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**CARB Comments on Air Quality Analysis**

*Additional submitted attachment is included below.*

**Comments by the California Air Resources Board on the California Energy Commission's Proposed Decision for the Proposed Sequoia Data Center Project (19-SPPE-03)**

The California Air Resources Board (CARB) greatly appreciates the California Energy Commission (CEC, or "the Commission") providing the opportunity to provide the following written comments on the proposed Sequoia Data Center (or "proposed project"). At the last hearing on the Data Center, consistent with requests from presiding Commissioner Douglas, the Commission voted unanimously to pause proceedings and asked CARB to file additional information by October 15, 2020, relating to the air quality analysis. These comments provide the requested information.

The Sequoia Data Center is one of an increasing number of such projects before the Commission; cumulatively, the CEC has approximately 650 MW of generation capacity before it. Each of these projects proposes to use diesel generators, and the substantial majority of the projects propose to use "Tier 2" diesel generators, which are dirtier than modern "Tier 4" generators. Many of these projects are in, or near, communities experiencing elevated levels of environmental risk per CalEnviroScreen.

Consistent with its general oversight role,<sup>1</sup> CARB is committed to working with CEC and with the Bay Air Quality Management District (BAAQMD) to consider options to address data center air quality issues. Indeed, CARB is meeting regularly with BAAQMD and CEC Staff on general analytic issues, and intends to continue to do so.

For instance, in response to the increasing number of such projects, BAAQMD Staff contacted CARB in March 2020 to request assistance with the District's efforts to find and develop advanced technology that can be used as backup power for data centers. This extensive collaboration has resulted in the development of a new tool to identify emergency backup power technology options for commercial operations.<sup>2</sup> CARB is also in ongoing conversations with CEC on these general issues. CARB is committed to continuing to support the air district and CEC in their efforts to identify and require the use of best available control technology (BACT) or alternative technologies for the proposed data center projects. CARB would be supportive of technical workshops

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<sup>1</sup> See Health & Safety Code § 39600 *et seq.*

<sup>2</sup> See <https://ww2.arb.ca.gov/our-work/programs/public-safety-power-shutoff-psps-events/emergency-backup-power-options-commercial>.

and conferences on data centers generally, as well as continued scrutiny of this particular project.

With regard to this project, and with regard to the Commission's request for more information, CARB has reviewed air quality information for the proposed project. There are several issues on which more analysis is warranted. Most importantly, the project, as proposed, appears to cause violations of the state 1-hour NO<sub>2</sub> standard and may violate the federal standard as well. Elevated levels of NO<sub>2</sub> can cause lung irritation and exacerbate asthma, among other concerns—which, are, of course, of special concern during the current pandemic. We also highlight concerns regarding how ambient air quality impacts are evaluated, analysis of "emergency" operations, environmental review significance thresholds, evaluation of project alternatives, and BACT. We have also included a data appendix providing more information.

CARB's concerns here are applicable to most, if not all, proposed data center projects undergoing review. Thus, while the comments here are made in the context of the Sequoia Data Center proposal, they also represent air quality issues with current data center review more broadly, which CARB Staff is collaboratively addressing with CEC Staff and BAAQMD Staff. CARB looks forward to continuing that collaboration.

## **1. Relevant Legal Standards**

Our comments are intended to provide information, consistent with the Commission's order, to inform review of this project under the Public Resources Code. We briefly recap the law at the outset to situate our comments, and provide a guide for members of the public who may review these materials after submission.

Public Resources Code section 25500 vests "exclusive power" in CEC to certify power plant sites and related facilities; construction cannot be commenced without first securing CEC certification, and CEC certification is "in lieu of any" and supersedes requirements by any other state, local, or regional agency. However, CEC may exempt "thermal power plants with a generating capacity of up to 100 megawatts" (MW) or modifications that add up to not more than 100 MW "if the commission finds that no substantial adverse impact on the environment or energy resources will result from the construction or operation of the proposed facility or from the modifications."<sup>3</sup> For such exempted facilities, the "exclusive power" grant does not go into effect, and so these facilities are subject to all other applicable agency requirements and permitting.<sup>4</sup> CEC developed a framework by which it would review

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<sup>3</sup> Pub. Res. Code, § 25541.

<sup>4</sup> Pub. Res. Code, § 25542.

applications for exemption by power plants of 100 MW or less, referred to as a small power plant exemption (SPPE).<sup>5</sup>

Relevant here, SPPE applications must also include a discussion of environmental and energy resources impacts that “may result from the construction or operation of the power plant”; a “discussion of proposed alternatives to the power plant, including the alternative of no power plant, and any mitigation measures proposed to reduce environmental impact”; and a “discussion of that portion of the gross energy output which will be used for the site and related facility.”<sup>6</sup> SPPE review “shall follow the requirements of the California Environmental Quality Act . . . and the state CEQA Guidelines.”<sup>7</sup> If an SPPE is granted, the project moves on to local authorities (here, BAAQMD) for permitting; if not, CEC conducts permitting.

## **2. Ambient Air Quality Impact Evaluation**

The Commission requested CARB’s views on air quality impacts. Both CARB and the U.S. Environmental Protection Agency set ambient air quality standards, which provide science-based criteria for air quality.<sup>8</sup> Relevant here, the standards for NO<sub>2</sub> are 188 micrograms per cubic meter (µg/m<sup>3</sup>) (1-hr National Ambient Air Quality Standard) and 339 µg/m<sup>3</sup> (1-hr California Ambient Air Quality Standard). The state standard is a “not to exceed” standard, while the federal standard allows some averaging. Accordingly, the state standard can be more rigorous in practice; we therefore focus on the state standard, but both standards may be exceeded by this project’s emissions. The City of San Jose conducted an “Initial Study/Mitigated Negative Declaration” (IS/MND) for the project, which, though otherwise outdated given subsequent project modifications, contains information on these standards that demonstrates this point.<sup>9</sup>

NO<sub>2</sub> exposure over short periods can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing, or difficulty breathing), hospital admissions, and visits to emergency rooms. Longer exposures to elevated concentrations of NO<sub>2</sub> may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. People with asthma, as well as children and the elderly, are generally at greater risk for the health effects of NO<sub>2</sub>. Projects whose emissions violate these standards cause adverse environmental impacts.

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<sup>5</sup> Cal. Code Regs., tit. 20, §§ 1934–1947.

<sup>6</sup> *Id.* App’x F(e), (f), (j).

<sup>7</sup> *Id.* § 1936(c).

<sup>8</sup> *See, e.g.*, 42 U.S.C. § 7408-7410; Health & Safety Code §§ 39606 *et seq.*

<sup>9</sup> Sequoia Data Center Initial Study and Proposed Mitigated Negative Declaration, January 23, 2020 (TN# 231651).

NO<sub>x</sub> emissions (including NO<sub>2</sub>) are emitted into the air by the combustion of fuels by a variety of sources including cars, trucks, buses, refineries, and power plants. For the proposed project, the primary source of NO<sub>x</sub> emissions is the operation of the diesel backup generator engines. As part of the IS/MND for the proposed project, CEC Staff calculated the NO<sub>x</sub> emissions for the diesel backup generator engines and performed a modeling analysis to determine the ambient air quality impacts due to the operation of these engines. According to the IS/MND, the modeled 1-hour average NO<sub>2</sub> impacts are at 98% and 99% of the allowable state and federal ambient air quality standards, respectively, as a result of maintenance and testing operation of the backup generator engines.<sup>10</sup> Thus, any increase in modeled NO<sub>2</sub> ambient impacts for the proposed project would be a concern given the small compliance margin remaining before a 1-hour average ambient NO<sub>2</sub> standard is exceeded.

The operation of *one* generator likely violates the standards if the modeling uses more appropriate model inputs. CARB believes modelling inputs need to be adjusted to reflect best modelling practices. Appropriate modeling assumptions—including the assumed partial load NO<sub>x</sub> emission rate, exhaust NO<sub>2</sub>/NO<sub>x</sub> ratio, modeling receptor spacing, type of ozone limiting method used, hourly meteorological missing data procedures used, and fence-line modeling receptor locations—result in higher impacts and potential NO<sub>2</sub> standard exceedances from only one backup diesel generator operating.

For a more concrete example of how modeling assumptions can result in the proposed project exceeding a 1-hour average NO<sub>2</sub> ambient air quality standard even just for one backup diesel generator operating, consider the background ambient dataset selected for the analysis. According to the IS/MND for the proposed project, the background ambient 1-hour average NO<sub>2</sub> levels used for purposes of modeling compliance with the 1-hr California Ambient Air Quality Standard were based on the use of an applicant-prepared dataset containing seasonal hour-of-day background NO<sub>2</sub> levels.<sup>11</sup> The seasonal hour-of-day background NO<sub>2</sub> levels were calculated by the applicant using a five-year average of third-highest value for the season and hour-of-day for data collected at the 158 Jackson Street monitor in San Jose, California, from January 2013 to December 2017.<sup>12</sup>

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<sup>10</sup> Sequoia Data Center Initial Study and Proposed Mitigated Negative Declaration, Table 5.3-8, 19-SPPE-03, January 23, 2020 (TN# 231651).

<sup>11</sup> Sequoia Data Center Initial Study and Proposed Mitigated Negative Declaration, Table 5.3-8 (note a), 19-SPPE-03, January 23, 2020 (TN# 231651).

