		
	Englewood	CO	80112
	City	State	Zip
Phone Number:	720 873 7203		
Fax Number:			
E-mail:	dhart@equinix.com		

Billing Contact: <i>(Annual Fees)⁴</i>	David Hart		
Address:	335 Inverness Drive South		
	Street		
	Englewood	CO	80112
	City	State	Zip
Phone Number:	720 873 7203		
Fax Number:			
E-mail:	dhart@equinix.com		

Check how would you like to receive your permit fee invoice?

Mail: ☐

E-mail: ☒

Fax: ☐

Footnotes:

¹ The permit contact should be the point of contact for technical information contained in the permit application. This may be a company representative or a consultant.

² The compliance contact should be the point of contact for discussing inspection and compliance at the permitted facility.

³ The billing contact (Permit fees) should be the point of contact that should receive the invoice for fees associated with processing the permit application & issuing the permit. (Reg. 3, Part A, Section VI.B)

⁴ The billing contact (Annual fees) should be the point of contact that should receive the invoices issued on an annual basis for fees associated with actual emissions reported on APENs for the facility. (Reg. 3, Part A, Section VI.C)

Facility Wide Emissions Inventory Form

Ver. September, 2019



Company Name: Equinix, LLC

Source Name: VDC I LLC

Source AIRS ID: 035/0404/001&002

			Uncontrolled Potential to Emit (PTE)													Controlled Potential to Emit (PTE)																			
			Criteria (TPY)						HAPs (lbs/yr)							Criteria (TPY)						HAPs (lbs/yr)													
AIRS ID	Permit No.	Description	TSP	PM10	PM2.5	FUG. TSP	FUG. PM10	FUG. PM2.5	SO2	NOx	VOC	CO	Benzene	Toluene	Acetal	Xylene	Acro	HCHO	TSP	PM10	PM2.5	FUG. TSP	FUG. PM10	FUG. PM2.5	SO2	NOx	VOC	CO	Benzene	Toluene	EB	Xylene	n-Hex	HCHO	
035/0404/001	99DG0880	Emergency Engine	0.3	0.3	0.3				1.6	18.9	0.5	2.4	13	5	0	4	0	1																	
035/0404/002	99DG0880	Emergency Engine	0.0	0.0	0.0				0.1	4.8	0.1	0.2	4	2	0	1	0	0																	
Permitted Sources Subtotal =			0.3	0.3	0.3	0.0	0.0	0.0	1.7	23.7	0.6	2.6	17	6	1	5	0	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	
APEN Only - Permit Exempt Sources																																			
APEN Only Subtotal =			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	
APEN Exempt / Insignificant Sources																																			
Insignificant Subtotal =			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	
Total, All Sources =			0.3	0.3	0.3	0.0	0.0	0.0	1.7	23.7	0.6	2.6	17	6	1	5	0	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	
Uncontrolled HAPs Summary (TPY) =												0.0	0.0	0.0	0.0	0.0	0.0	Controlled HAPs Summary (TPY) =												0.0	0.0	0.0	0.0	0.0	0.0
Uncontrolled Total, All HAPs (TPY) =												0.0	Controlled Total, All HAPs (TPY) =												0.0										

Footnotes:

- This form should be completed to include both existing sources and all proposed new or modifications to existing emissions sources
- If the emissions source is new then enter "proposed" under the Permit No. and AIRS ID data columns
- Add and/or replace HAPS and other Non-Criteria Reportable Pollutants as necessary. HAP abbreviations include:
 EB = Ethylbenzene Acro = Acrolein
 HCHO = Formaldehyde n-Hex = n-Hexane
 224-TMP = 2,2,4-Trimethylpentane Meth = Methanol
 Acetal = Acetaldehyde
- APEN Exempt/Insignificant Sources should be included when warranted.



COLORADO

Air Pollution Control Division

Department of Public Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

New Source Performance Standards (NSPS) – 40 CFR Part 60, Subpart IIII Applicability Air Pollutant Emission Notice (APEN) Addendum Form for Diesel Engines

Company Name: Equinix, LLC

Engine Information¹

Make: Cummins Model: DQKAB-7279444 SN: K080219660, J080217431

1. Date of Engine Manufacture: 2008
2. Has this engine operated outside of the state of Colorado?

☐ Yes
☒ No
3. If you answered "Yes" to question 2, please answer the following question. (If you answered "No" to question 2, please leave this field blank.) What is the date of first entry into Colorado? _____
4. This engine was manufactured to meet the following tier level standards² (e.g., Tier 1, Tier 2): Tier 2

Permit #³: 99DG0880

AIRS ID³: 035 / 0404 / 002

A copy of this form, along with appropriate supporting documentation⁴, shall be maintained on-site or at a local field office, with stationary source responsibility, with a copy of the construction permit, exemption letter or general permit approval letter issued by the Colorado Air Pollution Control Division (the Division) for this emissions source. These records may be kept in either electronic or hard copy format provided that they can be promptly supplied to the Division or agents thereof upon request.

