BLUE SKY ENVIRONMENTAL LLC

August 12, 2014

Bonnie Braganza
Federal Minor NSR Permit Coordinator (PDR)
U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue; Ste 1200
Dallas, Texas 75202-2733

Re: Amendment to Federal Minor New Source Review (NSR) Application for Indian Country Sandia Resort and Casino, Albuquerque, New Mexico

Dear Ms. Braganza:

On behalf of the Pueblo of Sandia, a sovereign tribal nation located in Bernalillo and Sandoval Counties, New Mexico, attached please find an amendment to the Federal Minor Source Review (NSR) application under EPA's Federal Minor NSR Program in Indian Country that was submitted to you on August 30, 2012. This amendment is in regards to two new 4,000 kW generators with certified Tier 2 emergency engines that will be installed later this year. Since these generators will be used for emergency use only, you recommended that a registration be submitted. This application is in regards to the sources at the Sandia Resort and Casino located at 30 Rainbow Road NE, Albuquerque, New Mexico. The facility is currently working on the upgrades to the three older generators (or subset) so that the engines meet the non-emergency requirements of the RICE NESHAP. Until the engines are upgraded, the generators are used for emergency and testing/maintenance use only.

The Pueblo of Sandia appreciates your review of the application and future issuance of this synthetic minor permit.

If you have any questions or require additional information, please do not hesitate to contact me at 617-834-8408 or at don@blueskyenviro.com.

Sincerely,
Blue Sky Environmental LLC

Don C. DiCristofaro, CCM
President
Attachments

cc: Joseph M. Rodriquez, Sandia Resort and Casino Facility Superintendent

P.O. Box 603 • Hingham, MA • 02043
Telephone 617-834-8408 •Fax 857-221-9464

Narrative Description

On July 13, 2009 the Sandia Resort and Casino (the "Casino"), an instrumentality of a federally recognized Indian tribe submitted a notification regarding three electrical generators at the Casino located at 30 Rainbow Road NE in Albuquerque, New Mexico at the Pueblo of Sandia Indian land. The notification was submitted pursuant to the EPA Memorandum entitled *Potential to Emit (PTE) Transition Policy for Part 71 Implementation in Indian Country* from John S. Seitz, Director, Office of Air Quality Planning and Standards, and Eric V. Schaeffer, Director, Office of Regulatory Enforcement, dated March 7, 1999 ("EPA Transition Memo"). As per the EPA Transition Memo, the EPA treated a source as non-major for the purposes of the Federal Operating Permits Program (Part 71) if its actual emissions are and remain below 50 percent of the PTE thresholds for major source status, for every consecutive 12-month period (beginning with the 12 months immediately preceding March, 1999) and it maintains adequate records to demonstrate that its actual emissions are kept below these levels. On July 1, 2011, the EPA promulgated the final rule for New Source Review ("NSR") in Indian Country. The final rule became effective on August 30, 2011. The EPA Transition Memo specifies that the PTE transition policy terminates when EPA adopts and implements a mechanism that can be used to limit PTE or EPA explicitly provides such a mechanism. Since this new minor NSR program for Indian Country adopts and implements a mechanism that can be used to limit PTE the PTE transition policy has been terminated by EPA. For sources, such as the Casino, that are currently operating under the EPA Transition Memo, synthetic minor permit applications are required by EPA by September 4, 2012. The synthetic minor permit application was submitted to EPA by the tribe on August 30, 2012.

Since the 2012 filing with EPA, the facility plans to install two Caterpillar 4,000 kW generators, Engine Model C175-20 (Model Year 2014, Tier 2 Certified, Emergency Use Only), later this year. Thus, the facility will operate the following emission sources:

- Two Caterpillar 4,000 kW Generators with 5,646 hp engines Model C175-20, Tier 2 Certified, Emergency Use Only (To be installed in late 2014)
- Two Detroit Diesel Model DDC 16V-4000 rated diesel stand-by generators, 2935 hp each
- One Detroit Diesel Model MTV 1000 rated diesel stand-by generator, 1,676 hp
- Thirteen 2.07 mmBtu/hr natural gas fired boilers
- Four 0.99 mmBtu/hr natural gas fired boilers

The three Detroit Diesel generators are existing units and are currently used solely for emergency power during periods when electrical power from the local utilities is not available, testing/maintenance, and for non-emergency demand response ("DR") once the engines are upgraded. The two new generators to be installed in late 2014 will have Tier 2 certified emergency only engines so the generators will be used for emergency use and

testing/maintenance only. The generators are driven by diesel-fueled reciprocating internal combustion engines ("RICE") which are sources of emissions of regulated air pollutants and hazardous air pollutants ("HAPs"). The HAP emissions of the engines are insignificant as defined by 40 CFR 71.5(11)(ii)(B)[1].

Once the engines for the three older generators (or a subset) have been upgraded to meet the non-emergency requirements of the RICE NESHAP as per 40 CFR 63 Subpart ZZZZ, the Casino plans to reenter the three generators (or a subset) back into a non-emergency demand response ("DR") program that could be called a maximum of 100 hours per year. The generators continue to operate for emergencies when electrical power is not available from the local utility and for testing/maintenance. All electrical generation is used onsite; electrical power is not sent to the grid. The generators are owned and operated by the Casino; however, participation in the DR program is managed by EnerNOC, Inc.

Bernalillo County, New Mexico falls is currently designated as an unclassified/attainment area with a major source threshold for oxides of nitrogen ("NO_x") of 100 tons per year ("tpy").

Attached (see Attachment 1) is a facility emissions analysis that includes all fuel burning sources onsite including the two new generators that are being installed in late 2014. Both criteria pollutant and greenhouse gas emissions are provided. In addition the proposed worst-case rates are included. The emissions from the generators are derived from the attached (see Attachment 3) Exhaust Emission Data Sheets as provided by the engine manufacturer for generators #1 and 2 (and the two new generators #4 and 5) and from EPA AP-42 for generator #3. In addition to the five generators, there are seventeen natural gas-fired boilers. No emission controls are used. The allowable emissions are based on 500 hours per year for all generators and a conservative 8,760 hours per year of operation for the natural gas fired units. Using this assumption the worst-case annual NO_x emissions from the facility are 87.4 tpy, well below the 100 tpy major source threshold. Since the engines do not operate at 100% load, fuel usage from the five engines will be tracked to ensure that the 12-month rolling average does not exceed 457,812 gallons (see Attachment 1, Operating and Firing Rates for details). Also, shown in the attached emissions analysis, the potential HAP emissions are insignificant as per 40 CFR 71.5(11)(ii)(B) since the PTE is less than 1,000 lbs/year. The Casino will keep records onsite to demonstrate that emissions are below these thresholds. These records will include hours of operation for each generator and total fuel usage.

Criteria Pollutant Emissions Estimates

The criteria pollutant emissions estimates (allowable and PTE) along with the source of the emission factors are presented in Attachment 1. Greenhouse gas emission estimates are also

[1] Potential to emit of any HAP from any single emission unit shall not exceed 1,000 lb per year or the de minimis level established under section 112(g) of the Act, whichever is less.

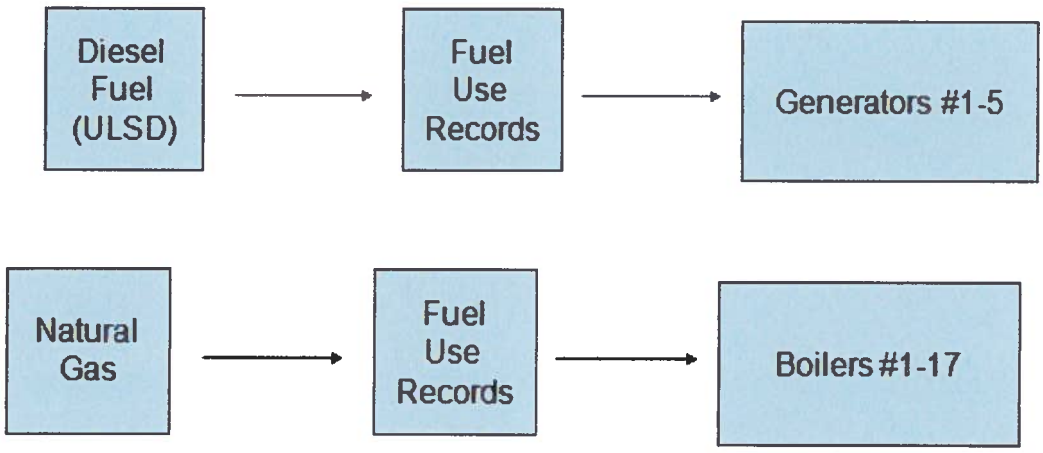
provided in Attachment 1. The emission factors used for the engines and other fuel burning equipment are included. The engine specification data sheets for the two new Caterpillar engines are presented in Attachment 2.

Operating and Firing Rates

The proposed operating and firing rates are provided in Attachment 1.