<sup>12</sup> Sequoia Data Center Initial Study and Proposed Mitigated Negative Declaration, page 5.3-21, 19-SPPE-03, January 23, 2020 (TN# 231651).

Because the 1-hr California Ambient Air Quality Standard is a simple not-to-exceed 1-hour average standard<sup>13</sup> and not a multi-year averaged standard (like the 1-hr National Ambient Air Quality Standard), a multi-year average of the background 1-hour NO<sub>2</sub> levels for modeling compliance with the state standard does not provide complete information. For purposes of modeling compliance with the state 1-hour NO<sub>2</sub> standard, the maximum modeled 1-hour NO<sub>2</sub> impact for the proposed project should be added to the maximum 1-hour NO<sub>2</sub> background level for the project area. Such an analysis would likely show that the proposed project exceeds the 1-hour NO<sub>2</sub> state ambient air quality standard of 339 µg/m<sup>3</sup>, given that the proposed project's maximum modeled 1-hour NO<sub>2</sub> impact is approximately 310 µg/m<sup>3</sup> for operation of a single diesel engine generator<sup>14</sup> and the maximum background level for the project area is approximately 162 µg/m<sup>3</sup>,<sup>15</sup> resulting in a maximum combined project impact of approximately 472 µg/m<sup>3</sup>. Again, the state standard is a "not-to-exceed" standard, making this analysis straightforward. Federal standard violations are also likely, though averaging requirements mean modeling is somewhat more complex, but important to review.

Moreover, note that the applicant-prepared background NO<sub>2</sub> monitoring dataset ends in 2017 and therefore does not represent the most current data available. The SPPE application for the proposed project was submitted in August 2019, and 2018 background data was readily available at that time. Given that the maximum background 1-hour NO<sub>2</sub> level for the dataset ending in 2017 is approximately 128 µg/m<sup>3</sup>,<sup>16</sup> while the maximum level for the dataset ending in 2018 is approximately 162 µg/m<sup>3</sup>, including the 2018 data results in a significant increase of approximately 34 µg/m<sup>3</sup> in the combined 1-hour NO<sub>2</sub> impacts for the proposed project.

As there are fifty-four generators in this project, exceedance concerns become even more acute. Because one generator appears to cause violations, operating multiple generators almost certainly would lead to further exceedances. We discuss this further below, regarding "emergency" operations.

Furthermore, it would be appropriate to consider ambient air quality impacts of multiple data centers—not just multiple generators—because the CEC is currently considering several projects in the same area. The impacts from the operation of the

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<sup>13</sup> See Cal. Code Regs., tit. 17, § 70200 (NO<sub>2</sub> standard is violated "when concentrations exceed those set forth in the body of the regulation").

<sup>14</sup> CEC Staff Data Requests Set 3 for Sequoia Data Center, background information for Data Request Number 118, 19-SPPE-03, December 12, 2019 (TN# 231014).

<sup>15</sup> Sequoia Data Center Initial Study and Proposed Mitigated Negative Declaration, Table 5.3-3, 2018 1-hr NO<sub>2</sub> of 86 ppb, 19-SPPE-03, January 23, 2020 (TN# 231651).

<sup>16</sup> Application for Small Power Plant Exemption, Sequoia Backup Generating Facility, Table 4.3-3 (68 ppb), August 14, 2019 (TN# 229419-1).

backup generators at these other constructed and/or proposed data centers located in the general project area should be included in the ambient air quality analysis for the proposed project to determine the cumulative impacts. Including these other data centers in the analysis is important given that it is unlikely the impacts from these other projects are properly accounted for in the background ambient data.

This suggests there are significant adverse environmental impacts from this proposed project that require additional mitigation measures or a full environmental impact report—or even that the SPPE is not appropriate for this project.

CARB Staff are prepared to assist CEC Staff on any further analysis. CARB also recommends as a best practice for all data center projects going forward under CEC's purview that CEC Staff perform a complete independent criteria pollutant ambient air quality modeling analysis and toxic air contaminant evaluation, and avoid using only applicant-prepared modeling input data/files.

### 3. Emergency Operation

The scope of the project's adverse environmental impacts—which already appear significant based on the foregoing—is likely more substantial if other generators operate, as may well occur. The proposed project, like all data centers, is seeking to install diesel engine backup generators for events in which it loses connection to the grid, so that it may continue to operate and provide its services reliably to its customers. Though the timing or occurrence of such events may not always be known, power loses do happen—and data centers are designed and built specifically because such events are foreseeable. Indeed, data centers *have* generators and sell themselves as reliable operators specifically because they intend to operate during such events, which have been occurring with increasing regularity. But this commercial proposition comes with analysis, disclosure, and mitigation obligations. Community members living near the data centers reasonably deserve to know—and want to know—what the air quality impacts will be when the centers operate. These impacts are likely to extend far beyond those of a single generator.

These obligations and operational realities mean forecasting a reasonable range of uses during power outages is appropriate. Such use is reasonably foreseeable. Although we recognize continuing work to limit reliability events and power shutoffs, data centers are constructed on the reasonable premise that such outages do occur, and that we must manage the continuing risks of a warming climate.

As Californians have experienced, the State is becoming increasingly prone to heat storm events, and these events occur precisely when air quality impacts are already likely to be severe, even before data centers operate their backup generators. During

a heat storm, other power plants are already likely to be running at capacity—including California’s remaining fleet of relatively polluting gas peaker plants. These generators add air pollution to that caused by smoke and hot weather (hot weather generally tends to drive smog events). Moreover, peak power demand often occurs during the evening—a time when smog can be at its peak. Thus, the conditions under which data centers may operate may already include poor air quality, meaning the incremental contribution of data centers to this pollution may also be cumulatively significant, even for relatively small amounts of pollution.

Capturing these concerns is important—which requires developing reasonable assumptions as to when centers will operate at greater capacity. In our conversations with Staff, one question was whether modeling such operations is in fact unduly speculative. In CARB’s view, data center emergency operations are not speculative, and an evaluation of their operations during loss of power—for which the centers are being specifically designed, and for which they are marketed to customers—is also not speculative. CEQA requires an appropriate evaluation even of foreseeable impacts otherwise imprecise in scope or contingent in occurrence.<sup>17</sup>

CEQA case law supports such modeling. For instance, in *Laurel Heights Improvement Association v. Regents of University of California*, the California Supreme Court held:

an EIR must include an analysis of the environmental effects of future expansion or other action if: (1) it is a reasonably foreseeable consequence of the initial project; and (2) the future expansion or action will be significant in that it will likely change the scope or nature of the initial project or its environmental effects.<sup>18</sup>

Similarly, in *Whitman v. Board of Supervisors*, an oil company applied for a conditional use permit for an exploratory well, and the permit was granted despite the EIR not discussing the environmental impacts of a contemplated pipeline should the well prove lucrative. In part, the county planning department defended this omission by claiming the pipeline did not require a permit and was not subject to CEQA.<sup>19</sup> The court disagreed, stating:

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<sup>17</sup> “The fact that precision may not be possible, however, does not mean that no analysis is required.” *Laurel Heights Improvement Association v. Regents of University of California* (1998) 47 Cal.3d 376, 396.

<sup>18</sup> *Ibid.* And though the proposed project does not currently contain an EIR, the principle of not ignoring impacts from reasonably foreseeable operations still holds—even more so, perhaps, give, CEC Staff’s more EIR-level review for its IS/MND.

<sup>19</sup> (2d Dist. 1979) 88 Cal.App.3d 397, 414–15.

The record before us reflects that the construction of the pipeline was, from the very beginning, within the contemplation of [the oil company] should its well prove productive. Although admittedly contingent on the happening of certain occurrences, the pipeline was, nevertheless, part of [the oil company's] overall plan for the project and could have been discussed in the EIR in at least general terms.<sup>20</sup>

These legal principles reflect many CEQA cases which reach the same conclusion that reasonably forecasting events is critical to full analysis. CEC can rely on this law as it models operations. Though the precise parameters of simultaneous backup generator operation (or even if these backup generators will actually operate at all) cannot now be known, that does not per se render them speculative to the degree of no evaluation. As noted, at least some simultaneous operation of backup generators during power outages is reasonably foreseeable, and will only continue to become more so as the climate continues to warm. The only purpose for the installation of the backup diesel generators for this proposed project is to operate and provide power to the data center due to a disruption in utility power. Modeling at least some impact from simultaneous operation of the backup generators is no more speculative than assuming no hours of simultaneous operation or even in modeling the permitted 50 hours annually of operation for maintenance, which requires a similar degree of CEC making reasonable assumptions.

Because some emergency operation is foreseeable and anticipated and because reasonable assumptions can be made similarly to model various scenarios of emergency operation, at least some meaningful analysis of emergency operation emissions impacts can be conducted. Such analysis becomes even more important when one considers, as discussed above, how close to the NO<sub>2</sub> standards the proposed project is with just one backup generator running for maintenance purposes—and thus the likelihood of significant short-term ambient air quality impacts associated with the simultaneous operation of multiple backup diesel generators.