This engine shall comply with the New Source Performance Standards (NSPS) requirements of Colorado Air Quality Control Commission Regulation No. 6, Part A, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE) including, but not limited to, the following:

[The requirements below reflect the rule language of 40 CFR Part 60 Subpart IIII published in the Federal Register on 01/30/2013. However, if revisions to this Subpart are published at a later date, the owner or operator is subject to the requirements contained in the revised version of 40 CFR Part 60, Subpart IIII.]

- I. All fuel used shall meet the following specifications:
 - A. Sulfur content shall not exceed 15 ppm
 - B. Have a minimum cetane index of 40 or have a maximum aromatic compound content of 35% by volume
 - C. Compliance shall be demonstrated by maintaining copies of the fuel specifications provided by the supplier on-site or in a readily accessible location and made available to the Division for inspection upon request.
- II. The engine and control devices must be installed, configured, operated and maintained according to the specifications and instructions provided by the engine manufacturer.
- III. If the engine is equipped with a diesel particulate filter, the filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached. Records shall be kept of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit is approached.
- IV. If the engine is used for emergency purposes, a non-resettable hour meter must be installed prior to start-up.
- V. If the diesel fuel-fired engine referenced herein avoids tier 4 or 4i requirements by being an emergency generator, the engine shall not be used for any purpose except emergency power generation and for the purpose of maintenance



checks and readiness testing, provided that the tests are recommended by Federal, State or local government, the manufacturer, the vendor or the insurance company associated with the engine. Maintenance checks and readiness testing of such units is limited to 100 hours per year. There is no time limit on the use of emergency stationary ICE in emergency situations. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that Federal, State, or local standards require maintenance and testing of emergency ICE beyond 100 hours per year. Emergency stationary ICE may operate up to 50 hours per year in non-emergency situations, but those 50 hours are counted towards the 100 hours per year provided for maintenance and testing. The 50 hours per year for non-emergency situations cannot be used for peak shaving or to generate income for a facility to supply power to an electric grid or otherwise supply non-emergency power as part of a financial arrangement with another entity. For owners and operators of emergency engines, any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, as permitted in this section, is prohibited.

VI. Emission Standards:

- A. The engine referenced herein shall meet all the emissions standards applicable to the engine.
- B. Compliance with the NSPS Subpart IIII Emissions Standards for Non-Methane Hydrocarbons (NMHC), Nitrogen Oxides (NOx), Carbon Monoxide (CO) and Particulate Matter (PM) shall be demonstrated by filing a copy of the unit's certification documentation of compliance with the NSPS Subpart IIII emissions standards, with the associated application.

VII. The following requirements of Regulation No. 6, Part A, Subpart A, General Provisions, shall apply:

- A. At all times, including periods of start-up, shutdown, and malfunction, the engine and control equipment shall, to the extent practicable, be maintained and operated in a manner consistent with good air pollution control practices for minimizing emissions. Determination of whether or not acceptable operating and maintenance procedures are being used will be based on information available to the Division, which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. (Reference: Regulation No. 6, Part A. General Provisions from 40 CFR 60.11)
- B. No article, machine, equipment or process shall be used to conceal an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with an opacity standard or with a standard which is based on the concentration of a pollutant in the gases discharged to the atmosphere. (§ 60.12)
- C. Written notification of construction and initial startup dates shall be submitted to the Division as required under § 60.7.
- D. Records of startups, shutdowns, and malfunctions shall be maintained, as required under § 60.7.

VIII. This engine meets all the requirements in New Source Performance Standard (NSPS) Subpart IIII as applicable to the specific engine, including the standards required for relocating into Colorado as set forth in Regulation No. 6, Part B, Section I.C.

I hereby certify that all information contained herein is complete, true and correct. I certify that this source is and will be operated in full compliance with the applicable tier standards of Colorado Air Quality Control Commission Regulation No. 6, Part A, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE) as well as all other requirements referenced herein.

Robert Gurdikian

Sr. Manager EHS FLC AMER

Name of Legally Authorized Person (Please Print)

Title



7/6/2023

Signature of Legally Authorized Person

Date

¹ If the engine has not been selected or ordered as of the date of submission of the construction permit application, this form must be completed and submitted to the Colorado Air Pollution Control Division, for an affected engine, within one hundred and eighty (180) days after the commencement of construction/operation.

² This information can be obtained from the engine manufacturer.

³ Please enter this information if this form is being submitted after the date of submission of the construction permit application and a permit number and AIRS ID number have been assigned. Otherwise, leave these fields blank.

⁴ Supporting documentation includes: document(s) proving the date of first entry into Colorado (purchase receipt, delivery receipt, etc.) and tier standard certification information from the manufacturer, as applicable.