Process Flow Diagrams

The Process Flow Diagrams for the facility's fuel burning equipment is as follows:



The five generators use ultra low sulfur diesel fuel only (sulfur content 0.0015% or less). The three older generators have their own 500 gallon storage fuel tank. The three older generators were installed prior to June 12, 2006. Thus, the three older generators operate under the EPA RICE NESHAP (40 CFR 63 Subpart ZZZZ). The engines associated with the two newest generators are Tier 2 emergency certified with a manufacture year of 2014; thus, they operate under the EPA New Source Performance Standards (40 CFR 60 Subpart IIII) as emergency engines. The boilers use natural gas only.

Forms

Since the two newest generators will be used for emergency only, a Registration for Existing Sources (Form REG) is included in Attachment 3.

Attachment 1

Facility Emissions: Proposed Allowable, Potential, and GHG; Operating and Firing Rates

Facility Emissions Analysis - Allowable

Sandia Resort and Casino
30 Rainbow Road NE
Albuquerque, NM 87113-2156

Source	Make	Model	Size (hp)	Size (kW)	Fuel	Fuel Use (gph or scfh)	Heat Input (mmBtu/hr)	Emissions (lb/hr) NOx	CO	SO2	PM	PM2.5	PM10	VOC	Pb	Hours	Proposed Allowable Emissions (tpy) NOx	CO	SO2	PM	PM2.5	PM10	VOC	Pb	Fluorides	H2SO4	H2S	TRS
Generator #1	Detroit Diesel	DDC 16V-4000	2935	2190	Diesel	133.2	17.98	44.65	55.00	0.03	2.59	2.59	2.59	6.28	0	500	11.16	13.75	6.81E-03	0.65	0.65	0.65	1.57	0	0	0	0	0
Generator #2	Detroit Diesel	DDC 16V-4000	2935	2190	Diesel	133.2	17.98	44.65	55.00	0.03	2.59	2.59	2.59	6.28	0	500	11.16	13.75	6.81E-03	0.65	0.65	0.65	1.57	0	0	0	0	0
Generator #3	Detroit Diesel	MTV 1000	1678	1250	Diesel	100.0	13.50	40.22	9.22	0.02	1.17	1.17	1.17	1.18	0	500	10.06	2.30	5.11E-03	0.29	0.29	0.29	0.30	0	0	0	0	0
Generator #4 (NEW)	Caterpillar	C175-20	5646	4000	Diesel	274.6	37.07	83.52	7.98	0.06	0.69	0.69	0.69	0.78	0	500	20.88	2.00	1.40E-02	0.17	0.17	0.17	0.20	0	0	0	0	0
Generator #5 (NEW)	Caterpillar	C175-20	5646	4000	Diesel	274.6	37.07	83.52	7.98	0.06	0.69	0.69	0.69	0.78	0	500	20.88	2.00	1.40E-02	0.17	0.17	0.17	0.20	0	0	0	0	0
Boiler #1					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #2					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #3					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #4					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #5					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #6					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #7					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #8					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #9					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #10					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #11					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #12					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #13					Natural Gas	2029.4	2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #14					Natural Gas	970.6	0.99	0.10	0.08	5.82E-04	1.54E-02	1.54E-02	1.54E-02	5.34E-03	4.85E-07	8760	0.43	0.36	2.55E-03	0.07	0.07	0.07	0.02	2.13E-06	0	0	0	0
Boiler #15					Natural Gas	970.6	0.99	0.10	0.08	5.82E-04	1.54E-02	1.54E-02	1.54E-02	5.34E-03	4.85E-07	8760	0.43	0.36	2.55E-03	0.07	0.07	0.07	0.02	2.13E-06	0	0	0	0
Boiler #16					Natural Gas	970.6	0.99	0.10	0.08	5.82E-04	1.54E-02	1.54E-02	1.54E-02	5.34E-03	4.85E-07	8760	0.43	0.36	2.55E-03	0.07	0.07	0.07	0.02	2.13E-06	0	0	0	0
Boiler #17					Natural Gas	970.6	0.99	0.10	0.08	5.82E-04	1.54E-02	1.54E-02	1.54E-02	5.34E-03	4.85E-07	8760	0.43	0.36	2.55E-03	0.07	0.07	0.07	0.02	2.13E-06	0	0	0	0
TOTAL																	87.40	44.93	0.13	3.08	3.08	3.08	4.55	6.83E-05	0.00	0.00	0.00	0.00

Notes:
Fuel Use for Generators #1 and 2, 4 and 5 from manufacturer's data sheet. Fuel Use for Generator #3 estimated as 0.08*kW. Estimated Heat Input = gal/hr * 135,000 Btu/gal
Engine rating conservatively assumes 100% load

Emission Factors:

Emergency Generators	Generators #1-2	Generator #3		Generators #4 and 5
	Source: Manufacturer	Source: EPA AP-42, Fifth Edition, October, 1996		Source: Manufacturer
	Detroit Diesel DDC 16V4000 T163/KD6-180			Caterpillar C175-20
	g/hp-hr	Diesel > 600 hp	lb/hp-hr	lb/hr
NOx	6.9		0.024	83.52
VOC	0.97		7.05E-04	0.78
CO	8.5		5.50E-03	7.98
PM, PM2.5, PM10	0.4		0.0007	0.69
			lb/mmBtu	
SOx	Use AP-42	SOx	0.001515 Assumes 0.0015% sulfur	Use AP-42
		Pb	0	
		Flourides	0	
		H2SO4	0	
		H2S	0	
		TRS	0	

Boilers
Source: EPA AP-42, Fifth Edition, October 1996, Tables 1.4-1 and 1.4-2 for Small Boilers (< 100 mmBtu/hr)

	lb/10^6 scf
NOx	100
VOC	5.5
CO	84
PM, PM2.5, PM10	7.6
SOx	0.6
Pb	0.0005
Flourides	0
H2SO4	0
H2S	0
TRS	0

Hazardous Air Pollutant (HAP) Analysis For One Engine
Source: EPA AP-42, Tables 3.4-3 and 3.4-4, Engines > 600 hp

	lb/mmBtu	lb/hr	PTE (8,760 hours) lbs
Benzene	7.76E-04	1.40E-02	122.2
Toluene	2.81E-04	5.05E-03	44.3
Xylenes	1.93E-04	3.47E-03	30.4
Propylene	2.79E-03	5.02E-02	439.5
Formaldehyde	7.89E-05	1.42E-03	12.4
Acetaldehyde	2.52E-05	4.53E-04	4.0
Acrolein	7.88E-06	1.42E-04	1.2
Total PAH	2.12E-04	3.81E-03	33.4

Facility Emissions Analysis - Potential

Sandia Resort and Casino
30 Rainbow Road NE
Albuquerque, NM 87113-2156

Source	Make	Model	Size (hp)	Size (kW)	Fuel	Fuel Use (gph or scfh)	Heat Input (mmBtu/hr)	Emissions (lb/hr) NOx	CO	SO2	PM	PM2.5	PM10	VOC	Pb	Hours	Potential Emissions (tpy) NOx	CO	SO2	PM	PM2.5	PM10	VOC	Pb	Fluorides	H2SO4	H2S	TRS
Generator #1	Detroit Diesel	DDC 16V-4000	2935	2190	Diesel	133.2		17.98	44.65	55.00	0.03	2.59	2.59	2.59	6.28	0	8760	196.55	240.90	1.19E-01	11.34	11.34	11.34	27.49	0	0	0	0	0
Generator #2	Detroit Diesel	DDC 16V-4000	2935	2190	Diesel	133.2		17.98	44.65	55.00	0.03	2.59	2.59	2.59	6.28	0	8760	196.55	240.90	1.19E-01	11.34	11.34	11.34	27.49	0	0	0	0	0
Generator #3	Detroit Diesel	MTV 1000	1678	1250	Diesel	100.0		13.50	40.22	9.22	0.02	1.17	1.17	1.17	1.18	0	8760	178.18	40.37	8.96E-02	5.14	5.14	5.14	5.18	0	0	0	0	0
Generator #4 (NEW)	Caterpillar	C175-20	5646	4000	Diesel	274.6		37.07	83.52	7.98	0.06	0.69	0.69	0.69	0.78	0	8760	365.82	34.95	2.46E-01	3.02	3.02	3.02	3.42	0	0	0	0	0
Generator #5 (NEW)	Caterpillar	C175-20	5646	4000	Diesel	274.6		37.07	83.52	7.98	0.06	0.69	0.69	0.69	0.78	0	8760	365.82	34.95	2.46E-01	3.02	3.02	3.02	3.42	0	0	0	0	0
Boiler #1					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #2					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #3					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #4					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #5					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #6					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #7					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #8					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #9					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #10					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #11					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #12					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #13					Natural Gas	2029.4		2.07	0.20	0.17	1.22E-03	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #14					Natural Gas	970.6		0.99	0.10	0.08	5.82E-04	1.54E-02	1.54E-02	1.54E-02	1.12E-02	1.01E-06	8760	0.89	0.75	5.33E-03	0.07	0.07	0.07	0.05	4.44E-06	0	0	0	0
Boiler #15					Natural Gas	970.6		0.99	0.10	0.08	5.82E-04	1.54E-02	1.54E-02	1.54E-02	5.34E-03	4.85E-07	8760	0.43	0.36	2.55E-03	0.07	0.07	0.07	0.02	2.13E-06	0	0	0	0
Boiler #16					Natural Gas	970.6		0.99	0.10	0.08	5.82E-04	1.54E-02	1.54E-02	1.54E-02	5.34E-03	4.85E-07	8760	0.43	0.36	2.55E-03	0.07	0.07	0.07	0.02	2.13E-06	0	0	0	0
Boiler #17					Natural Gas	970.6		0.99	0.10	0.08	5.82E-04	1.54E-02	1.54E-02	1.54E-02	5.34E-03	4.85E-07	8760	0.43	0.36	2.55E-03	0.07	0.07	0.07	0.02	2.13E-06	0	0	0	0
TOTAL																		1312.18	803.22	0.90	35.00	35.00	35.00	67.72	6.63E-05	0.00	0.00	0.00	0.00