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<sup>20</sup> *Ibid.* Likewise, in *City of Antioch v. City Council*, a proposed road and sewer construction project received a negative declaration, which the court found violated CEQA because it did not evaluate impacts of any resulting development. The City argued that an EIR was not required because it was not known what kind of development would occur, and any proposals for future development would be subject to further environmental review. (*City of Antioch v. City Council* (1986) 187 Cal.App.3d 1325, 1333.) The court held that “[c]onstruction of the roadway and utilities cannot be considered in isolation from the development it presages. Although the environmental impacts of future development cannot be presently predicted, it is very likely these impacts will be substantial”—and therefore required an EIR considering the “most probable development patterns.” (*Id.* at pp. 1336, 1337.) The cases we have cited are representative; CEC will have ample legal support if it proceeds with modelling.

Consequently, CARB recommends that the short-term criteria pollutant and toxic air contaminant ambient air quality impacts due to the emergency operation of the backup generators for the proposed project be evaluated. For this analysis, CARB recommends that several operating scenarios be analyzed, including a scenario with multiple backup generators operating at high load and providing the full power required by the data center and a scenario based on the recent operation of data center backup generator systems due to the heat storm in California. It is CARB's understanding that the CEC and BAAQMD Staffs are in the process of collecting this information. In addition, CARB, CEC, and BAAQMD Staffs are in the process of determining other backup diesel generator operating scenarios that should be included in this type of ambient impact analysis. Were the Commission to direct a general evaluation of these issues, CARB is happy to assist.

#### 4. CEQA Significance Thresholds

We have also discussed appropriate significance thresholds for these projects. CARB is of the view that multiple thresholds are appropriate for evaluation here. A range of thresholds could be used, including the 1-hour state and federal ambient air quality standards, federal ambient significance impact levels (SILs), hourly pounds-per-hour NSR trigger levels, and short-term acute toxic air contaminant thresholds. CARB also notes that evaluation of emergency operations would likely use the same significance thresholds as CEC uses for evaluation of generator maintenance impacts; CARB is not aware of any reason to rely on separate significance thresholds for air quality impacts from maintenance operation as opposed to power outage operation.

We further note that a fuller analysis of the project's significance may be masked by the use of offsets. An important component of the CEQA review process is the evaluation of a proposed project's impacts compared to significance thresholds. An example of this type of analysis is shown in the following evaluation from the IS/MND for the proposed project<sup>21</sup>:

**Table 5.3-6** provides the annual criteria pollutant emission estimates for project readiness testing and maintenance using the emissions source assumptions noted above. **Table 5.3-6** shows that with NO<sub>x</sub> emissions from the readiness testing and maintenance of the standby generators fully offset through the permitting process with the BAAQMD, the project would not exceed any of the BAAQMD emissions significance thresholds. The BAAQMD CEQA Guidelines state that if the project's daily average or annual emissions of operational-related criteria air pollutants or precursors do not exceed any applicable Threshold of Significance listed in **Table 5.3-**

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<sup>21</sup> Sequoia Data Center Initial Study and Proposed Mitigated Negative Declaration, page 5.3-19, 19-SPPE-03, January 23, 2020 (TN# 231651).

4, the proposed project would not result in a cumulatively significant impact (BAAQMD 2017b). The BAAQMD significance thresholds for daily emissions are daily average values that scale to equal the annual thresholds. Therefore, a separate comparison of the project’s average daily emissions versus the BAAQMD average daily significance thresholds is unnecessary.

**TABLE 5.3-6 ANNUAL CRITERIA POLLUTANT EMISSIONS FROM PROJECT TESTING AND MAINTENANCE**

Source Type	Annual Emissions (type)					
	ROG	CO	NOx	SO <sub>2</sub>	PM10	PM2.5
Mobile Sources	0.14	1.8	0.63	0.003	0.58	0.16
Facility Upkeep (Area and Energy Sources)	3.2	0.76	0.9	0.01	0.07	0.07
Standby Generators (Testing Only)	0.54	6.4	35.96	0.03	0.16	0.16
Proposed Offsets at 1:15 to 1	--	--	(-41.35)	--	--	--
Net Project Emissions	3.9	8.9	- 5.39	0.04	0.81	0.39
BAAQMD Annual Significance Thresholds	10	--	10	--	15	10
Mitigated Emissions Exceed BAAQMD Threshold? (Y/N)	No	N/A	No	N/A	No	No

While there is some question as to whether the NOx emission offsets shown above are being used as a CEQA mitigation measure,<sup>22</sup> it is clear that the NOx emission offsets are being treated as negative emissions and used to reduce the proposed project’s emissions below CEQA significance levels. But the community will not experience simultaneous benefits from these offsets during operations—which is the key issue here. Emission offsets are based on emission reductions that have occurred many years prior to the review/permitting of a new project in question. Therefore, the emission reductions associated with emission offsets are not concurrent with the emission increases for the project under review.

In addition to this obvious timing issue, emission offsets are not re-evaluated at the time of use to ensure that they continue to represent real surplus emission reductions for the area in question (i.e., emission reductions beyond those required by current air quality regulations). Furthermore, emission offsets oftentimes are based on emission reductions that have occurred at facilities located far from where a new project is being proposed. Given these shortcomings, it is inappropriate to use NOx emission offsets as a concurrent emission reduction to keep the proposed project’s emissions below CEQA significance levels, at least without more analysis to be able to conclude

<sup>22</sup> For instance, Table 5.3-6 refers to “[m]itigated emissions,” while, two paragraphs later on the same page, the IS/MND states there are no required mitigation measures for readiness testing and maintenance.

based on substantial evidence that the proposed project's NOx emissions will not have substantial adverse impacts on the nearby communities.

CARB recommends that the CEC Staff do not treat emission offsets as negative emissions when comparing the proposed project's emissions to CEQA significance thresholds, and to include more analysis on the NOx offsets themselves. CARB and BAAQMD should be able to assist here.

## 5. Alternatives

For the reasons discussed above, a full analysis of the proposed project's impacts would lead to the conclusion that it has significant adverse environmental impacts, and hence prompt a thorough review of alternatives. Alternatives analysis is also a part of the SPPE process, even if significant adverse environmental impacts are not present.

In order to aid in its required finding of no significant adverse environmental impact, the CEC's regulations require SPPE applications to include a discussion of project alternatives. Accordingly, the proposed project's application includes an alternatives section of possible alternatives to the use of diesel backup generator engines. However, the discussion is cursory and lacks any meaningful evaluation of the alternatives listed.

At least two alternatives should reasonably be considered in more detail: the use of gas-fired engines and the use of Tier 4 diesel generators. Going forward, evaluating zero- or lower-emission alternatives even than these will be important – and a matter which CARB suggests CEC may wish to consider in a broader technical conference.

With regard to gas-fired engines the application materials provide only<sup>23</sup>:

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<sup>23</sup> Application for Small Power Plant Exemption, Sequoia Backup Generating Facility, Section 5.3, page 5-2, August 14, 2019 (TN# 229419-1).

## *Gas-Fired Engines*

C1 considered using natural gas-fired engines instead of diesel generators to supply backup power for the SDC. This technology option was rejected because it is not technically feasible. The UPS systems described in Section 2.2 require backup generation that starts very quickly, and natural gas engines are too slow to start. Loss of natural gas delivery, such as broken pipe or loss of supply, would render the natural gas engines inoperable and unable to reliably provide backup electrical power in an emergency. Further, emergency conditions resulting in loss of power from SVP may also result in temporary loss of gas utility service. Therefore, natural gas engines are not considered reliable enough to meet the industry standard or needs of the SDC. Storage of enough natural gas on site to maintain emergency electricity to the SDC during an outage would not be tenable given the volume of natural gas that would be required. Finally, natural gas-fired engines are not considered industry standard for data centers.

But more analysis would be helpful. The above alternative discussion lacks supporting calculations, data, and references to actually conclude that natural-gas-fired engines start up too slowly, that the natural gas supply system is not reliable enough, or that there is insufficient room for onsite storage of natural gas. CEC's regulations, which require applicants to describe any studies or research undertaken or relied upon to provide any information in the application and to include or reference all studies and literature relied upon, can further support such analyses.<sup>24</sup>

Based on recent discussions with a manufacturer of rich-burn natural-gas-fired backup/emergency generator engines, these units are comparable to diesel-fired generating units with regards to startup time, transient load following, reliability, and space requirements. Enclosed as Attachment 1 is a list of a number of rich-burn natural-gas-fired backup/emergency generator engine installations. As shown by this list, these types of engines have been installed at a variety of facility types including hospitals, schools, warehouses, water supply utilities, and manufacturer operations. Because these types of engines are fired with natural gas and can be equipped with three-way catalyst systems, there would be no toxic diesel particulate emissions associated with the operation of the engines and the NOx emissions would be a small fraction the emissions associated with diesel engines.

In addition, the conclusion that the natural gas supply system may fail when there is a failure of the utility power grid is not supported by any evaluation of actual dual system failure analysis. Finally, there is no calculation of the extra room needed to

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<sup>24</sup> Cal. Code Regs., tit. 20, §§ 1704 subd. (a)(3), 1940.

store natural gas onsite as a backup fuel supply, nor any discussion of why accommodating such extra room would be infeasible or inappropriate. CARB recommends that the Commission require the project applicant to provide the data, studies, research, or literature relied upon in concluding the project alternatives are not feasible, or, more preferably, to significantly expand the alternatives analysis.