Exhaust Emission Data Sheet

2000DQKC

60 Hz Diesel Generator Set

Engine Information:

Model: Cummins Inc. QSK60-G6 Nonroad 1	Bore: 6.25 in. (159 mm)
Type: 4 Cycle, 60°V, 16 Cylinder Diesel	Stroke: 7.48 in. (190 mm)
Aspiration: Turbocharged and Low Temperature Aftercooled	Displacement: 3673 cu. in. (60.1 liters)
Compression Ratio: 14.5:1	
Emission Control Device: Turbocharged and Low Temperature Aftercooled	

	1/4	1/2	3/4	Full	Full
PERFORMANCE DATA	Standby	Standby	Standby	Standby	Prime
BHP @ 1800 RPM (60 Hz)	731	1461	2192	2922	2647
Fuel Consumption (gal/Hr)	41.0	71.0	102.8	138.6	121.5
Exhaust Gas Flow (CFM)	6110	9130	12420	15150	13765
Exhaust Gas Temperature (°F)	705	785	820	850	805
EXHAUST EMISSION DATA					
HC (Total Unburned Hydrocarbons)	0.50	0.28	0.21	0.20	0.18
NOx (Oxides of Nitrogen as NO ₂)	5.40	6.20	6.40	7.00	7.10
CO (carbon Monoxide)	0.70	0.70	0.80	0.90	1.00
PM (Particular Matter)	0.21	0.10	0.10	0.10	0.10
SO ₂ (Sulfur Dioxide)	0.71	0.61	0.58	0.58	0.57
Smoke (Bosch)	0.70	0.40	0.30	0.40	0.40

All Values are Grams/HP-Hour, Smoke is Bosch #

Model: DQKAB
Frequency: 60
Fuel type: Diesel
KW rating: 2000 standby
1825 prime

Emissions level: EPA NSPS Stationary Emergency Tier 2

➤ **Generator set data sheet**

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Exhaust emission data sheet:	EDS-1065
Exhaust emission compliance sheet:	EPA-1099
Sound performance data sheet:	
Cooling performance data sheet:	MCP-158
Prototype test summary data sheet:	PTS-267
Standard set-mounted radiator cooling outline:	0500-4392
Optional set-mounted radiator cooling outline:	0500-4780
Optional heat exchanger cooling outline:	
Optional remote radiator cooling outline:	0500-4393

Fuel consumption	Standby				Prime				Continuous
	kW (kVA)				kW (kVA)				kW (kVA)
Ratings	2000 (2500)				1825 (2281)				
Load	1/4	1/2	3/4	Full	1/4	1/2	3/4	Full	Full
US gph	46.5	82	107.3	141.3	43.4	75.1	100.6	124.1	
L/hr	176	311	407	535	164	285	381	470	

Engine	Standby rating	Prime rating	Continuous rating
Engine manufacturer	Cummins Inc.		
Engine model	QSK60-G6 NR2		
Configuration	Cast iron, V 16 cylinder		
Aspiration	Turbocharged and low temperature aftercooled		
Gross engine power output, kWm (bhp)	2179 (2922)	1975 (2647)	
BMEP at set rated load, kPa (psi)	2420 (350)	2185 (316)	
Bore, mm (in)	159 (6.25)		
Stroke, mm (in)	190 (7.48)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	11.4 (2244)		
Compression ratio	14.5:1		
Lube oil capacity, L (qt)	334 (304)		
Overspeed limit, rpm	2100 ±50		
Regenerative power, kW	168		

Fuel flow		
Maximum fuel flow, L/hr (US gph)	946 (250)	
Maximum fuel inlet restriction, kPa (in Hg)	30 (9.0)	
Maximum fuel inlet temperature, °C (°F)	71 (160)	

Air	Standby rating	Prime rating	Continuous rating
Combustion air, m ³ /min (scfm)	178 (6295)	159 (5615)	
Maximum air cleaner restriction, kPa (in H ₂ O)	6.2 (25)		
Alternator cooling air, m ³ /min (cfm)	204 (7300)		

Exhaust			
Exhaust flow at set rated load, m ³ /min (cfm)	436 (15385)	385 (13580)	
Exhaust temperature, °C (°F)	488 (900)	466 (870)	
Maximum back pressure, kPa (in H ₂ O)	6.8 (27)		

Standard set-mounted radiator cooling			
Ambient design, °C (°F)	40 (104)		
Fan load, kW _m (HP)	57 (77)		
Coolant capacity (with radiator), L (US gal)	492 (130)		
Cooling system air flow, m ³ /min (scfm)	1922 (67870)		
Total heat rejection, MJ/min (Btu/min)	99.5 (94395)	91.0 (86382)	
Maximum cooling air flow static restriction, kPa (in H ₂ O)	0.12 (0.5)		
Maximum fuel return line restriction kPa (in Hg)	30 (9.0)		