Notes:
Fuel Use for Generators #1 and 2 from manufacturer's data sheet. Fuel Use for Generator #3 estimated as 0.08*kW. Estimated Heat Input = gal/hr * 135,000 Btu/gal
Engine rating conservatively assumes 100% load.

Emission Factors:

Emergency Generators — Generators #1-2
Source: Manufacturer
Detroit Diesel DDC 16V4000
T1637K35-3380

	g/hp-hr
NOx	6.9
VOC	0.97
CO	8.5
PM, PM2.5, PM10	0.4

Generator #3
Source: EPA AP-42, Fifth Edition, October, 1996

	lb/hp-hr
Diesel > 600 hp	0.024
	7.05E-04
	5.50E-03
	0.0007
	lb/mmBtu
SOx	0.001515 Assumes 0.0015% sulfur
Pb	0
Flourides	0
H2SO4	0
H2S	0
TRS	0

Generators #4 and 5
Source: Manufacturer
Caterpillar
C175-20

	lb/hr	
	83.52	
	0.78	
	7.98	
	0.69	
SOx		Use AP-42

Boilers
Source: EPA AP-42, Fifth Edition, October 1996, Tables 1.4-1 and 1.4-2 for Small Boilers (< 100 mmBtu/hr)

	lb/10^6 scf
NOx	100
VOC	5.5
CO	84
PM, PM2.5, PM10	7.6
SOx	0.6
Pb	0.0005
Flourides	0
H2SO4	0
H2S	0
TRS	0

Hazardous Air Pollutant (HAP) Analysis for One Engine
Source: EPA AP-42, Tables 3.4-3 and 3.4-4, Engines > 600 hp

	lb/mmBtu	lb/hr	PTE (8,760 hours) lbs
Benzene	7.76E-04	1.40E-02	122.2
Toluene	2.81E-04	5.05E-03	44.3
Xylenes	1.93E-04	3.47E-03	30.4
Propylene	2.79E-03	5.02E-02	439.5
Formaldehyde	7.89E-05	1.42E-03	12.4
Acetaldehyde	2.52E-05	4.53E-04	4.0
Acrolein	7.88E-06	1.42E-04	1.2
Total PAH	2.12E-04	3.81E-03	33.4

Facility Emissions Analysis - Greenhouse Gas Emissions

Sandia Resort and Casino
30 Rainbow Road NE
Albuquerque, NM 87113-2156

Source	Make	Model	Size (kW)	Size (bhp)	Fuel	Fuel Use (gph or scfh)	Heat Input (mmBtu/hr)	Hours	CO2	CH4	N2O	HFCs (metric tons)	PFCs	SF6	CO2e
Generator #1	Detroit Diesel	DDC 16V-4000	2935	2190	Diesel	133.2	17.98	500	679.75	0.03	0.01	0.00	0.00	0.00	682.04
Generator #2	Detroit Diesel	DDC 16V-4000	2935	2190	Diesel	133.2	17.98	500	679.75	0.03	0.01	0.00	0.00	0.00	682.04
Generator #3	Detroit Diesel	MTV 1000	1250	1676	Diesel	134.1	18.10	500	684.24	0.03	0.01	0.00	0.00	0.00	686.55
Generator #4 (NEW)	Caterpillar	C175-20	5646	4000	Diesel	274.6	37.07	500	1401.35	0.06	0.01	0.00	0.00	0.00	1406.07
Generator #5 (NEW)	Caterpillar	C175-20	5646	4000	Diesel	274.6	37.07	500	1401.35	0.06	0.01	0.00	0.00	0.00	1406.07
Boiler #1					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #2					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #3					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #4					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #5					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #6					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #7					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #8					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #9					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #10					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #11					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #12					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #13					Natural Gas	2029.4	2.07	8760	968.96	0.02	0.00	0.00	0.00	0.00	969.91
Boiler #14					Natural Gas	970.6	0.99	8760	463.42	0.01	0.00	0.00	0.00	0.00	463.87
Boiler #15					Natural Gas	970.6	0.99	8760	463.42	0.01	0.00	0.00	0.00	0.00	463.87
Boiler #16					Natural Gas	970.6	0.99	8760	463.42	0.01	0.00	0.00	0.00	0.00	463.87
Boiler #17					Natural Gas	970.6	0.99	8760	463.42	0.01	0.00	0.00	0.00	0.00	463.87
TOTAL									19296.63	0.47	0.07	0.00	0.00	0.00	19327.12

Operating and Firing Rates

Sandia Resort and Casino
30 Rainbow Road NE
Albuquerque, NM 87113-2156

Source	Make	Model	Size (kW)	Size (bhp)	Fuel Type	Fuel %S	Fuel Use (gph or scfh)	Heat Input (mmBtu/hr)	Proposed Operating Schedule Daily (Hrs)	Hrs/Week	Weeks/Yr	Operating Rates (Hours) Hourly	Daily	Annual	Max Firing Rates (gals or scf) Hourly	Daily	Annual
Generator #1	Detroit Diesel	DDC 16V-4000	2935	2190	Diesel	0.0015	133.2	17.98	24	168	52	1	24	500	133.2	3,196.8	66,600.0
Generator #2	Detroit Diesel	DDC 16V-4000	2935	2190	Diesel	0.0015	133.2	17.98	24	168	52	1	24	500	133.2	3,196.8	66,600.0
Generator #3	Detroit Diesel	MTV 1000	1676	1250	Diesel	0.0015	100.0	13.50	24	168	52	1	24	500	100.0	2,400.6	50,011.8
Generator #4 (NEW)	Caterpillar	C175-20	5646	4000	Diesel	0.0015	274.6	37.07	24	168	52	1	24	500	274.6	6,590.4	137,300.0
Generator #5 (NEW)	Caterpillar	C175-20	5646	4000	Diesel	0.0015	274.6	37.07	24	168	52	1	24	500	274.6	6,590.4	137,300.0
Boiler #1					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #2					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #3					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #4					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #5					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #6					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #7					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #8					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #9					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #10					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #11					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #12					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #13					Natural Gas		2029.4	2.1	24	168	52	1	24	8760	2,029.4	48,705.9	17,777,647.1
Boiler #14					Natural Gas		970.6	1.0	24	168	52	1	24	8760	970.6	23,294.1	8,502,352.9
Boiler #15					Natural Gas		970.6	1.0	24	168	52	1	24	8760	970.6	23,294.1	8,502,352.9
Boiler #16					Natural Gas		970.6	1.0	24	168	52	1	24	8760	970.6	23,294.1	8,502,352.9
Boiler #17					Natural Gas		970.6	1.0	24	168	52	1	24	8760	970.6	23,294.1	8,502,352.9

Total Diesel (gals)	457,811.8
Total Natural Gas (scf)	265,118,823.5

Attachment 2

Equipment Specification Sheets

DIESEL GENERATOR SET

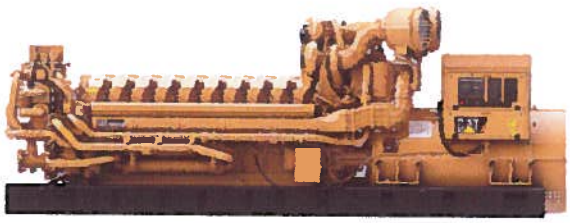


Image shown may not reflect actual package

STANDBY
4000 ekW 5000 kVA
60 Hz 1800 rpm 12470 Volts

Caterpillar is leading the power generation Market place with Power Solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

FUEL/EMISSIONS STRATEGY
- EPA Certified for Stationary Emergency Applications (EPA Tier 2 emissions level)

DESIGN CRITERIA
- The generator set accepts 100% rated load in one step per NFPA 110 and meets ISO 8528-5 transient response.