As to Tier 4 diesel engines, because Tier 4 diesel backup generator engines are equipped with selective catalytic reduction (SCR) systems to control NO<sub>x</sub> emissions, the NO<sub>x</sub> emissions for these units are approximately 93% lower<sup>25</sup> than the emissions for Tier 2 diesel engines, including those equipped with diesel particulate filters. Based on discussions with two major manufacturers, Tier 4 diesel backup generator engines are essentially identical to Tier 2 units in terms of startup times, ramp rates, transient load following, and reliability (provided that manufacturer suggested maintenance is performed). For instance, CARB is aware of several EPA Tier 4 certified/Tier 4 compliant diesel backup/emergency generator sets that have been installed over the past few years. A list of these Tier 4 certified/Tier 4 compliant diesel backup/emergency generator installations are enclosed as Attachment 2. Also included in Attachment 2 are copies of some of the air quality permits for these listed units. CARB is in the process of collecting additional information on these installations and will be sharing this data with the CEC and BAAQMD Staffs as soon as it is available.

CARB notes that should the Commission ultimately require an EIR for this project, such EIR would necessarily include a more detailed review of these alternatives. Ideally, the following additional evaluations would be included in the expanded alternatives analysis:

- A detailed analysis (including calculations, vendor data, studies, etc.) of the startup times/ramp rates for simple-cycle natural-gas-fired gas turbine generators versus diesel backup generator engines;
- A detailed analysis (including calculations, vendor data, studies, etc.) of the startup times/ramp rates for natural-gas-fired rich-burn I/C engine generators versus diesel backup generator engines;
- Detailed studies examining the simultaneous dual failure of the utility power and natural gas supply systems;

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<sup>25</sup> Base on EPA Nonroad Compression-Ignition Engine Exhaust Emission Standards, engines > 560 kw, 9.2 g/kw-hr (Tier 2) vs. 0.67 g/kw-hr (Tier 4) NO<sub>x</sub> emission standard.

- Detailed calculations of the space requirement for onsite liquid propane or liquid natural gas versus onsite storage of diesel fuel on a total stored energy basis;
- Manufacturer-supplied information regarding the availability of EPA Tier 4 certified/compliant diesel backup generator engines;
- Detailed calculations of the energy density of current generation large scale backup battery systems, available site space, battery packaging/layout options (including stacking of battery containers), and corresponding available power levels/duration for this system; and
- Further evaluation on the feasibility of using natural-gas-fired fuel cells, with the assumption that the fuel cells are constantly operating and feeding the grid with the ability to switch to facility-only power when needed for an emergency. To help with the CEC review of the feasibility of fuel cells, enclosed as Attachment 3 is a list of a number of large-scale fuel cells installations powered by natural gas.

CARB is prepared to work with CEC and BAAQMD to acquire the necessary information for such alternatives analysis. Such alternatives, if feasible, would properly be required as a condition for a SPPE, or could inform the CEC's considerations if an EIR becomes necessary.

## 6. BACT

New major sources of air pollution are required to reduce emissions consistent with the application of the BACT under both state and federal law.<sup>26</sup> In considering an SPPE application, CEC Staff considers whether BACT is being applied as part of its environmental evaluation, although the BACT determination will ultimately be made by local air districts if an SPPE is granted. If an SPPE is not granted, CEC must ultimately seek BACT determinations from the air district and impose those requirements itself through its certification process. Although BACT is legally distinct from CEQA alternatives analysis, the availability of cleaner technologies for backup generation also informs the BACT analysis.

In the SPPE application for the proposed project, the project developer concludes that the proposed diesel backup/emergency generator engines trigger BAAQMD New Source Review (NSR) BACT requirements for carbon monoxide (CO) and NO<sub>x</sub>, and that the use of EPA-certified Tier 2 diesel engines complies with these BACT

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<sup>26</sup> Note that California BACT is generally more stringent than federal BACT. Thus, as CEC considers this matter, it should ensure that *both* legal standards are satisfied.

requirements.<sup>27</sup> While this conclusion is consistent with the BAAQMD BACT guideline for emergency diesel generators,<sup>28</sup> it is important to note that this guideline has not been updated for nearly ten years. Moreover, BACT guidelines are to be updated in particular circumstances, and thus do not preordain a Tier 2 outcome.<sup>29</sup> Instead, BACT is more akin to a moving target, requiring reevaluation over time. After all, the “best” available technology invariably changes over time, and has been improving. In particular, BAAQMD NSR regulations define BACT as an emission limitation, control device, or control technique applied at a source that is the most stringent of:

202.1 The most effective emission control device or technique that has been successfully utilized for the type of equipment comprising such a source; or

202.2 The most stringent emission limitation achieved by an emission control device or technique for the type of equipment comprising such a source; or

202.3 The most effective control device or technique or most stringent emission limitation that the APCO has determined to be technologically feasible for a source, taking into consideration cost-effectiveness, any ancillary health and environmental impacts, and energy requirements; or

202.4 The most effective emission control limitation for the type of equipment comprising such a source that is contained in an approved implementation plan of any state, unless the applicant demonstrates to the satisfaction of the APCO that such limitation is not achievable.

Under no circumstances shall BACT be less stringent than any emission control required by any applicable provision of federal, state or District laws, rules or regulations.<sup>30</sup>

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<sup>27</sup> Application for Small Power Plant Exemption, Sequoia Backup Generating Facility, page 4.3-16, August 14, 2019 (TN# 229419-1).

<sup>28</sup> BAY AREA AIR QUALITY MANAGEMENT DISTRICT, Best Available Control Technology (BACT) Guideline, IC Engine-Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump > 50 bhp, 12/22/2010.

<sup>29</sup> That BAAQMD’s BACT guideline uses a CARB air toxic control measure is also not material here: air districts are authorized to have more stringent controls or limitations than those otherwise required by CARB. This will especially hold true with standards like BACT, which are purposely designed to ratchet up pollution controls over time as technology advances.

<sup>30</sup> BAAQMD Regulation 2, Rule 2, Section 2-2-202, December 6, 2017.

Importantly for this project (and all data center projects), the above definition for BACT clearly indicates that BACT requires the use of either the most effective emission control device or technique that has been used or the most stringent emission limitation that has been achieved for the type of equipment being reviewed/permitted (generally referred to as achieved in practice).<sup>31</sup> The BACT definition is broad in nature and requires exploration of currently available emission control technologies and emission limits and selecting the most stringent one that has been installed on the type of equipment being reviewed/permitted. To CARB's knowledge, this has not occurred to date for the proposed project.

Since BAAQMD issued its BACT guideline ten years ago, the EPA certification standards for non-road diesel engines have become more stringent with Tier 4 requirements for engines with output greater than 560 kw manufactured since 2011. In addition, the major diesel engine generator manufacturers, including Cummins and Caterpillar, offer EPA Tier 4 final certified/EPA Tier 4 final compliant backup/emergency diesel generator sets in the size range identified for the proposed project (i.e., continuous generating ratings between approximately 1.5 MW to 3 MW). As discussed above, CARB is aware of several EPA Tier 4 certified/Tier 4 compliant diesel backup/emergency generator sets that have been installed over the past few years and has included a list of these installations as Attachment 2. Also included in Attachment 2 are copies of some of the air permits for these units. CARB is in the process of collecting information on these installations and will be sharing this data with the CEC and BAAQMD Staffs as soon as it is available.

In the meantime, CARB recommends that the BACT discussion in the IS/MND for the proposed project be revised to clearly indicate that BACT determinations are made on a case-by-case basis using the most current information available. This revised discussion should also make it clear that a case-by-case analysis may determine that BACT for the backup diesel generators identified for this proposed project is something other than the use of Tier 2 diesel engines.

## **Conclusion**

CARB recognizes the importance of reliable data center operation and will be happy to continue to provide air quality information to CEC. As data center applications multiply, it is critical that air and energy agencies collaborate to ensure that the internet is powered by the cleanest energy possible. Doing so is especially important because many data centers are in or near communities already suffering from air pollution burdens. The Commission has an opportunity to ensure that this project,

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<sup>31</sup> The APCO has not made a technologically feasible BACT determination for these diesel backup generators, and even if they had, it would not be more stringent than what is achieved in practice.

and all projects before it, reflect modern pollution control standards. CARB looks forward to working with CEC and BAAQMD to ensure that such standards are required.