Optional set-mounted radiator cooling			
Ambient design, °C (°F)	50 (122)		
Fan load, kW _m (HP)	57 (77)		
Coolant capacity (with radiator), L (US gal)	617 (163)		
Cooling system air flow, m ³ /min (scfm)	2795 (98700)		
Total heat rejection, MJ/min (Btu/min)	99.5 (94395)	91 (86382)	
Maximum cooling air flow static restriction, kPa (in H ₂ O)	0.12 (0.5)		
Maximum fuel return line restriction, kPa (in Hg)	30 (9.0)		

Optional heat exchanger cooling			
Set coolant capacity, L (US gal)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, aftercooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated to room, MJ/min (Btu/min)			
Maximum raw water pressure, jacket water circuit, kPa (psi)			
Maximum raw water pressure, aftercooler circuit, kPa (psi)			
Maximum raw water pressure, fuel circuit, kPa (psi)			
Maximum raw water flow, jacket water circuit, L/min (US gal/min)			
Maximum raw water flow, aftercooler circuit, L/min (US gal/min)			
Maximum raw water flow, fuel circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, jacket water circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, aftercooler circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, fuel circuit, L/min (US gal/min)			
Raw water delta P at min flow, jacket water circuit, kPa (psi)			
Raw water delta P at min flow, aftercooler circuit, kPa (psi)			
Raw water delta P at min flow, fuel circuit, kPa (psi)			
Maximum jacket water outlet temp, °C (°F)			
Maximum aftercooler inlet temp, °C (°F)			
Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F)			
Maximum fuel return line restriction, kPa (in Hg)			

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Optional remote radiator cooling¹	Standby rating	Prime rating	Continuous rating
Set coolant capacity, L (USg gal)			
Max flow rate at max friction head, jacket water circuit, L/min (US gal/min)	1902 (502)		
Max flow rate at max friction head, aftercooler circuit, L/min (US gal/min)	606 (160)		
Heat rejected, jacket water circuit, MJ/min (Btu/min)	46.9 (44526)	44.1 (41824)	
Heat rejected, aftercooler circuit, MJ/min (Btu/min)	33.9 (32156)	30.4 (28887)	
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated to room, MJ/min (Btu/min)	18.7 (17713)	16.5 (15671)	
Maximum friction head, jacket water circuit, kPa (psi)	69 (10)		
Maximum friction head, aftercooler circuit, kPa (psi)	48 (7)		
Maximum static head, jacket water circuit, m (ft)	18 (60)		
Maximum static head, aftercooler circuit, m (ft)	18 (60)		
Maximum jacket water outlet temp, °C (°F)	104 (220)	100 (212)	
Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F)	49 (120)		
Maximum aftercooler inlet temp, °C (°F)	66 (150)		
Maximum fuel flow, L/hr (US gph)			
Maximum fuel return line restriction, kPa (in Hg)	30 (9.0)		

Weights²

Unit dry weight kgs (lbs)	14628 (32249)
Unit wet weight kgs (lbs)	15155 (33410)

Notes:

¹ For non-standard remote installations contact your local Cummins Power Generation representative.

² Weights represent a set with standard features. See outline drawing for weights of other configurations.

Derating factors

Standby	Engine power available up to 447 m (1466 ft) at ambient temperatures up to 40 °C (104 °F). From 447 m (1466 ft) up to 2001 m (6562 ft) engine derates at 5.1% per 305 m (1000 ft) for 40 °C (104 °F). Above these elevations, derate an additional 5.8% per 305 m (1000 ft). For temperatures from 40 °C (104 °F) to 50 °C (122 °F) derate 14.6%. For temperatures above 50 °C (122 °F) derate 29% per 10 °C (50 °F).
Prime	Engine power available up to 447 m (1466 ft) at ambient temperatures up to 40 °C (104 °F). From 447 m (1466 ft) up to 2001 m (6562 ft) engine derates at 5.1% per 305 m (1000 ft) for 40 °C (104 °F). Above these elevations, derate an additional 5.8% per 305 m (1000 ft). For temperatures from 40 °C (104 °F) to 50 °C (122 °F) derate 14.6%. For temperatures above 50 °C (122 °F) derate 29% per 10 °C (50 °F).
Continuous	

Ratings definitions

Emergency standby power (ESP):	Limited-time running power (LTP):	Prime power (PRP):	Base load (continuous) power (COP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.