FULL RANGE OF ATTACHMENTS
- Wide range of bolt-on system expansion attachments, factory designed and tested
- Flexible packaging options for easy and cost effective installation

SINGLE-SOURCE SUPPLIER
- Fully prototype tested with certified torsional vibration analysis available

WORLDWIDE PRODUCT SUPPORT
- Cat® dealers provide extensive post sale support including maintenance and repair agreements
- Cat dealers have over 1600 dealer branch stores operating in 200 countries.
- The Cat® S•O•S℠ program effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by products.

CAT C175-20 DIESEL ENGINE
- Reliable, rugged, durable design
- Four-stroke diesel engine combines consistent performance and excellent fuel economy with minimum weight

CAT SR5 GENERATOR
- Designed to match performance and output characteristics of Cat diesel engines
- Single point access to accessory connections

CAT EMCP 4 CONTROL PANELS
- Simple user friendly interface and navigation
- Scalable system to meet a wide range of customer needs
- Integrated Control System and Communications Gateway

STANDBY 4000 ekW 5000 kVA
60 Hz 1800 rpm 12470 Volts

FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT

System	Standard	Optional
Air Inlet	• Air cleaner, 4 x single element canister with service indicator(s) • Plug group for air inlet shut-off	[ ] Air cleaner, 4 x dual element with service indicator(s) [ ] Air inlet adapters
Cooling	• SCAC cooling • Jacket water and AC inlet/outlet flanges	[ ] Remote horizontal SCAC radiator [ ] Remote fuel cooler [ ] Low coolant level sensor (for remote radiators)
Exhaust	• Dry exhaust manifold • Bolted flange (ANSI 8" & DIN 200) with bellow for each turbo (qty 4)	[ ] Engine Exhaust Temperature Module [ ] Mufflers (15 dBA,25 dBA, or 40 dBA) [ ] Dual 20" or single 24" vertical exhaust collector [ ] Weld flanges: ANSI 20" and ANSI 24"
Crankcase Systems	• Open crankcase ventilation	[ ] Crankcase explosion relief valve
Fuel	• Primary fuel filter with water separator • Secondary fuel filters (engine mounted)	
Generator SR5	• 3 phase brushless, salient pole • Space heater kit • IEC platinum stator RTD's • Cat digital voltage regulator (CDVR)	[ ] Oversize generators [ ] Power connection arrangement
Governor	• ADEM™ A4	[ ] Redundant shutdown
Control Panels	• EMCP 4.2 Genset Controller	[ ] Local & remote annunciator modules [ ] Discrete I/O module [ ] Generator temperature monitoring & protection [ ] Remote monitoring [ ] Load share module
Lube	• Lubricating oil • Oil filter, filler and dipstick • Oil drain line with valves • Fumes disposal • Gear type lube oil pump • Integral lube oil cooler • Electric prelube pumps	
Mounting	• Rails-engine / generator • Rubber anti-vibration mounts (shipped loose)	[ ] Spring type linear vibration isolators [ ] IBC vibration isolators
Starting / Charging	• Dual 24 volt electric starting motors • Batteries with rack and cables • Battery disconnect switch	[ ] Oversized battery set [ ] 75 amp charging alternator [ ] Battery chargers (20,35 or 50 Amp) [ ] Jacket water heater [ ] Redundant Electric Starter
General	• RH service (Except LH Service Oil Filter) • Paint - Caterpillar Yellow with high gloss black rails • SAE standard rotation • Flywheel and flywheel housing - SAE No. 00	[ ] Barring group- manual or air powered [ ] Factory test reports

STANDBY 4000 ekW 5000 kVA
60 Hz 1800 rpm 12470 Volts

SPECIFICATIONS

CAT GENERATOR

Frame	3055
Excitation	PM
Pitch	0.6667
Number of poles	4
Number of bearings	2
Number of Leads	6
Insulation	Class F
IP rating	Drip proof IP23
Over speed capability - % of rated	125%
Wave form deviation	3 %
Voltage regulator	3 phase sensing with selectable V/Hz regulation
Telephone Influence Factor	Less than 50
Harmonic Distortion	Less than 5%

CAT DIESEL ENGINE
C175-20 SCAC, V-20, 4 stroke, water-cooled diesel

Bore	175.00 mm (6.89 in)
Stroke	220.00 mm (8.66in)
Displacement	105.8 L (6456.31 in^3)
Compression ratio	15.3:1
Aspiration	TA
Fuel system	Common Rail
Governor Type	ADEM™ A4

CAT EMCP 4 CONTROL PANELS
EMCP 4 controls including:
- Run / Auto / Stop Control
- Speed Adjust
- Voltage Adjust
- Engine Cycle Crank
- Emergency stop pushbutton

EMCP 4.2 controller features:
- 24-volt DC operation
- Environmental sealed front face
- Text alarm/event descriptions
- True RMS AC metering, 3-phase, ±1% accuracy.

Digital indication for:
- RPM
- DC volts
- Operating hours
- Oil pressure (psi, kPa or bar)
- Coolant temperature
- Volts (L-L & L-N), frequency (Hz)
- Amps (per phase & average)
- Power Factor (per phase & average)
- kW (per phase, average & percent)
- kVA (per phase, average & percent)
- kVAr (per phase, average & percent)
- kW-hr (total)
- kVAr-hr (total)

Warning/shutdown with common LED indication of shutdowns for:
- Low oil pressure
- High coolant temperature
- Overspeed
- Emergency stop
- Failure to start (overcrank)
- Low coolant temperature
- Low coolant level

Programmable protective relaying functions:
- Generator phase sequence
- Over/Under voltage (27/59)
- Over/Under Frequency (81 o/u)
- Reverse Power (kW) (32)
- Reverse Reactive Power (kVAr) (32RV)
- Overcurrent (50/51)

Communications
- Customer data link (Modbus RTU)
- Accessory module data link
- Serial annunciator module data link
- 6 programmable digital inputs
- 6 programmable relay outputs (Form A)
- 2 programmable relay outputs (Form C)
- 2 programmable digital outputs

STANDBY 4000 ekW 5000 kVA
60 Hz 1800 rpm 12470 Volts

Technical Data

Open Generator Set - 1800 rpm/60 Hz/12 470 Volts	DM8854	
Stationary Emergency (EPA Tier 2)		
Generator Set Package Performance		
Genset Power rating @ 0.8 pf	5000 kVA	
Genset Power Rating without fan	4000 ekW	
Fuel Consumption		
100% Load with fan	1039.3 L/hr	274.6 Gal/hr
75% Load with fan	770.6 L/hr	203.6 Gal/hr
50% Load with fan	615.0 L/hr	162.5 Gal/hr
Inlet Air		
Combustion air inlet flow rate	339.1 m^3/min	11975 cfm
Exhaust System		
Exhaust stack gas temperature (engine out)	473.9 °C	885 °F
Exhaust gas flow rate	871.4 m^3/min	30771 cfm
Exhaust system backpressure (maximum allowable)	6.7 kPA	26.9 in water
Heat Rejection		
Heat rejection to coolant (total)	2148 kW	122133 Btu/min
Heat rejection to exhaust (total)	3928 kW	223338 Btu/min
Heat rejection to aftercooler	447 kW	25437 Btu/min
Heat rejection to atmosphere from engine	304 kW	17303 Btu/min
Heat rejection to atmosphere from generator	197 kW	11213 Btu/min
Alternator		
Motor starting capabiliy @30% voltage dip	10728 skVA	
Frame	3055	
Temperature Rise	130 °C	234 °F
Lube System		
Sump refil with filter	675 L	178.3 gal
Emissions (Nominal)[2]		
NOx g/hp-hr	5.07 g/hp-hr	
CO g/hp-hr	0.52 g/hp-hr	
HC g/hp-hr	0.17 g/hp-hr	
PM g/hp-hr	0.04 g/hp-hr	

Note: This generator set is not offered with an engine driven radiator. Addition of an engine driven fan will reduce the output below the nameplate rating.

[1] Some packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40 degree C ambient per NEMA MG1-32.

[2] Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77°F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle. Emissions values are tailpipe out with aftertreatment installed. Values shown as zero may be greater than zero but were below the detection level of the equipment used at the tie of measurement.

RATING DEFINITIONS AND CONDITIONS

Meets or Exceeds International Specifications: AS1359, CSA, IEC60034-1, ISO3046, ISO8528, NEMA MG 1-22, NEMA MG 1-33, UL508A, 72/23/EEC, 98/37/EC, 2004/108/EC

Standby - Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year. Standby power in accordance with ISO8528. Fuel stop power in accordance with ISO3046. Standby ambients shown indicate ambient temperature at 100% load which results in a coolant top tank temperature just below the shutdown temperature.

Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions

Fuel Rates are based on fuel oil of 35° API [16° C (60° F)] gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.). Additional ratings may be available for specific customer requirements, contact your Caterpillar representative for details. For information regarding Low Sulfur fuel and Biodiesel capability, please consult your Cat dealer.