**ATTACHMENT 1**

NATURAL GAS FIRED RICH BURN EMERGENCY GENERATOR ENGINES

**Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Industry Use of Installation:</b>
Enchanted Rock	G4.5	448	Construction	TX	77346	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77532	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77506	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77523	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77581	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77505	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77571	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77565	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78209	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77339	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77041	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78220	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78582	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77521	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77469	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77429	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77406	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	76574	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	79706	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78621	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	76028	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78247	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78232	Non-Certified Engine (DG)	Retail Trade

**Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Industry Use of Installation:</b>
Enchanted Rock	G4.5	448	Construction	TX	78596	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	79764	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77571	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78201	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77065	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77449	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	76502	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77373	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77042	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77379	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77979	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77059	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78202	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78212	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77057	Non-Certified Engine (DG)	Health Care and Social Assistance
Enchanted Rock	G4.5	448	Construction	TX	75088	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77546	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77375	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78216	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78232	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78247	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78213	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77380	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	77379	Non-Certified Engine (DG)	Retail Trade

**Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Industry Use of Installation:</b>
Enchanted Rock	G4.5	448	Construction	TX	77382	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78251	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78228	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78230	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78221	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78223	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	76710	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78573	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78572	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78539	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	Construction	TX	78213	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2020	TX	77901	Non-Certified Engine (DG)	Health Care and Social Assistance
Enchanted Rock	G4.5	448	2020	TX	78578	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2020	TX	77406	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2020	TX	75119	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2020	TX	78220	Non-Certified Engine (DG)	Manufacturing
Enchanted Rock	G4.5	448	2020	TX	78250	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2020	TX	78224	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2020	TX	78217	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2020	TX	78227	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2020	TX	78244	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2020	TX	77096	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2020	TX	76107	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	78223	Non-Certified Engine (DG)	Retail Trade

**Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Industry Use of Installation:</b>
Enchanted Rock	G4.5	448	2019	TX	78230	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	78258	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	78227	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	78204	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	78408	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	77087	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	78253	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	78251	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	77382	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	77494	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	75206	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	77531	Non-Certified Engine (DG)	Manufacturing
Enchanted Rock	G4.5	448	2019	TX	77095	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	77449	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	77068	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	77449	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	77375	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	77025	Non-Certified Engine (DG)	Health Care and Social Assistance
Enchanted Rock	G4.5	448	2019	TX	77041	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	76087	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	77380	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	75189	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	77085	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2019	TX	75454	Non-Certified Engine (DG)	Retail Trade

**Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Industry Use of Installation:</b>
Enchanted Rock	G4.5	448	2019	TX	77090	Non-Certified Engine (DG)	Water Infrastructure
Enchanted Rock	G4.5	448	2019	TX	76711	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	75165	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77008	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	79605	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	76522	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77503	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	75075	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78382	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	76502	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78045	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78045	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77505	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77005	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77084	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78374	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78660	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	76542	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77075	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78664	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77087	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77401	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	75236	Non-Certified Engine (DG)	Manufacturing
Enchanted Rock	G4.5	448	2018	TX	75220	Non-Certified Engine (DG)	Retail Trade

**Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Industry Use of Installation:</b>
Enchanted Rock	G4.5	448	2018	TX	78043	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77479	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77581	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	76542	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78041	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	76548	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77049	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77807	Non-Certified Engine (DG)	Educational Services
Enchanted Rock	G4.5	448	2018	TX	77027	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77055	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77521	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77071	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78664	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78589	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78363	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78332	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78660	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78717	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77088	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77379	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	76502	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78577	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78539	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78501	Non-Certified Engine (DG)	Retail Trade

**Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Industry Use of Installation:</b>
Enchanted Rock	G4.5	448	2018	TX	77901	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77433	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77345	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78501	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77093	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77523	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77494	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77494	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77429	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78596	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77054	Non-Certified Engine (DG)	Health Care and Social Assistance
Enchanted Rock	G4.5	448	2018	TX	77441	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78411	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77901	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77469	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77566	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78550	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	78550	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2018	TX	77546	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	78415	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77346	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	78412	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	78413	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	78413	Non-Certified Engine (DG)	Retail Trade

**Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Industry Use of Installation:</b>
Enchanted Rock	G4.5	448	2017	TX	77488	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77044	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77077	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77521	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77407	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	78418	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77388	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77388	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	75160	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77422	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77084	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77354	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	76901	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77459	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77379	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77478	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77083	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77459	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77573	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77521	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77494	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77584	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77573	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77484	Non-Certified Engine (DG)	Retail Trade

**Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Industry Use of Installation:</b>
Enchanted Rock	G4.5	448	2017	TX	77070	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77429	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77450	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77591	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77493	Non-Certified Engine (DG)	Manufacturing
Enchanted Rock	G4.5	448	2017	TX	77073	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77386	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77057	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77072	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77375	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77433	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2017	TX	77066	Non-Certified Engine (DG)	Retail Trade
Enchanted Rock	G4.5	448	2016	TX	77414	Non-Certified Engine (DG)	Retail Trade

## **ATTACHMENT 2**

TIER 4 DIESEL EMERGENCY GENERATOR ENGINES

**Table A-2: Tier 4 Backup Diesel Generator Installations**

<b>Manufacturer:</b>	<b>Model:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Industry Use of Installation:</b>
Cummins	2750DQLF	2750	2019	WI	53711	Tier 4 Compliant & Certified	Utilities
Cummins	2250DQKAM	2250	2020	FL	33442	Tier 4 Compliant & Certified	General Backup
Cummins	2250DQKAC			TX			Data Center
Cummins	2250DQKAC			VA	23150		Data Center
Cummins	2500DQLF			MD			Emergency Backup
Cummins	1750DQKAD			AZ			Data Center
Cummins	1500DQGAF			PA			Data Center
Cummins	2250DQKAF			CA			Data Center
Cummins	2250DQKAF			CA			Data Center
Cummins	2250DQKAF			CA			Data Center
Cummins	2250DQKAF			CA			Data Center
Cummins	1750DQKAD			PA			Data Center
Cummins	2000DQKAB			VA			Data Center
Cummins	1500DQGAF			PA			Data Center
Cummins	1250DQGAE			PA			Data Center
Cummins	1250DQGAR			PA			Data Center
Cummins	750DQFAA			VA			Emergency Backup
Cummins	2750DQLF	2750	2019	AR	72758	Tier 4 Compliant & Certified	General Backup
Cummins	750DQFAA	750	2019	CA	94105	Tier 4 Compliant	Accommodation and Food Services
Cummins	800DQFAB	800	2018	CA	90230	Tier 4 Compliant	Pump Station
Cummins	1500DQGAS	1500	2018	MN	55448	Tier 4 Compliant & Certified	General Backup
Cummins	1000DQFAH	1000	2020	SD	57030	Tier 4 Compliant & Certified	Data Center
Cummins	1500DQGAS	1500	2018	CA	90292	Tier 4 Compliant	General Backup
Cummins	750DQFAA	750	2018	CA	90292	Tier 4 Compliant	Pump Station
Cummins	1500DQGAS	1500	2018	MN	55021	Tier 4 Compliant	General Backup
Cummins	1500DQGAF	1500	2018	CA	94158	Tier 4 Compliant	General Backup
Cummins	2250DQKAM	2250	2019	CA	92145	Tier 4 Compliant & Certified	Utilities
Cummins	800DQFAB	800	2018	CA	90731	Tier 4 Compliant	Pump Station

**Table A-2: Tier 4 Backup Diesel Generator Installations**

<b>Manufacturer:</b>	<b>Model:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Industry Use of Installation:</b>
Cummins	1500DQGAS	1500	2017	WI	53562	Tier 4 Compliant & Certified	Data Center
Cummins	1000DQFAH	1000	2018	FL	32940	Tier 4 Compliant & Certified	Water Infrastructure
Cummins	2250DQKAM	2250	1900	NC	28273	Tier 4 Compliant & Certified	General Backup
Cummins	1500DQGAS	1500	2018	VA	23297	Tier 4 Compliant & Certified	General Backup
Cummins	1500DQGAS	1500	2017	MT	59028	Tier 4 Compliant & Certified	Continuous Base Load
Cummins	1000DQFAH	1000	1900	TX	77541	Tier 4 Compliant & Certified	General Backup
Cummins	1500DQGAF	1500	2014	CA	90045	Tier 4 Compliant	General Backup
Cummins	2500DQLH	2500	2015	NY	10979	Tier 4 Compliant & Certified	General Backup
Cummins	750DQFAA	750	2015	CA	90744	Tier 4 Compliant	Pump Station
Cummins	1000DQFAH	1000	2014	MN	56352	Tier 4 Compliant & Certified	General Backup
Cummins	2000DQKAL	2000	2014	PR	771	Tier 4 Compliant & Certified	General Backup
Cummins	900DQFAH	900	2013	NC	28308	Tier 4 Compliant & Certified	General Backup
Cummins	900DQFAH	900	2013	HI	96707	Tier 4 Compliant & Certified	Manufacturing
Cummins	2000DQKAL	2000	2015	VA	22079	Tier 4 Compliant & Certified	Water Infrastructure
Cummins	1250DQGAR	1250	2014	NC	27932	Tier 4 Compliant & Certified	General Backup
Cummins	1250DQGAR	1250	2012	NC	27932	Tier 4 Compliant & Certified	Water Infrastructure
Cummins	1500DQGAF	1500	2014	CA	92835	Tier 4 Compliant	General Backup
Caterpillar	3516CHD	1920 <sup>1</sup>	2020	CA		Tier 4 Compliant & Certified	Utility
Caterpillar	3516CHD	2000 <sup>1</sup>	2019	ND		Tier 4 Compliant & Certified	Utility
Caterpillar	C18	500 <sup>1</sup>	2020	CA		Tier 4 Compliant & Certified	University
Caterpillar	C175	3000 <sup>1</sup>	2020	AZ		Tier 4 Compliant & Certified	Mining
Caterpillar	3516CHD	2500 <sup>1</sup>	2013	NJ		Tier 4 Compliant & Certified	Data Center
Caterpillar	3516CHD	2000 <sup>1</sup>		CA		Tier 4 Compliant & Certified	Transportation

<sup>1</sup> Per unit rated capacity (kW) provided by Caterpillar

**ATTACHMENT 2-1**

PERMITS & SUPPORTING DOCUMENTS FOR TIER 4 GENERATOR ENGINES LOCATED AT  
THE SAN MANUEL CASINO FACILITY



## United States Environmental Protection Agency Synthetic Minor Permit for San Manuel Casino

**Tribal NSR Permit:**

T-0003-CA-R2

**Permittee:**

San Manuel Entertainment Authority  
777 San Manuel Blvd.,  
Highland, CA 92346

**Facility:**

San Manuel Casino

**Location:**

777 San Manuel Blvd.,  
Highland, CA 92346

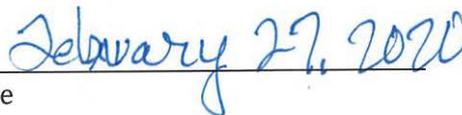
Pursuant to the provisions of the Clean Air Act (CAA) and the Code of Federal Regulations (CFR) Title 40, Sections 49.151-165, the United States Environmental Protection Agency Region 9 (EPA) is issuing a synthetic minor source permit in Indian Country to San Manuel Entertainment Authority dba as San Manuel Casino (San Manuel). This permit applies to the operation of equipment at San Manuel that consists of two natural gas cogeneration units, five emergency diesel generators, five temporary replacement generators, three natural gas boilers, 13 water heaters, two fire pumps, and six cooling towers.