Alternator data

Voltage	Connection ¹	Temp rise degrees C	Duty ²	Single phase factor ³	Max surge kVA ⁴	Winding No.	Alternator data sheet	Feature Code
380	Wye, 3-phase	150/125/105	S/P/C		7327	13	ADS-515	B595
380	Wye, 3-phase	125/105/80	S/P/C		7327	13	ADS-515	B598
380	Wye, 3-phase	105/80	S/P		7327	13	ADS-515	B599
380	Wye, 3-phase	80	S		7963	13	ADS-516	B660
440	Wye, 3-phase	125/105/80	S/P/C		7361	312	ADS-334	B663
440	Wye, 3-phase	105	S		7284	12	ADS-515	B665
480	Wye, 3-phase	125/105/80	S/P/C		7361	312	ADS-334	B462
480	Wye, 3-phase	105/80	S/P		7695	312	ADS-335	B463
480	Wye, 3-phase	125/105	P/C		6716	312	ADS-332	B464
480	Wye, 3-phase	80	S		8412	12	ADS-516	B601
480	Wye, 3-phase	80	P		8412	12	ADS-516	B694
480	Wye, 3-phase	105	S		7695	12	ADS-517	B796
600	Wye, 3-phase	125/105/80	S/P/C		7361	07	ADS-334	B465
600	Wye, 3-phase	105/80	S/P		7695	07	ADS-335	B301
600	Wye, 3-phase	125/105	P/C		6716	07	ADS-333	B466
600	Wye, 3-phase	80	S		7265	07	ADS-516	B604
4160	Wye, 3-phase	125/105/80	S/P/C		6307	51	ADS-518	B467
4160	Wye, 3-phase	105/80	S/P		6307	51	ADS-518	B313
4160	Wye, 3-phase	80	S		6307	51	ADS-518	B605
4160	Wye, 3-phase	105	S		6307	51	ADS-520	B795
12470-13800	Wye, 3-phase	125/105/80	S/P/C		6062	91	ADS-521	B448
12470	Wye, 3-phase	105/80	S/P		6038	87	ADS-521	B567
13200-13800	Wye, 3-phase	105/80	S/P		6062	91	ADS-521	B612
12470	Wye, 3-phase	80	S		6685	87	ADS-522	B607
13200-13800	Wye, 3-phase	80	S		8012	91	ADS-523	B628
13800	Wye, 3-phase	80	S		6833	91	ADS-521	B610
13800	Wye, 3-phase	105	S		6062	91	ADS-523	B797

Notes:

¹ Limited single phase capability is available from some three phase rated configurations. To obtain single phase rating, multiply the three phase kW rating by the Single Phase Factor³. All single phase ratings are at unity power factor.

² Standby (S), Prime (P) and Continuous ratings (C).

³ Factor for the *Single Phase Output from Three Phase Alternator* formula listed below.

⁴ Maximum rated starting kVA that results in a minimum of 90% of rated sustained voltage during starting.

Formulas for calculating full load currents:

Three phase output

$$\frac{\text{kW} \times 1000}{\text{Voltage} \times 1.73 \times 0.8}$$

Single phase output

$$\frac{\text{kW} \times \text{SinglePhaseFactor} \times 1000}{\text{Voltage}}$$

Cummins Power Generation

1400 73rd Avenue N.E.
Minneapolis, MN 55432 USA
Phone: 763 574 5000
Fax: 763 574 5298

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

Our energy working for you.™

www.cumminspower.com

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Exhaust Emission Data Sheet

2000DQKAB*

60 Hz Diesel Generator Set

Engine Information:

Model:	Cummins Inc QSK60-G6 NR2	Bore:	6.25 in. (158 mm)
Type:	4 Cycle, 60°V, 16 Cylinder Diesel	Stroke:	7.48 in. (189 mm)
Aspiration:	Turbocharged and Low Temperature Air Aftercooled	Displacement:	3673 cu. In. (60.1 liters)
Compression Ratio:	14.5:1		
Emission Control Device:	Turbocharged and Low Temperature Aftercooled		

	1/4	1/2	3/4	Full	Full
PERFORMANCE DATA	Standby	Standby	Standby	Standby	Prime
BHP @ 1800 RPM (60 Hz)	730	1460	2189	2919	2639
Fuel Consumption (gal/Hr)	46.5	82	107.3	141.3	124.1
Exhaust Gas Flow (CFM)	6510	10220	12000	14920	13780
Exhaust Gas Temperature (°F)	772	838	873	893	884
EXHAUST EMISSION DATA					
HC (Total Unburned Hydrocarbons)	0.22	0.13	0.10	0.11	0.09
NOx (Oxides of Nitrogen as NO ₂)	2.70	3.10	4.70	5.30	6.00
CO (carbon Monoxide)	0.57	0.36	0.13	0.18	0.16
PM (Particular Matter)	0.16	0.14	0.04	0.04	0.02
SO ₂ (Sulfur Dioxide)	0.14	0.13	0.11	0.11	0.11
Smoke (Bosch)	0.50	0.60	0.20	0.20	0.10

All values are Grams per HP-Hour, Smoke is Bosch#

TEST CONDITIONS

Data is representative of steady-state engine speed (± 25 RPM) at designated genset loads. Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:	ASTM D975 No. 2-D diesel fuel with 0.03-0.05% sulfur content (by weight), and 40-48 cetane number.
Fuel Temperature:	99 ± 9 °F (at fuel pump inlet)
Intake Air Temperature:	77 ± 9 °F
Barometric Pressure:	29.6 ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H ₂ O/lb dry air
Reference Standard:	ISO 8178

The NOx, HC, CO and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.