STANDBY 4000 ekW 5000 kVA
60 Hz 1800 rpm 12470 Volts

DIMENSIONS

Package Dimensions		
Length	6719 mm	267.5 in
Width	2377 mm	93.6 in
Height	2556 mm	100.6 in

NOTE: For reference only - do not use for installation design. Please contact your local dealer for exact weight and dimensions.

www.Cat-ElectricPower.com

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Materials and specifications are subject to change without notice. The International System of Units (SI) is used in this publication.

Sourced: U.S. Sourced

EPD00066-C (03/2012)

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PERFORMANCE DATA[DM8854]

January 27, 2014

Performance Number: DM8854

Change Level: 01

SALES MODEL:	C175-20	**COMBUSTION:**	DI
ENGINE POWER (BHP):	5,647	**ENGINE SPEED (RPM):**	1,800
GEN POWER W/O FAN (EKW):	4,000.0	**HERTZ:**	60
COMPRESSION RATIO:	15.3	**ASPIRATION:**	TA
APPLICATION:	GENERATOR SET	**AFTERCOOLER TYPE:**	SCAC
RATING LEVEL:	STANDBY	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC+1AC, 2AC
SUB APPLICATION:	STANDARD	**AFTERCOOLER TEMP (F):**	115
PUMP QUANTITY:	2	**JACKET WATER TEMP (F):**	210.2
FUEL TYPE:	DIESEL	**TURBO CONFIGURATION:**	PARALLEL
MANIFOLD TYPE:	DRY	**TURBO QUANTITY:**	4
GOVERNOR TYPE:	ADEM4	**TURBOCHARGER MODEL:**	GTB6772BLN-48T-1.56
ELECTRONICS TYPE:	ADEM4	**CERTIFICATION YEAR:**	2012
CAMSHAFT TYPE:	STANDARD	**CRANKCASE BLOWBY RATE (FT3/HR):**	2,683.6
IGNITION TYPE:	CI	**FUEL RATE (RATED RPM) NO LOAD (GAL/HR):**	17.7
INJECTOR TYPE:	CR	**PISTON SPD @ RATED ENG SPD (FT/MIN):**	2,598.4
FUEL INJECTOR:	3492522		
REF EXH STACK DIAMETER (IN):	14		

General Performance Data

GENSET POWER WITHOUT FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP
EKW	%	BHP	PSI	LB/BHP-HR	GAL/HR	IN-HG	DEG F	DEG F	IN-HG	DEG F
4,000.0	100	5,646	385	0.340	274.6	91.5	121.4	1,223.6	63.8	885.0
3,600.0	90	5,110	348	0.333	243.0	79.2	122.1	1,172.3	53.8	864.4
3,200.0	80	4,559	311	0.331	215.6	69.6	122.7	1,132.9	45.9	849.4
3,000.0	75	4,280	292	0.333	203.6	65.8	122.9	1,117.9	42.9	844.1
2,800.0	70	3,995	272	0.341	194.4	64.0	123.1	1,110.4	41.3	842.1
2,400.0	60	3,424	233	0.365	178.6	61.7	123.2	1,102.4	39.4	841.5
2,000.0	50	2,853	194	0.399	162.5	58.5	123.3	1,095.1	37.3	842.0
1,600.0	40	2,283	156	0.426	139.0	47.2	123.3	1,071.5	30.2	836.8
1,200.0	30	1,712	117	0.456	111.5	34.8	123.3	1,039.1	22.9	829.0
1,000.0	25	1,427	97	0.473	96.3	28.2	123.3	1,019.7	19.2	824.1
800.0	20	1,141	78	0.493	80.3	21.7	123.4	940.7	15.6	758.5
400.0	10	571	39	0.560	45.7	8.4	123.6	716.1	8.2	562.7

GENSET POWER WITHOUT FAN	PERCENT LOAD	ENGINE POWER	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
EKW	%	BHP	IN-HG	DEG F	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
4,000.0	100	5,646	95	447.1	11,975.3	30,771.1	52,034.6	53,956.7	11,251.4	10,278.3
3,600.0	90	5,110	82	405.5	10,853.2	27,287.2	46,799.9	48,502.0	10,132.7	9,266.2
3,200.0	80	4,559	72	372.6	9,961.1	24,548.2	42,658.8	44,169.6	9,220.3	8,447.0
3,000.0	75	4,280	69	359.6	9,608.2	23,480.4	41,031.6	42,458.6	8,854.9	8,122.0
2,800.0	70	3,995	66	353.5	9,439.0	22,951.2	40,249.6	41,612.8	8,668.7	7,964.3
2,400.0	60	3,424	63	345.1	9,203.6	22,274.4	39,199.7	40,452.1	8,417.1	7,761.2
2,000.0	50	2,853	60	333.0	8,868.0	21,447.8	37,760.4	38,900.1	8,101.3	7,497.2
1,600.0	40	2,283	48	297.9	7,784.8	19,064.6	32,954.5	33,935.5	7,229.8	6,697.6
1,200.0	30	1,712	36	251.2	6,554.1	15,890.0	27,612.6	28,398.1	6,062.6	5,629.5
1,000.0	25	1,427	29	223.6	5,887.1	14,011.6	24,757.3	25,431.4	5,366.4	4,994.3
800.0	20	1,141	23	194.3	5,224.4	11,999.1	21,926.5	22,488.6	4,843.0	4,524.3
400.0	10	571	9	128.4	3,836.2	7,454.5	16,050.1	16,369.9	3,585.0	3,383.5

Heat Rejection Data

PUMP POWER IS INCLUDED IN HEAT REJECTION BALANCE, BUT IS NOT SHOWN.

GENSET POWER WITHOUT FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHUAST RECOVERY TO 350F	FROM OIL COOLER	FROM 2ND STAGE AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
4,000.0	100	5,646	122,108	11,729	223,338	122,328	31,385	25,446	239,449	589,255	627,705
3,600.0	90	5,110	105,601	11,163	195,882	105,524	27,777	20,837	216,690	521,512	555,541
3,200.0	80	4,559	92,287	10,730	174,043	93,097	24,642	17,271	193,350	462,656	492,845
3,000.0	75	4,280	86,927	10,567	165,401	88,452	23,269	15,911	181,497	436,882	465,389
2,800.0	70	3,995	83,674	10,484	160,691	86,245	22,225	15,198	169,397	417,263	444,490
2,400.0	60	3,424	79,011	10,399	154,285	83,569	20,415	14,398	145,197	383,286	408,296
2,000.0	50	2,853	74,364	10,337	147,176	80,308	18,579	13,719	120,998	348,811	371,571
1,600.0	40	2,283	63,610	10,163	130,230	69,204	15,886	11,387	96,798	298,267	317,729
1,200.0	30	1,712	51,695	9,864	106,727	56,882	12,746	8,755	72,599	239,296	254,910
1,000.0	25	1,427	45,332	9,667	92,548	50,376	11,010	7,459	60,499	206,708	220,196
800.0	20	1,141	38,998	9,193	76,271	38,117	9,183	6,338	48,399	172,408	183,658
400.0	10	571	25,829	7,893	38,363	14,179	5,219	4,238	24,199	97,980	104,373

Sound Data

EXHAUST: Sound Power (1/3 Octave Frequencies)

GENSET POWER WITHOUT FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	100 HZ	125 HZ	160 HZ	200 HZ	250 HZ	315 HZ	400 HZ	500 HZ	630 HZ	800 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
4,000.0	100	5,646	130.3	98.3	103.0	109.5	113.8	113.3	112.2	115.0	114.7	117.0	117.2
3,600.0	90	5,110	129.0	96.3	102.1	113.5	112.6	112.7	111.7	114.2	113.8	116.1	116.0
3,200.0	80	4,559	128.0	93.5	100.1	116.3	112.5	110.7	112.9	114.5	112.7	115.8	115.2
3,000.0	75	4,280	127.3	91.9	99.3	116.4	113.6	108.9	112.1	114.0	112.4	115.5	115.2
2,800.0	70	3,995	126.8	90.5	98.8	116.2	114.4	108.0	112.1	113.7	112.2	115.2	115.0
2,400.0	60	3,424	126.2	88.7	98.6	114.9	114.6	107.4	112.3	113.1	111.7	114.8	114.6
2,000.0	50	2,853	125.9	90.5	99.2	113.0	112.6	105.9	110.5	111.5	111.4	114.6	114.9
1,600.0	40	2,283	124.9	88.9	99.9	113.1	110.5	107.9	111.5	111.8	111.2	114.4	114.0
1,200.0	30	1,712	123.7	88.7	99.7	113.0	109.7	106.8	111.6	111.7	111.6	113.8	111.6
1,000.0	25	1,427	123.0	88.5	99.0	112.8	109.6	105.7	110.7	111.3	111.6	113.0	109.8
800.0	20	1,141	121.4	87.1	97.9	110.7	109.2	104.6	107.6	109.6	111.2	111.0	107.7
400.0	10	571	118.4	84.4	95.9	107.6	106.4	104.1	107.9	106.6	107.8	107.4	104.2