San Manuel is authorized to operate equipment at the facility as described herein, in accordance with the permit application, the regulations pertaining to the Federal Minor New Source Review Program in Indian Country at 40 CFR 49.151-165, and other terms and conditions set forth in this permit. Failure to comply with any condition or term set forth in this permit may result in enforcement action pursuant to section 113 of the CAA. This permit does not relieve San Manuel from the responsibility to comply with any other applicable provisions of the CAA (including applicable implementing regulations in 40 CFR parts 51, 52, 60, 61, 63, and 72 through 75), or other federal, tribal, and local requirements.

Per 40 CFR 49.159(a) this permit becomes effective 30 days after service of notice of this final permit decision unless review is requested on the permit pursuant to 40 CFR 49.159(d), in which case the permit will be stayed and construction is not authorized until agency review procedures under this section are exhausted and the EPA subsequently issues a final permit decision authorizing construction.



Elizabeth J. Adams  
Director, Air and Radiation Division



Date

## **Information about this Permit:**

### *Applicability*

Pursuant to the provisions of the Clean Air Act (CAA), Subchapter I, part D and 40 CFR part 49, subpart C, this permit authorizes the operation of the equipment described in Section 1 of this permit.

### *Termination*

Section 7 of this permit addresses EPA's ability to revise, revoke and reissue, or terminate this permit.

### *Definitions*

The terms used herein shall have the meaning as defined in 40 CFR 49.152, unless otherwise defined in Attachment B of this permit. If a term is not defined, it shall be interpreted in accordance with normal business use.

## **Section 1: Location, Equipment and Activity Description**

### *Permittee Name and Address:*

San Manuel Entertainment Authority  
777 San Manuel Blvd.  
Highland, CA 92346

### *Facility Contact:*

Director of Facilities  
777 San Manuel Blvd.  
Highland, CA 92346

### *Physical Location:*

777 San Manuel Blvd.  
Highland, CA 92346

Table 1. Equipment Description

Emission Unit I.D. No.	Unit Description
Cogen-1, Cogen-2	INNIO Jenbacher Cogeneration Unit, Model No. JMS 616 GS-J02, Natural Gas, 2,654 kW. Equipped with SCR/Oxidation Catalyst Systems.
CT-7, CT-8, CT-9, CT-10, CT-11, CT-12	BAC Cooling Towers, Model No. S3E-1424-14W/V, 4,400 gallons per minute per cell (26,400 gallons per minute for all six cells), equipped with wave form Drift Eliminators
EG-7	CAT Emergency Generator, Model No. C18, Diesel, 500 ekW, equipped with SCR and complying with Tier 4 Final standard.
EG-8, EG-9, EG-10, EG-11	CAT Emergency Generator, Model No. 3516C, Diesel, 2,000 ekW, equipped with SCR and complying with Tier 4 Final standard.
TEMP-1, TEMP-2, TEMP-5	Caterpillar, Tier 2, Diesel, 2029.8 kw, EPA Engine Family Name: ACPXL78.1T2X
TEMP-3, TEMP-4	Caterpillar, Tier 2, Diesel, 2029.8 kw, EPA Engine Family Name: 8CPXL78.1T2E
FP-1	John Deere Model PE4045D, Fire Pump, Diesel, 45 kW
FP-2	Clarke, UFAD88, Fire Pump, Diesel, 177 kW
WH-1	Lochnivar Model CWN1436PM, Water Heater, Natural Gas, 1.4 MMBtu/hr
WH-2	Lochnivar Model CWN1436PM, Water Heater, Natural Gas, 1.4 MMBtu/hr
WH-3, WH-4, WH-5, WH-6, WH-7, WH-8	Lochinvar ARMOR X2 Water Heater, Model No. AWN1300PM, natural gas, 1.3 MMBtu/hr. Equipped with ultralow NO <sub>x</sub> burner, and SCAQMD certified to comply with 20 ppm NO <sub>x</sub> @ 3% O <sub>2</sub> .
WH-9, WH-10, WH-11	Lochinvar ARMOR Water Heater, Model No. AWN400PM, Natural Gas, 0.4 MMBtu/hr. Equipped with ultra-low NO <sub>x</sub> burner, and SCAQMD certified to comply with 20 ppm NO <sub>x</sub> @ 3% O <sub>2</sub> .
WH-12, WH-13	Lochinvar POWER-PIN Water Heater, Model No. PFN2001PM, Natural Gas, 2 MMBtu/hr. Equipped with ultra-low NO <sub>x</sub> burner, and SCAQMD certified to comply with 20 ppm NO <sub>x</sub> @ 3% O <sub>2</sub> .
BO-1	Unilux Model ZF1600W Boiler, Natural Gas, 15 MMBtu/hr, Equipped with Ultra Low NO <sub>x</sub> Burners
BO-2	Unilux Model ZF1600W Boiler, Natural Gas, 15 MMBtu/hr, Equipped with Ultra Low NO <sub>x</sub> Burners
BO-3	Unilux Model ZF1600W Boiler, Natural Gas, 15 MMBtu/hr, Equipped with Ultra Low NO <sub>x</sub> Burners

## Section 2 – General Provisions

### 1. *Permit Notification Requirements*

The Permittee shall notify EPA by letter (postmarked by the timelines below) or by email, at [AEO\\_R9@epa.gov](mailto:AEO_R9@epa.gov) and [R9AirPermits@epa.gov](mailto:R9AirPermits@epa.gov), of:

- a. The date upon which performance tests will commence, in accordance with the provisions in Condition 12 and not less than 30 days prior to such date. Notification may be provided with the submittal of the performance test protocol(s) required pursuant to Condition 12.

### 2. *Source Operation*

At all times, including periods of startup, shutdown, shakedown, and malfunction, the Permittee shall, to the extent practicable, maintain and operate the facility that is subject to this permit (Source), including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be on information available to EPA which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the Source.

### 3. *Malfunction Report*

- a. The Permittee shall notify EPA at [AEO\\_R9@epa.gov](mailto:AEO_R9@epa.gov) and [R9AirPermits@epa.gov](mailto:R9AirPermits@epa.gov) within two (2) working days following the discovery of any failure of equipment listed in this permit (see Equipment List above), or failure of a process listed in this permit to operate in a normal manner, which results in an increase in emissions above any allowable emission limit stated in Section 3 of this permit.
- b. The Permittee shall provide an additional notification to EPA in writing or email within 15 days of any such failure described in under Condition 3a. This notification shall include a description of the malfunctioning equipment or abnormal operation, the date of the initial malfunction, the period of time over which emissions were increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of those allowed in Section 3 and the methods utilized to mitigate emissions and restore normal operations.
- c. Compliance with the malfunction notification requirements in Condition 3 shall not excuse or otherwise constitute a defense to any violation of this permit or any law or regulation such malfunction may cause.

### 4. *Inspection and Entry*

The EPA Regional Administrator, and/or an authorized representative, upon presentation of proper credentials, shall be permitted to:

- a. Enter upon the premises where the Source is located or emissions-related activity is conducted; or where records are required to be kept under the terms and conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that are required to be kept under the conditions of the permit;
- c. Inspect, during normal business hours or while the Source is in operation, any facilities, equipment (including monitoring and air pollution control equipment), method, practices or operations regulated or required under the permit;
- d. Sample or monitor substances or parameters subject to the requirements in this permit; and
- e. Record any inspection by use of written, electronic, magnetic and photographic media.

5. *Transfer of Ownership*

In the event of any changes in the Permittee listed on this permit, the Permittee must submit a written or electronic notice to EPA within 30 days after the change in Permittee is effective. In the notice, the succeeding Permittee must provide a written agreement containing a specific date for transfer of the Permittee, and an effective date on which the new Permittee assumes partial and/ or full coverage and liability under this permit. The submittal must identify the previous owner, and update the name, street address, mailing address, contact information, and any other information about the Source if it would change as a result of the change of ownership. The Permittee shall ensure that the Source remains in compliance with this permit during any such transfer of ownership.

6. *Severability*

The provisions of this permit are severable. If any portion of this permit is held invalid, the remaining terms and conditions of this permit shall remain valid and in force.

7. *Adherence to Application and Compliance with other Environmental Laws*

The Permittee shall construct and operate equipment and activities and any associated air pollution control equipment listed in this permit (see Equipment and Activities List in Section 1) in compliance with this permit, the application on which this permit is based, and all other applicable federal, state, and local air quality regulations. This permit does not release the Permittee from any liability for compliance with other applicable federal, state, and local environmental laws and regulations, including the Clean Air Act.