EPA Tier 2 Exhaust Emission Compliance Statement 2000DQKAB 60 Hz Diesel Generator Set

Compliance Information:

The engine used in this generator set complies with the Tier 2 emissions limits of U.S EPA New Source Performance Standards for Stationary Emergency engines under the provisions of 40 CFR 60 Subpart IIII when tested per ISO 8178 D2.

Engine Manufacturer:	Cummins Inc
EPA Certificate Number:	CEX-STATCI-11-06
Effective Date:	06/08/2010
Date Issued:	06/08/2010
EPA Diesel Engine Family:	BCEXL060.AAD
CARB Executive Order:	

Engine Information:

Model:	Cummins Inc QSK60-G6 NR2	Bore:	6 25 in. (159 mm)
Engine Nameplate HP:	2922		
Type:	4 Cycle, 60°V, 16 Cylinder Diesel	Stroke:	7.48 in. (190 mm)
Aspiration:	Turbocharged and Low Temperature Aftercooled	Displacement:	3673 cu. in (60.2 liters)
Compression Ratio:	14.5:1		
Emission Control Device:	Turbocharged and Low Temperature Aftercooled		

U.S. Environmental Protection Agency NSPS Stationary Emergency Tier 2 Limits

(All values are Grams per HP-Hour)

<u>COMPONENT</u>	
NOx + HC (Oxides of Nitrogen as NO2 + Non Methane Hydrocarbons)	4.77
CO (Carbon Monoxide)	2.61
PM (Particulate Matter)	0.15

Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.



Facility and Project Information Submittal Form for Modeling Requirements Determination Form APCD-114

Please answer all questions on this form. If requested information does not apply to your project insert "N/A". Form completion and submission of all associated documentation is required to obtain a Permit Modeling Unit (PMU) Determination. This Determination must describe and include all substantially related changes to the source that are being made as part of the modification(s) leading to this permit action, even if those changes are being, or have been, submitted under a separate application and even if those changes are not being permitted as part of this permit action. All information submitted to obtain this modeling determination must be the same as that submitted to the Division's permitting staff in support of the permit application, including, but not limited to, requested emission limitations, requested annual operating hours, facility configuration, and stack characteristics provided on the APEN. Any changes to this information can result in the need for a new modeling determination. Please submit this form and all attachments to cdphe_apcd_modelingdeterminations@state.co.us

1) Date: _____

2) Company Name: _____

3) Company contact information

Name: _____

Email: _____

Phone number: _____

4) Applicant contact information (If different than company contact)

Name: _____

Email: _____

Phone number: _____

5) Facility name: _____

6) Is this a new facility or modification to an existing facility? New facility ☐ Modification ☐

If new, please provide (LAT/LONG or UTM) _____

List a description of existing modified and new emission points (including APEN and Permit exempt sources), AIRS ID number, and location (LAT/LONG or UTM)

Description	AIRS ID Number	LAT/LONG or UTM
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Provide a detailed description of all changes to the source that are “substantially related” as that term is defined in EPA’s “Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR): Aggregation and Project Netting” 74 Fed. Reg. 2376, 2377 (January 15, 2009) and EPA’s 2018 Reinstatement Rule, 83 Fed. Reg. 57324 (Nov. 15, 2018) (Units moving? Operational changes?). Please identify which of the substantially related changes are part of the current permit action, and which may have been separately permitted.

7) Does the proposed project include a new General Permit Registration to GP01, GP02, GP05, GP06, GP07, GP08, GP09, GP10, and/or GP11? If so, please identify the applicable General Permit for each applicable Source ID:

Source ID	General Permit Number

035/0404/0016 Emergency Generators39.560792, -104.857349

6.15263.370.33

035/0404/0022 Emergency Generators104.857349

6.15263.370.33

Yes ☐

No ☐

No

9) Please provide 1:24,000 Topographical map with the modified or new emissions point(s), structures and site boundary shown.

10) **Attach** facility criteria pollutant (NOX, SO2, CO, PM10 and PM2.5) potential to emit (PTE) emission estimates for all modified and new emission units, as well as facility totals, before and after this modification (including all substantially related changes) and the total change in emissions. Include fugitive and APEN and Permit exempt emission units. Provide release parameters for each emissions unit (as provided in tables below). Include the Form APCD-102 for the facility. The tables below provide a guide for the information required to make the modeling determination. Please provide details in an attachment as the below tables do not provide adequate space.