EXHAUST: Sound Power (1/3 Octave Frequencies)

GENSET POWER WITHOUT FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	1250 HZ	1600 HZ	2000 HZ	2500 HZ	3150 HZ	4000 HZ	5000 HZ	6300 HZ	8000 HZ	10000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
4,000.0	100	5,646	119.0	120.3	124.4	121.0	120.4	117.1	114.5	110.8	107.9	108.4	117.6
3,600.0	90	5,110	117.9	119.3	122.6	119.8	118.7	114.9	112.6	109.1	106.3	105.9	114.5
3,200.0	80	4,559	116.2	118.4	120.4	119.0	117.6	113.4	111.3	107.5	104.9	107.8	108.5
3,000.0	75	4,280	115.5	117.7	118.5	117.9	116.8	112.8	110.3	106.7	104.5	110.8	105.3
2,800.0	70	3,995	114.8	117.1	117.3	117.1	116.1	112.3	109.6	106.0	104.1	111.8	102.9
2,400.0	60	3,424	113.9	116.5	116.4	116.3	115.5	111.9	109.2	105.3	103.5	111.9	100.8
2,000.0	50	2,853	114.1	116.8	116.8	116.6	115.7	111.8	109.6	105.7	103.8	110.4	101.5
1,600.0	40	2,283	112.7	115.6	114.9	115.5	114.5	110.6	107.6	103.9	103.0	105.3	98.9
1,200.0	30	1,712	111.5	114.1	112.8	114.1	112.7	109.1	106.1	102.3	102.4	100.6	96.9
1,000.0	25	1,427	110.9	113.1	111.7	113.4	111.6	108.1	105.1	101.9	102.2	98.8	95.6
800.0	20	1,141	110.1	110.9	110.1	111.6	109.3	106.1	103.2	101.9	98.9	97.0	93.4
400.0	10	571	109.3	107.2	107.0	107.1	104.9	103.2	100.8	98.6	94.1	93.7	89.5

PERFORMANCE DATA[DM8854]

Sound Data (Continued)

MECHANICAL: Sound Power (1/3 Octave Frequencies)

GENSET POWER WITHOUT FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	100 HZ	125 HZ	160 HZ	200 HZ	250 HZ	315 HZ	400 HZ	500 HZ	630 HZ	800 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
4,000.0	100	5,646	127.0	81.1	95.8	100.1	100.1	103.1	107.6	111.8	112.9	112.1	112.9
3,600.0	90	5,110	126.3	80.6	95.1	99.4	99.4	102.6	106.8	111.1	112.2	111.4	112.8
3,200.0	80	4,559	125.4	81.3	94.5	99.5	99.6	103.0	107.0	110.8	111.9	111.1	112.7
3,000.0	75	4,280	124.9	81.8	94.1	99.7	99.8	103.3	107.0	110.4	111.7	111.2	112.6
2,800.0	70	3,995	124.5	82.4	93.4	99.5	99.5	103.1	107.1	110.0	111.4	111.2	112.4
2,400.0	60	3,424	124.2	83.0	92.5	98.8	99.1	103.3	107.3	109.5	110.7	111.3	111.9
2,000.0	50	2,853	124.2	83.1	92.6	99.1	100.6	105.7	106.8	109.9	110.8	111.3	111.7
1,600.0	40	2,283	123.5	83.2	91.0	99.0	100.0	105.9	107.0	109.1	110.8	111.1	112.2
1,200.0	30	1,712	122.8	81.8	89.5	98.8	99.6	105.1	106.7	109.5	110.9	111.1	112.2
1,000.0	25	1,427	122.5	81.0	88.9	98.7	99.4	104.4	106.5	109.8	111.1	111.1	112.0
800.0	20	1,141	122.3	81.1	88.8	97.8	99.0	103.4	106.6	109.6	112.1	111.5	111.7
400.0	10	571	121.7	80.7	89.1	96.4	96.3	99.7	105.8	108.5	109.9	110.5	110.6

MECHANICAL: Sound Power (1/3 Octave Frequencies)

GENSET POWER WITHOUT FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	1250 HZ	1600 HZ	2000 HZ	2500 HZ	3150 HZ	4000 HZ	5000 HZ	6300 HZ	8000 HZ	10000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
4,000.0	100	5,646	115.4	114.6	115.2	115.3	115.3	114.7	114.7	113.8	113.6	112.5	121.3
3,600.0	90	5,110	114.7	114.3	114.6	114.7	114.6	113.3	113.2	112.5	112.7	112.3	120.7
3,200.0	80	4,559	115.5	114.1	113.9	114.1	114.1	112.8	111.9	111.6	112.0	113.8	117.1
3,000.0	75	4,280	115.6	113.7	113.5	112.9	113.6	112.5	111.4	111.1	111.6	115.3	112.9
2,800.0	70	3,995	115.4	113.5	113.2	112.4	113.2	112.4	111.0	110.7	111.3	115.7	110.7
2,400.0	60	3,424	114.8	113.3	112.7	111.8	112.8	112.4	110.9	110.3	110.9	115.7	109.6
2,000.0	50	2,853	115.0	113.3	112.8	111.5	112.8	112.1	111.1	110.4	111.2	115.4	110.3
1,600.0	40	2,283	114.5	113.2	112.1	111.0	112.2	111.3	110.0	109.3	110.4	113.0	108.3
1,200.0	30	1,712	114.1	112.8	111.4	110.3	111.3	110.2	109.3	108.2	109.8	109.1	106.3
1,000.0	25	1,427	114.0	112.6	111.2	110.1	110.8	109.6	108.8	107.7	109.7	106.9	105.3
800.0	20	1,141	114.2	112.5	111.4	110.2	110.4	109.2	107.7	107.3	106.7	105.1	103.2
400.0	10	571	114.9	112.6	111.4	109.8	110.0	109.5	106.5	105.1	102.2	102.1	99.1

Emissions Data

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITHOUT FAN		EKW	4,000.0	3,000.0	2,000.0	1,000.0	400.0
PERCENT LOAD		%	100	75	50	25	10
ENGINE POWER		BHP	5,646	4,280	2,853	1,427	571
TOTAL NOX (AS NO2)		G/HR	37,883	30,781	9,984	4,384	2,820
TOTAL CO		G/HR	3,618	4,085	9,251	2,355	3,016
TOTAL HC		G/HR	354	318	610	824	698
PART MATTER		G/HR	310.9	246.1	180.7	155.3	179.0
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	3,184.5	3,438.7	1,401.7	1,116.9	1,496.4
TOTAL CO	(CORR 5% O2)	MG/NM3	269.1	434.3	1,216.8	565.4	1,503.0
TOTAL HC	(CORR 5% O2)	MG/NM3	23.1	28.9	69.7	170.9	301.6
PART MATTER	(CORR 5% O2)	MG/NM3	20.7	22.3	20.8	32.8	80.6
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,551	1,675	683	544	729
TOTAL CO	(CORR 5% O2)	PPM	215	347	973	452	1,202
TOTAL HC	(CORR 5% O2)	PPM	43	54	130	319	563
TOTAL NOX (AS NO2)		G/HP-HR	6.81	7.25	3.51	3.08	4.95
TOTAL CO		G/HP-HR	0.65	0.96	3.25	1.65	5.29
TOTAL HC		G/HP-HR	0.06	0.07	0.21	0.58	1.23
PART MATTER		G/HP-HR	0.06	0.06	0.08	0.11	0.31
TOTAL NOX (AS NO2)		LB/HR	83.52	67.86	22.01	9.67	6.22
TOTAL CO		LB/HR	7.98	9.01	20.40	5.19	6.65
TOTAL HC		LB/HR	0.78	0.70	1.35	1.82	1.54
PART MATTER		LB/HR	0.69	0.54	0.40	0.34	0.39