8. *Compliance*

The Permittee must comply with all provisions of this permit, including emission limitations that apply to the affected emissions units at the permitted Source. Noncompliance with any permit provision is a violation of the permit and may constitute a violation of the CAA; is grounds for an enforcement action; and is grounds for the EPA to revoke and terminate the permit.

9. *Unavailable Defense*

In an enforcement action it shall not be a defense for the Permittee that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the provisions of this permit.

10. *Property Rights*

The permit does not convey any property rights of any sort or any exclusive privilege.

11. *Credible Evidence*

For the purpose of establishing whether the Permittee violated or is in violation of any requirement of this permit, nothing shall preclude the use, including the exclusive use, of any credible evidence or information relevant to whether a source would have been in compliance with applicable requirements if the Permittee had performed the appropriate performance or compliance test or procedure.

12. *Performance Tests*

- a. The Permittee shall submit a test report to EPA within 60 days after the completion of any required performance test. At a minimum, the test report shall include:
  1. A description of the Emissions Unit and sampling location(s);
  2. The time and date of each test;
  3. A summary of test results, reported in units consistent with the applicable standard;
  4. A description of the test methods and quality assurance procedures used;

5. A summary of any deviations from the proposed test plan and justification for why the deviation(s) was necessary;
  6. The amount of fuel burned, raw material consumed, and/or product produced during each test run;
  7. Operating parameters of the Source and control equipment during each test run;
  8. Sample calculations of equations used to determine test results in the appropriate units; and
  9. The name of the company or entity performing the analysis.
- b. For each performance test required by this permit, the Permittee shall submit a performance test protocol to EPA no later than 30 days prior to the test to allow review of the test plan and to arrange for an observer to be present at the test. The test protocol shall include records to allow the Administrator to determine representative conditions upon which performance tests shall be conducted. The performance test shall be conducted in accordance with the submitted protocol, and any changes required by EPA.
  - c. Performance tests shall be conducted in accordance with the test methods set forth as specified in this permit. In lieu of the specified test methods, equivalent methods may be used with prior written approval from EPA.
  - d. Upon written request and adequate justification from the Permittee, EPA may waive a specific periodic test.
  - e. For performance test purposes, sampling ports, platforms, and access shall be provided on the Emissions Unit exhaust system in accordance with the requirements of 40 CFR 60.8(e).

### 13. *Recordkeeping and Reporting*

In addition to the recordkeeping, notification, reporting requirements specified in Section 5 and 6, the Permittee shall:

- a. Maintain a file of all records, data, measurements, reports, and documents related to operation of the Source. All records shall be in a permanent form suitable for inspection.
- b. The Permittee shall maintain records and submit a written report of all excess emissions and any other noncompliance with permit conditions to EPA for each six-month reporting period from January 1 to June 30 and from July 1 to December 31, except when more frequent reporting is required by an applicable subpart, or EPA, on a case-by-case basis, determines that more frequent reporting is necessary to accurately assess the compliance status of the Source. Each report shall be postmarked by the 45<sup>th</sup> day following the end of each six-month reporting period and shall include the following:
  1. Time intervals, data, and magnitude of the excess emissions;
  2. Nature and cause of the excess emissions (if known);
  3. Corrective actions taken and preventive measures adopted;
  4. If applicable, a statement in the report specifying that no excess emissions occurred or that the monitoring equipment has not been inoperative, repaired, or adjusted;
  5. Any failure to conduct any required source testing, monitoring, or other compliance activities; and
  6. Any violation of limitations on operation, including but not limited to restrictions on hours of operation.
- c. Excess emissions shall be defined as any period in which an Emissions Unit (listed in the Equipment List above) exceeds any emissions limits set forth in this permit in Sections 3.
- d. Excess emissions indicated by performance testing or compliance monitoring shall be considered violations of the applicable emission limit for the purposes of this permit.
- e. All records required by this permit shall be retained for not less than five years following the date of such measurements, maintenance reports, and/or records.

14. *Notification of Closure*

The Permittee must submit a report of any permanent or indefinite closure to EPA in writing within 90 days after the cessation of any operations at the permitted Source. It is not necessary to submit a report of closure for regular, seasonal closures.

15. *Signature Verifying Truth, Accuracy, and Completeness*

All reports required by this permit shall be signed by a responsible official as to the truth, accuracy, and completeness of the information. The report must state that, based on information and belief formed after reasonable inquiry, the statements and information are true, accurate, and complete. If the Permittee discovers that any reports or notification submitted to the reviewing authority contain false, inaccurate, or incomplete information, the Permittee shall notify the reviewing authority immediately and correct or amend the report as soon as is practicable.

16. *Agency Notifications*

The Permittee shall send all required notifications, reports and test plans to EPA at the addresses listed below. Reports and notifications sent by mail shall be postmarked by the applicable due date identified in this permit. With prior written notification, the EPA may waive the requirement to submit a hardcopy by mail or may update the mail or emailing addresses specified below.

US Mail

EPA Region 9  
Director, Enforcement Division  
Attn: Air & TRI, ENF-2-1  
75 Hawthorne Street  
San Francisco, CA 94105-3901

Electronic Mail

[AEO\\_R9@epa.gov](mailto:AEO_R9@epa.gov)  
[R9AirPermits@epa.gov](mailto:R9AirPermits@epa.gov)

17. *Good Air Pollution Control Practices*

The Permittee shall maintain and operate each affected emissions unit, including any associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions of New Source Review-regulated pollutants and considering the manufacturer's recommended operating procedures at all times, including periods of startup, shutdown, maintenance and malfunction. The EPA will determine whether the Permittee is using acceptable operating and maintenance procedures based on information available to the EPA which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the permitted Source.

18. *Liability*

This permit does not release the Permittee from any liability for compliance with other applicable federal and tribal environmental laws and regulations, including the CAA.

19. *National Ambient Air Quality Standards (NAAQS)/Prevention of Significant Deterioration (PSD) Protection*

The permitted Source must not cause or contribute to a NAAQS violation or, in an attainment area, must not cause or contribute to a PSD increment violation.

**20. Information Requests**

You, as the Permittee, shall furnish to the EPA, within a reasonable time, any information that the EPA may request in writing to determine whether cause exists for revising, revoking and reissuing, or terminating the permit or to determine compliance with the permit. For any such information claimed to be confidential, the Permittee must submit a claim of confidentiality in accordance with 40 CFR part 2 subpart B.

**21. Posting of Permit**

This permit must be posted prominently at the facility, and each affected emissions unit, activity and any associated air pollution control technology must be labeled with the identification number listed in Section 1.

**22. Permit Becomes Invalid**

As provided in 40 CFR 49.155(b), unless the EPA grants an extension, this permit shall become invalid if construction is not commenced (as defined in 40 CFR 49.152(d)) within 18 months after the approval takes effect, is discontinued for a period of 18 months or more, or is not completed within a reasonable time. The EPA may extend the 18-month period upon a satisfactory showing that an extension is justified.

**Section 3: Emission Limitations and Standards**

Facility-wide Emission and Fuel Usage Limits

23. Total facility emissions, including during periods of startup, shutdown, and malfunction, shall not exceed the following annual emissions limit (on a 12-month rolling basis):

- 9.87 tons per year of Nitrogen Oxides (NO<sub>x</sub>)
- 5.50 tons per year of Volatile Organic Compounds (VOC)
- 10.74 tons per year of Carbon Monoxide (CO)

Compliance with Condition 23 shall be demonstrated pursuant to the procedures specified in Condition 47.

24. Throughput of natural gas and diesel fuel shall not exceed the following amounts, based on a 12-month rolling basis:

- a. BO-1, BO-2, BO-3, WH-1, WH-2: 59,242,546 standard cubic feet per year of natural gas combined.
- b. WH-3, WH-4, WH-5, WH-6, WH-7, WH-8, WH-9, WH-10, WH-11, WH-12, WH-13 : 47,450,000 standard cubic feet per year of natural gas combined.
- c. Diesel-Fuel Fire Pump, FP-1: 460 gallons per year of diesel fuel.
- d. TEMP-1, TEMP-2, and TEMP-5: 31,252 gallons per year of diesel fuel.
- e. TEMP-3, TEMP-4: 27,780 gallons per year of diesel fuel.

Compliance with Condition 24 shall be demonstrated pursuant to the procedures specified in Condition 47.

Fuel Burning Operations (EG-7, EG-8, EG-9, EG-10, EG-11, FP-1, FP-2, BO-1, BO-2, BO-3, Cogen-1, Cogen-2, WH-1 through WH-13)

25. Fuel combustion shall be limited to the following fuels:

- a. Natural gas and propane in the natural gas-fired boilers, water heaters WH-1 through WH-13, and Cogen generators (Cogen-1 and Cogen-2)
- b. Diesel or biodiesel containing no more than 15 parts per million (ppm) (0.0015 percent) sulfur.

Requirements for Boilers (BO-1, BO-2, BO-3)

26. Emissions of NO<sub>x</sub> from BO-1, BO-2, and BO-3 may not exceed 0.031 lb/mmBtu. Compliance with this limit shall be demonstrated pursuant to Conditions 12, 27-29.

27. Initial Performance Testing

Within 180 days after permit issuance date, the Permittee shall perform initial performance tests in accordance with Conditions 12 and 29.

28. Periodic Performance Testing

Permittee shall conduct periodic performance testing in accordance with Conditions 12 and 29 every 8,760 operational hours or 3 calendar years, whichever comes first.