Point Sources (e.g. stacks and isolated vents) with a vertical release (not a flare)									
Pollutant:									
Source ID	Description of source	Location LAT/LONG or UTM	Emission rate (tpy)	Emission rate (lb/hr)	Source release height above ground (m)	Stack gas exit temperature (K)	Stack gas exit velocity (m/s)	Stack inside diameter (m)	Capped, J-tube, or Horizontal release?
Example. Do not complete this table. Please attach information according to instructions.									



Flares

Pollutant:

Source ID	Description of source	Location LAT/LONG or UTM	Emission rate (tpy)	Emission rate (lb/hr)	Effective Stack Height Value (m)	Stack gas exit temperature Value (K)	Stack gas exit velocity Value (m/s)	Effective Stack inside Diameter Value (m)
NA								

Calculate the effective stack parameters for flares as discussed in the AERSCREEN User's Guide. For ECDs provide source release height and stack inside diameter.

Volume Sources (releases at an elevation e.g. multiple vents, conveyor belts)

		Pollutant:					
Source ID	Description of source	Location LAT/LONG or UTM	Emission rate (tpy)	Emission rate (lb/hr)	Release height	Initial lateral dimension σ_y	Initial vertical dimension σ_z
					Value (m)	Value (m)	Value (m)
Example. Do not complete this table. Please attach information according to instructions.							

Use procedures in Table 3-2 of the AERMOD User's Guide to calculate vertical and lateral dimensions.

Area Sources (low level releases e.g. storage piles, slag dumps, lagoons)

Pollutant:							
Source ID	Description of source	Location LAT/LONG or UTM	Emission rate (tpy)	Emission rate (lb/hr)	Release height Value (m)	Length of side X- and Y-dimension Values (m)	Initial vertical dimension σ_z Value (m)

Use this table to include Areacircle and Areapoly sources as well.

Openpit Sources

Pollutant:							
Source ID	Description of source	Location	Emission rate (tpy)	Emission rate (lb/hr)	Release height value (m)	Length of side values (m)	Initial vertical dimension value (m)
	The generators are located outside on the north side of the data center building. See attached aerial of the generator locations and surrounding structures.						

11) Please provide Operation Schedule:

Daily starting and ending hours (eg. 7am- 5pm): _____

Days of the week (eg. Monday-Friday): _____

- 12) If emissions points are located adjacent to buildings or other structures, please provide structure dimensions.

Building Description	Height (m)	Length (m)	Width (m)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

- 13) Has this facility been modeled before? Yes ☐ No ☐
 If yes, provide any records of previous modeling demonstrations that the facility will not cause or contribute to a violation of the NAAQS.

- 14) If you do not believe modeling should be required, please provide clear justification for this along with the information requested above.

- 15) Has a permit application already been submitted for this facility and still awaiting permit approval? Yes ☐ No ☐
 If yes, when was the application submitted?

----- INTERNAL USE ONLY - DO NOT WRITE BELOW THIS LINE -----

- 1) Modeling determination identification number_____
- 2) Existing Source Facility ID and AIRS number_____
- 3) Based on the application information submitted, is modeling needed to complete the required NAAQS analysis?
Yes ☐ No ☐
- 4) Justification for Modeling Determination (e.g., previous NAAQS modeling demonstration has been made).
- 5) If modeling is required, which criteria pollutants and averaging periods need to be modeled to demonstrate compliance with the National Ambient Air Quality Standards and Colorado Ambient Air Quality Standards?
- 6) If modeling is needed, provide modeling procedure guidance.
- 7) Date modeling decision provided to Applicant and CDPHE Permitting Representative.
- 8) Number of hours spent on modeling determination

**Legend**

Equinix Data Center Property Boundary

Equinix Data Center
335 Inverness Dr
South Englewood, CO

Table 1. Point Source emission characteristics (e.g. stacks and isolated vents) with a vertical release (not a flare)

Source ID	035/0404/001, Six Emergency Generators								
Pollutant:	Individual Emission rate (tpy)	Individual Emission rate (lb/hr)	Combined Emission rate (tpy)	Location LAT/LONG or UTM	Source release height above ground (m)	Stack gas exit temperature (K)	Stack gas exit velocity (m/s)	Stack inside diameter (m)	Capped, J-tube, or Horizontal release?
PM/PM10/PM2.5	0.05	0.64	0.27	39.560792, -104.857349	6.1	526	3.37	0.33	No
SO2	0.26	3.74	1.57						
NOx	3.16	45.09	18.94						
CO	0.41	5.8	2.44						

Source ID	035/0404/002, Two Emergency Generators								
Pollutant:	Individual Emission rate (tpy)	Individual Emission rate (lb/hr)	Combined Emission rate (tpy)	Location LAT/LONG or UTM	Source release height above ground (m)	Stack gas exit temperature (K)	Stack gas exit velocity (m/s)	Stack inside diameter (m)	Capped, J-tube, or Horizontal release?
PM/PM10/PM2.5	0.02	0.26	0.04	39.560792, -104.857349	6.1	526	3.37	0.33	No
SO2	0.05	0.71	0.1						
NOx	2.39	34.11	4.77						
CO	0.08	1.16	0.16						