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITHOUT FAN		EKW	4,000.0	3,000.0	2,000.0	1,000.0	400.0
PERCENT LOAD		%	100	75	50	25	10
ENGINE POWER		BHP	5,646	4,280	2,853	1,427	571
TOTAL NOX (AS NO2)		G/HR	31,569	25,651	8,320	3,654	2,350
TOTAL CO		G/HR	2,010	2,269	5,140	1,308	1,675
TOTAL HC		G/HR	266	239	459	619	525
TOTAL CO2		KG/HR	2,976	2,183	1,732	958	464
PART MATTER		G/HR	222.1	175.8	129.1	111.0	127.8
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,653.8	2,865.5	1,168.1	930.8	1,247.0
TOTAL CO	(CORR 5% O2)	MG/NM3	149.5	241.3	676.0	314.1	835.0
TOTAL HC	(CORR 5% O2)	MG/NM3	17.4	21.7	52.4	128.5	226.8
PART MATTER	(CORR 5% O2)	MG/NM3	14.8	15.9	14.9	23.4	57.5
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,293	1,396	569	453	607
TOTAL CO	(CORR 5% O2)	PPM	120	193	541	251	668
TOTAL HC	(CORR 5% O2)	PPM	32	41	98	240	423
TOTAL NOX (AS NO2)		G/HP-HR	5.67	6.04	2.93	2.57	4.12
TOTAL CO		G/HP-HR	0.36	0.53	1.81	0.92	2.94
TOTAL HC		G/HP-HR	0.05	0.06	0.16	0.43	0.92
PART MATTER		G/HP-HR	0.04	0.04	0.05	0.08	0.22
TOTAL NOX (AS NO2)		LB/HR	69.60	56.55	18.34	8.05	5.18
TOTAL CO		LB/HR	4.43	5.00	11.33	2.88	3.69
TOTAL HC		LB/HR	0.59	0.53	1.01	1.37	1.16
TOTAL CO2		LB/HR	6,561	4,813	3,819	2,112	1,024
PART MATTER		LB/HR	0.49	0.39	0.28	0.24	0.28
OXYGEN IN EXH		%	10.0	10.7	12.0	13.0	15.2
DRY SMOKE OPACITY		%	1.5	1.5	0.6	0.5	2.3
BOSCH SMOKE NUMBER			0.53	0.51	0.25	0.18	0.73

Regulatory Information

EPA EMERGENCY STATIONARY		2011 - ----		
GASEOUS EMISSIONS DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. GASEOUS EMISSIONS LIMIT VALUES ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	STATIONARY	EMERGENCY STATIONARY	CO: 3.5 NOx + HC: 6.4 PM: 0.20

Altitude Derate Data

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
ALTITUDE (FT)													
0	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,647
1,000	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,617	5,420	5,140	5,647
2,000	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,517	5,232	4,923	5,647
3,000	5,647	5,647	5,647	5,647	5,647	5,647	5,647	5,632	5,606	5,379	5,056	4,730	5,647
4,000	5,628	5,628	5,628	5,628	5,628	5,628	5,625	5,571	5,488	5,264	4,977	4,689	5,628
5,000	5,503	5,503	5,503	5,503	5,503	5,503	5,479	5,414	5,346	5,151	4,900	4,649	5,503
6,000	5,360	5,360	5,360	5,360	5,360	5,360	5,336	5,275	5,214	5,031	4,798	4,560	5,360
7,000	5,215	5,215	5,215	5,215	5,215	5,215	5,193	5,138	5,082	4,910	4,688	4,466	5,215
8,000	5,070	5,070	5,070	5,070	5,070	5,070	5,050	5,000	4,950	4,789	4,581	4,372	5,070
9,000	4,934	4,934	4,934	4,934	4,934	4,934	4,916	4,871	4,827	4,674	4,476	4,271	4,934
10,000	4,805	4,805	4,805	4,805	4,805	4,805	4,789	4,749	4,709	4,564	4,372	4,166	4,805
11,000	4,675	4,675	4,675	4,675	4,675	4,675	4,661	4,627	4,592	4,453	4,269	4,061	4,675
12,000	4,546	4,546	4,546	4,546	4,546	4,546	4,534	4,504	4,474	4,342	4,166	3,956	4,546
13,000	4,427	4,427	4,427	4,427	4,427	4,427	4,417	4,391	4,365	4,232	4,053	3,846	4,427
14,000	4,311	4,311	4,311	4,311	4,311	4,311	4,302	4,280	4,257	4,122	3,939	3,736	4,311
15,000	4,194	4,194	4,194	4,194	4,194	4,194	4,187	4,168	4,149	4,012	3,825	3,626	4,194

Cross Reference

Engine Arrangement			
Arrangement Number	Effective Serial Number	Engineering Model	Engineering Model Version
3442955	BXR00001	GS269	-

Test Specification Data						
Test Spec	Setting	Effective Serial Number	Engine Arrangement	Governor Type	Default Low Idle Speed	Default High Idle Speed
0K7814	LL6181	BXR00001	3442955	ADEM4		

Performance Parameter Reference

Parameters Reference:DM9600-05
PERFORMANCE DEFINITIONS

PERFORMANCE DEFINITIONS DM9600

APPLICATION:
Engine performance tolerance values below are representative of a typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test Facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3 1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request (SERR) test data shall be noted.

PERFORMANCE PARAMETER TOLERANCE FACTORS:
Power +/- 3%
Torque +/- 3%
Exhaust stack temperature +/- 8%
Inlet airflow +/- 5%
Intake manifold pressure-gage +/- 10%
Exhaust flow +/- 6%
Specific fuel consumption +/- 3%
Fuel rate +/- 5%
Heat rejection +/- 5%
Heat rejection exhaust only +/- 10%

Torque is included for truck and industrial applications, do not use for Gen Set or steady state applications.

On C7 - C18 engines, at speeds of 1100 RPM and under these values are provided for reference only, and may not meet the tolerance listed.

These values do not apply to C280/3600. For these models, see the tolerances listed below.

C280/3600 HEAT REJECTION TOLERANCE FACTORS:
Heat rejection +/- 10%
Heat rejection to Atmosphere +/- 50%
Heat rejection to Lube Oil +/- 20%
Heat rejection to Aftercooler +/- 5%

TEST CELL TRANSDUCER TOLERANCE FACTORS:

Torque +/- 0.5%
Speed +/- 0.2%
Fuel flow +/- 1.0%
Temperature +/- 2.0 C degrees
Intake manifold pressure +/- 0.1 kPa

OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995 REFERENCE AIR AND FUEL CONDITIONS.

REFERENCE ATMOSPHERIC INLET AIR

FOR 3500 ENGINES AND SMALLER
SAE J1228 reference atmospheric pressure is 100 KPA (29.61 in hg) and standard temperature is 25 (77) at 60% relative humidity.

FOR 3600 ENGINES
Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JAN90 standard reference conditions of 25, 100 KPA 30% relative humidity and 150M altitude at the stated aftercooler water temperature.

MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE
Location for air temperature measurement air cleaner inlet at stabilized operating conditions.

PERFORMANCE DATA[DM8854]

REFERENCE EXHAUST STACK DIAMETER
The Reference Exhaust Stack Diameter published with this dataset is only used for the calculation of Smoke Opacity values displayed in this dataset. This value does not necessarily represent the actual stack diameter of the engine due to the variety of exhaust stack adapter options available. Consult the price list, engine order or general dimension drawings for the actual stack diameter size ordered or options available.

REFERENCE FUEL

DIESEL
Reference fuel is #2 distillate diesel with a 35API gravity.
A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at 29 (84.2), where the density is 838.9 G/Liter (7.001 Lbs/Gal).

GAS
Reference natural gas fuel has a lower heating value of 33.74 KJ/L (905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500 BTU/CU FT) lower heating value gas. Propane ratings are based on 87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.

ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER (GROSS) LESS EXTERNAL AUXILIARY LOAD
Engine corrected gross output includes the power required to drive standard equipment: lube oil, scavenge lube oil, fuel transfer, common rail fuel, separate circuit aftercooler and jacket water pumps. Engine net power available for the external (flywheel) load is calculated by subtracting the sum of auxiliary load from the corrected gross flywheel out put power. Typical auxiliary loads are radiator cooling fans, hydraulic pumps, air compressors and battery charging alternators.

ALTITUDE CAPABILITY
Altitude capability is the maximum altitude above sea level at standard temperature and standard pressure at which the engine could develop full rated output power on the current performance data set. Standard temperature values versus altitude could be seen on TM2001.

Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for atmospheric pressure and temperature conditions outside the values defined, see TM2001. Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.

REGULATIONS AND PRODUCT COMPLIANCE
TMI Emissions information is presented at 'nominal' and 'Potential Site Variation' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative.
Log on to the Technology and Solutions Divisions (T&SD) web page (https://pdgt.cat.com/cda/layout) for information including federal regulation applicability and time lines for implementation. Information for labeling and tagging requirements is also provided.

NOTES:
Regulation watch covers regulations in effect and future regulation changes for world, federal, state and local. This page includes items on the watch list where a regulation change or product change might be pending and may need attention of the engine product group. For additional emissions information log on to the TMI web page.

Additional product information for specific market application is available.
Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.

HEAT REJECTION DEFINITIONS:
Diesel Circuit Type and HHV Balance : DM9500

EMISSIONS DEFINITIONS:
Emissions : DM1176

PERFORMANCE DATA[DM8854]

January 27, 2014

SOUND DEFINITIONS:
Sound Power : DM8702

Sound Pressure : TM7080

RATING DEFINITIONS
Agriculture : TM6008

Fire Pump : TM6009

Generator Set : TM6035

Generator (Gas) : TM6041

Industrial Diesel : TM6010

Industrial (Gas) : TM6040

Irrigation : TM5749

Locomotive : TM6037

Marine Auxiliary : TM6036

Marine Prop (Except 3600) : TM5747

Marine Prop (3600 only) : TM5748

MSHA : TM6042

Oil Field (Petroleum) : TM6011

Off-Highway Truck : TM6039

On-Highway Truck : TM6038

Date Released : 11/23/11

CATERPILLAR®

Caterpillar Inc.
P.O. Box 600
Mossville, Illinois 61552

January 28, 2014

To Whom It May Concern:

Caterpillar Inc. confirms that engine families ECPXL78.1NZS and ECPXL106.NZS are certified in accordance with EPA procedures that allow ratings with multiple power categories to be combined into one power category for certification. In this case, two power categories, 560<kW<=2237 and kW >2237, were combined into power category 560 <kW<=2237. The 3500 and C175 engine ratings on the following tables are certified in ECPXL78.1NZS and ECPXL106.NZS engine families using the one power category.