Table 2. Pre/Post Project Emission comparison

	Pollutant (tons/year)				
	NOx	CO	VOC	SO ₂	PM/PM10/PM2.5
Current Potential Emissions	35.67	7.10	0.08	0.21	0.11
Proposed Potential Emissions	23.71	2.60	0.64	1.67	0.31
Difference	-11.96	-4.50	0.57	1.46	0.19
Long term modeling Thresholds	40	-	-	40	5
Exceeds Modeling Threshold?	NO	NO	NO	NO	NO

Equinix, LLC
335 Inverness Drive South, Englewood, CO
Table 3 Summary Sheet

Source Description	Potential Emissions (tpy)					
	NOx	CO	VOC	SO ₂	PM	HAPs
AIRS 001	18.94	2.44	0.54	1.57	0.27	0.01
AIRS 002	4.77	0.16	0.10	0.10	0.04	0.00
Total Facility Emissions	23.71	2.60	0.64	1.67	0.31	0.01

Table 4

Emission Calculations for Engines Using Manufacturer Data

Type Emission Unit Six Cummins 2000DQKC Diesel Engines

Generator Kilowatt: 2179 kW

Horsepower: 2922.00 hp

Fuel Consumption: 141.3 gal/hr

Fuel Flow Rate: 19.59831 MMBtu/hr

Heating Value: 0.1387 MMBtu/gal

2922.0 Horsepower

19.6 MMBtu/hr

Fuel Type: No. 2 Fuel Oil

Hours/Year Per Engine 140

Count of Engines 6

Total Hours/Year Potential 840

Pollutant	Manufacturer's Data		Individual Engine PTE		AIRS ID 01 PTE
	(g/hp*hr)	(lb/MMBtu)	(lb/hr)	(ton/yr)	(ton/yr)
PM	0.10		0.64	0.05	0.27
PM10/PM2.5	0.10		0.64	0.05	0.27
SOx	0.58		3.74	0.26	1.57
NOx	7.00		45.09	3.16	18.94
VOC	0.20		1.29	0.09	0.54
CO	0.90		5.80	0.41	2.44
Benzene (BIN A)		7.76E-04	1.52E-02	1.06E-03	6.39E-03
Toluene (BIN C)		2.81E-04	5.51E-03	3.85E-04	2.31E-03
Xylene (BIN C)		1.93E-04	3.78E-03	2.65E-04	1.59E-03
Formaldehyde (BIN A)		7.89E-05	1.55E-03	1.08E-04	6.49E-04
Acetaldehyde (BIN A)		2.52E-05	4.94E-04	3.46E-05	2.07E-04
Acrolein (BIN A)		7.88E-06	1.54E-04	1.08E-05	6.49E-05
Naphthalene (BIN B)		0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 5

Emission Calculations for Engines Using Manufacturer Data

Type Emission Unit Two Cummins QSK60-G6 Diesel Engines

Generator Kilowatt: 2179 kW

Horsepower: 2919 hp

Fuel Consumption: 141.3 gal/hr

Fuel Flow Rate: 19.59831 MMBtu/hr

Heating Value: 0.1387 MMBtu/gal

2919.0 Horsepower

19.6 MMBtu/hr

Fuel Type: No. 2 Fuel Oil

Hours/Year Per Engine 140

Count of Engines 2

Total Hours/Year Potential 280

Pollutant	Manufacturer's Data		Individual Engine PTE		AIRS ID 02 PTE
	(g/hp*hr)	(lb/MMBtu)	(lb/hr)	(ton/yr)	(ton/yr)
PM	0.04		0.26	0.02	0.04
PM10/PM2.5	0.04		0.26	0.02	0.04
SOx	0.11		0.71	0.05	0.10
NOx	5.30		34.11	2.39	4.77
VOC	0.11		0.71	0.05	0.10
CO	0.18		1.16	0.08	0.16
Benzene (BIN A)		7.76E-04	1.52E-02	1.06E-03	2.13E-03
Toluene (BIN C)		2.81E-04	5.51E-03	3.85E-04	7.71E-04
Xylene (BIN C)		1.93E-04	3.78E-03	2.65E-04	5.30E-04
Formaldehyde (BIN A)		7.89E-05	1.55E-03	1.08E-04	2.16E-04
Acetaldehyde (BIN A)		2.52E-05	4.94E-04	3.46E-05	6.91E-05
Acrolein (BIN A)		7.88E-06	1.54E-04	1.08E-05	2.16E-05
Naphthalene (BIN B)		0.00E+00	0.00E+00	0.00E+00	0.00E+00