Sincerely,

Gregory D. Hoenert / SEM

Gregory D. Hoenert
Manager, Global Emissions Certification
Large Power Systems Division (MOS 11)
Caterpillar Inc.

Telephone: (309) 578-4868
Hoenert_Gregory_D@Cat.com

EPA Engine Family Name	Model Year	Engine Model	Rated Power (kW)	Rated Speed (RPM)
ECPXL78.1NZS	2014	3516C	2710	1800
ECPXL78.1NZS	2014	3516C	2441	1800
ECPXL78.1NZS	2014	3516C	2475	1800
ECPXL78.1NZS	2014	3516C	2240	1800
ECPXL78.1NZS	2014	3516C	1940	1800
ECPXL78.1NZS	2014	3516C	2190	1800
ECPXL78.1NZS	2014	3516C	2010	1800
ECPXL78.1NZS	2014	3516C	1820	1800
ECPXL78.1NZS	2014	3512C	1645	1800
ECPXL78.1NZS	2014	3512C	1500	1800
ECPXL78.1NZS	2014	3512C	1360	1800
ECPXL78.1NZS	2014	3512C	1415	1800
ECPXL78.1NZS	2014	3512C	1864	1900
ECPXL78.1NZS	2014	3512C	1101	1200
ECPXL78.1NZS	2014	3508C	671	1200
ECPXL78.1NZS	2014	3512C	932	1200
ECPXL78.1NZS	2014	3516C	2710	1800
ECPXL78.1NZS	2014	3512C	1864	1900

EPA Engine Family Name	Model Year	Engine Model	Rated Power (kW)	Rated Speed (RPM)
ECPXL106.NZS	2014	C175-16	3298	1800
ECPXL106.NZS	2014	C175-16	3008	1800
ECPXL106.NZS	2014	C175-16	2772	1800
ECPXL106.NZS	2014	C175-16	3263	1800
ECPXL106.NZS	2014	C175-16	2974	1800
ECPXL106.NZS	2014	C175-16	2737	1800
ECPXL106.NZS	2014	C175-20	4295	1800
ECPXL106.NZS	2014	C175-20	3527	1800
ECPXL106.NZS	2014	C175-16	3298	1800
ECPXL106.NZS	2014	C175-20	4295	1800

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2014 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT OF 1990

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: Caterpillar Inc.
(U.S. Manufacturer or Importer)
Certificate Number: ECPXL106.NZS-011

Effective Date: 09/30/2013
Expiration Date: 12/31/2014

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 09/30/2013
Revision Date: N/A

Model Year: 2014
Manufacturer Type: Original Engine Manufacturer
Engine Family: ECPXL106.NZS

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 560<kW<=2237
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Electronic Control, Engine Design Modification

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Attachment 3

Form REG

OMB Control No. 2060-0003
Approval expires 04/30/2012

United States Environmental Protection Agency Program Address Phone Fax Web address	*Reviewing Authority* *Program* *Address* *Phone* *Fax* *Web address*

FEDERAL MINOR NEW SOURCE REVIEW PROGRAM IN INDIAN COUNTRY

Registration for Existing Sources
(FORM REG)

Please submit information to:

Federal Minor NSR Permit Coordinator
U.S. EPA, Region 6 PDR
1445 Ross Ave.
Dallas, TX 75202

A. GENERAL SOURCE INFORMATION

1. Company Name **Sandia Resort & Casino**	**2. Source Name** **Sandia Resort & Casino**
3. Type of Operation **Casino**	**4. Portable Source? Yes X No** **5. Temporary Source? Yes X No**
6. NAICS Code **71320**	**7. SIC Code** **7993**
8. Physical Address (home base for portable sources) **30 Rainbow Road NE; Albuquerque, NM 87113-2156**	

9. Reservation*	**10. County***	**11a. Latitude***	**11b. Longitude***
Pueblo of Sandia	**Bernadillo**	**35°12'23.32.32"N**	**106° 33'59.04"W**
12a. Quarter-Quarter Section*	**12b. Section***	**12c. Township***	**12d. Range***
6 and 7	**1**	**11 North**	**3 East**

* Provide all locations of operation for portable sources

B. CONTACT INFORMATION

1. Owner Name Pueblo of Sandia; Joseph M. Rodriguez as Representative	Title Superintendent of Facilities
Mailing Address 30 Rainbow Road NE; Albuquerque, NM 87113-2156	
Email Address jmrodriguez@sandiacasino.com	
Telephone Number 505-796-7750	Facsimile Number 505-796-7617
2. Operator Name (if different from owner) Paul Bitner	Title Electrical Supervisor
Mailing Address 30 Rainbow Road NE; Albuquerque, NM 87113-2156	
Email Address PBitner@sandiacasino.com	
Telephone Number 505-771-5086	Facsimile Number 505-771-5086
3. Source Contact Same as Owner Contact	Title
Mailing Address	
Email Address	
Telephone Number	Facsimile Number
4. Compliance Contact Frank Chaves	Title Pueblo of Sandia Environment Director
Mailing Address 30 Rainbow Road NE; Albuquerque, NM 87113-2156	
Email Address fchaves@sandiapueblo.nsn.us	
Telephone Number 505-771-5086	Facsimile Number 505-771-5086

C. ATTACHMENTS

Include all of the following information as attachments to this form

X Narrative description of the operations

X Identification and description of all emission units and air pollution generating activities (with the exception of the exempt emissions units and activities listed in §49.153(c)

X Identification and description of any existing air pollution control equipment and compliance monitoring devices or activities

X Type and amount of each fuel used

Type raw materials used
Production Rates

X Operating Schedules

X Any existing limitations on source operations affecting emissions or any work practice standards, where applicable, for all regulated NSR pollutants at your source.

X Total allowable (potential to emit if there are no legally and practically enforceable restrictions) emissions from the air pollution source for the following air pollutants: particulate matter, PM_{10}, $PM_{2.5}$, sulfur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H_2SO_4), hydrogen sulfide (H_2S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.

X Estimates of the total actual emissions from the air pollution source for the following air pollutants: particulate matter, PM_{10}, $PM_{2.5}$, sulfur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, ammonia (NH_3), fluorides (gaseous and particulate), sulfuric acid mist (H_2SO_4), hydrogen sulfide (H_2S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.

X Other – Manufacturer Spec Sheets

[Disclaimers] The public reporting and recordkeeping burden for this collection of information is estimated to average 6 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

D. TABLE OF ESTIMATED EMISSIONS

The following estimates of the total emissions in tons/year for all pollutants contained in your worksheet stated above should be provided.
(EMISSIONS BELOW ARE FROM ALL SOURCES INCLUDING THE TWO NEW GENERATORS)

Pollutant	Total Actual Emissions (tpy)	Total Allowable or Potential Emissions (TPY)
PM		3.08
PM_{10}		3.08
$PM_{2.5}$		3.08
SO_x		0.13
NO_x		87.40
CO		44.93
VOC		4.55
Pb		6.63E-5
NH_3		0
Fluorides		0

H_2SO_4	0
H_2S	0
TRS	0
RSC	0

Emissions calculations must include fugitive emissions if the source is one the following listed sources, pursuant to CAA Section 302(j):

(a) Coal cleaning plants (with thermal dryers);
(b) Kraft pulp mills;
(c) Portland cement plants;
(d) Primary zinc smelters;
(e) Iron and steel mills;
(f) Primary aluminum ore reduction plants;
(g) Primary copper smelters;
(h) Municipal incinerators capable of charging more than 250 tons of refuse per day;
(i) Hydrofluoric, sulfuric, or nitric acid plants;
(j) Petroleum refineries;
(k) Lime plants;
(l) Phosphate rock processing plants;
(m) Coke oven batteries;
(n) Sulfur recovery plants;
(o) Carbon black plants (furnace process);
(p) Primary lead smelters;
(q) Fuel conversion plants;
(r) Sintering plants;
(s) Secondary metal production plants;
(t) Chemical process plants
(u) Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input;
(v) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels;
(w) Taconite ore processing plants;
(x) Glass fiber processing plants;
(y) Charcoal production plants;
(z) Fossil fuel-fired steam electric plants of more that 250 million British thermal units per hour heat input, and
(aa) Any other stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Act.