29. Test Methods

Compliance with the NO<sub>x</sub> emissions limit specified in Condition 26 shall be determined by one of the following test methods:

- i. EPA Method 3A of 40 CFR Part 60, App. A-2 - Determination of Oxygen and Carbon Dioxide and Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure) and EPA Method 7E of 40 CFR Part 60, App. A-2 - Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)
- ii. ASTM D6522-00(2005) Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers

Requirements for Emergency Generators (EG-7, EG-8, EG-9, EG-10, EG-11)

30. EG-7 through EG-11 shall be operated only for testing and maintenance of the emission units, required regulatory purposes, and during emergency situations (as defined in Attachment B).

31. EG-7 through EG-11 shall be certified to the applicable Tier standards based on model year and maximum engine power, as provided in Table 1.

32. Operation of EG-7 through EG-11 for maintenance, testing, required regulatory purposes, shall not exceed 40 hours per calendar year per generator, including during periods of startup and shutdown.
33. Emergency Generators EG-7 through EG-11 must comply with the requirements of the New Source Performance Standards for Stationary Compression Ignition Internal Combustion Engines, codified at 40 CFR Part 60, Subpart IIII:
- a. Install and operate a non-resettable hour meter.
  - b. Minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes.
  - c. Meet applicable Tier standards in 40 CFR 89.112, for all pollutants, for the same model year and maximum engine power. [40 CFR 60.4211 (a)(3)]
  - d. Meet the following applicable requirements of 40 CFR Part 60.4211 [40 CFR 60.4211 (a)(1-2)]:
    - i. Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions; and
    - ii. Change only those emission-related settings that are permitted by the manufacturer.
34. EG-7 through EG-11 shall be equipped with an SCR system. The SCR system shall operate at all times while fuel is flowing through a unit, excluding periods of startup. SCR ammonia or urea injection shall begin when the engine exhaust temperature reaches 575 degrees Fahrenheit (°F) and do so continuously until the engine stop signal is triggered.

Requirements for Fire Pumps (FP-1, FP-2)

35. FP-1 and FP-2 shall each be equipped with a non-resettable hour meter.

Requirements for Cogeneration Units (Cogen-1, Cogen-2)

36. Cogen-1 and Cogen-2 shall be equipped with an SCR/oxidation catalyst system. The SCR/oxidation catalyst system shall operate at all times while fuel is flowing through a unit, excluding periods of startup. SCR ammonia or urea injection shall begin no later than when the engine exhaust temperature reaches 641 degrees Fahrenheit (°F) and do so continuously until the engine stop signal is triggered.
37. The total hours of startup and shutdown shall not exceed 18 hours per calendar year and the total duration of non downtime-usage shall be a maximum of 8720 hours per calendar year, for each unit Cogen-1 and Cogen-2. Startup shall be defined as setting in operation the emission unit for any purpose. For each unit Cogen-1 and Cogen-2, the Permittee shall minimize the emission unit's time spent at idle during startup and minimize the unit's startup time to a period needed for appropriate and safe loading. Startup begins when fuel is first combusted in the engine and ends after the engine exhaust temperature reaches 641°F or more; the duration of startup shall not exceed 65 minutes. Shutdown shall be defined as the period of time from the initial lowering of the engine load until the point at which the combustion process has stopped; the duration of shutdown shall not exceed 5 minutes.
38. Except during periods of startup and shutdown, emissions from Cogen-1 and Cogen-2 shall not exceed the following standards for each unit averaged over a period of one hour, as verified by monitoring and testing results demonstrated pursuant to Conditions 40 and 48:

VOC: 0.10 lb/MW-hr  
NO<sub>x</sub>: 0.07 lb/MW-hr  
CO: 0.20 lb/MW-hr

39. Cogen-1 and Cogen-2 must comply with the requirements of the Standards of Performance for Stationary Spark Ignition Internal Combustion Engines, codified at 40 CFR Part 60, Subpart JJJJ:

- a. The Permittee must install, operate, and maintain the emissions unit and control device according to the manufacturer's emission-related written instructions [40 CFR 60.4243(a) and (h)(1)].
- b. Propane may be used for a maximum of 100 hours per year as an alternative fuel solely during emergency operations, but records of such use must be kept. If propane is used for more than 100 hours per year in an engine that is not certified to the emission standards when using propane, the Permittee must conduct a performance test to demonstrate compliance with the emission standards of 40 CFR 60.4233 [40 CFR 60.4243(e)].

40. Performance Tests

- a. The Permittee shall conduct performance tests according to the requirements in 40 CFR 60.8 and under the specific conditions specified by Table 2 to Subpart JJJJ of Part 60. Performance tests shall be performed as followed:
  - i. While the Source is operating within 10% of its maximum operating rate; [40 CFR 60.4244(a)]
  - ii. Using test methods from 40 CFR part 60, appendix A unless alternative methods are approved by the EPA in writing in advance of the test. For Cogen-1 and Cogen-2, measurements of NO<sub>x</sub> and CO may be taken using portable analyzers according to ASTM D6522(2005);
  - iii. Demonstrating compliance with each limit by averaging the results of at least three test runs of at least one-hour duration each, unless the Permittee can demonstrate to the satisfaction of the EPA that the result of one of the test runs should be discarded. The test results the Permittee submits must contain at least two test runs. [40 CFR 60.4244]
  - iv. Simultaneously for CO and NO<sub>x</sub> whenever either pollutant is being tested.
- b. The Permittee may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in §60.8(c). If the engine is non-operational, the Permittee does not need to startup the engine solely to conduct a performance test; however, the Permittee must conduct the performance test immediately upon startup of the engine. [40 CFR 60.4244(b)]
- c. Within 60 days after achieving the maximum production rate at which the Source will be operated, but not later than 180 days after initial startup of the Source, the Permittee shall conduct initial performance tests according to Condition 40.a to demonstrate compliance with Condition 38.
- d. The Permittee shall conduct subsequent performance tests to demonstrate compliance with Condition 38 whenever requested by the EPA and at least every 3 years (within 45 days before or after the previous performance test anniversary) after the initial performance test.
- e. For performance test purposes, sampling ports, platforms, and access shall be provided on the emission unit exhaust system in accordance with the requirements of 40 CFR 60.8(e).
- f. The Permittee shall furnish the EPA with a written report of the results of performance tests within 60 days of completion, and in accordance with Condition 12.
- g. In limited circumstances, upon written request and with adequate justification from the Permittee, the EPA may waive a specific performance test and/or allow for testing to be done under different operating conditions. Such justification must demonstrate to the EPA's satisfaction that it would be impractical to conduct the required test at the specified interval or to operate as specified during testing, as

applicable. Any waiver or allowance granted by the EPA shall be approved in writing and the Permittee shall adhere to any specifications or requirements concerning such waiver or allowance that the EPA imposes therein.

Requirements for cooling towers (CT-7 through CT-12)

41. The cooling towers shall be equipped with drift eliminators designed to limit circulating water drift loss to 0.0005 percent or less.

Requirements for water heaters (WH-3, WH-4, WH-5, WH-6, WH-7, WH-8, WH-9, WH-10, WH-11, WH-12, WH-13)

42. The water heaters shall be equipped with an ultra-low NO<sub>x</sub> burner.

43. The water heaters shall be SCAQMD certified not to exceed a concentration of 20 ppm NO<sub>x</sub> @ 3% O<sub>2</sub>.

Requirements during period of construction and installation of new equipment

44. EG-7 will not commence operation until at least one of the four Tier 1 generators (EG-3 to EG-6) at the existing casino utility plant is taken offline.

45. The temporary replacement generators, TEMP-1 through TEMP-5, shall each not commence operation until the generator it is replacing (EG-1 through EG-6) at the casino utility plant permanently ceases operation and is taken offline.

46. Cogen-1, Cogen-2, and EG-8 through EG-11 shall not commence operation until TEMP-1 through TEMP-5 at the casino utility plant permanently cease operation and are taken offline.

**Section 4: Monitoring Requirements**

47. Twelve-Month Rolling Limits

- a. Compliance with the twelve-month rolling limits in Conditions 23 and 24 shall be demonstrated by calculating or determining emissions and fuel usage from all emissions units, including during periods of startup, shutdown, and malfunction, and during the period of transition to new equipment described in Conditions 44-46.
- b. Natural gas usage shall be obtained from local utility bills and shall include usage of all natural gas-consuming units and equipment at the facility.
- c. Records of diesel usage for FP-1 shall be obtained from product transfer documents from the diesel fuel vendor.
- d. Month One of the emissions or fuel usage totals shall be added to the aggregate sum of the previous eleven months' emissions or fuel usage totals to determine each month's 12-month rolling total.
- e. The first 12-month rolling total shall be determined after Month Twelve of operation, and every subsequent month thereafter.
- f. Compliance with the 12-month rolling emissions limits specified in Conditions 23 and 24 shall be determined as follows:

- i. Condition 23 VOC and CO limits and Condition 24.b limits: beginning from the effective date of the revised permit T-0003-CA-R1.
- ii. Condition 23 NO<sub>x</sub> limit and Conditions 24.a and 24.c: including monthly totals from operations prior to the effective date of the revised permit T-0003-CA-R1.

48. *Monitoring Requirements for Cogen-1 and Cogen-2*

- a. For each unit Cogen-1 and Cogen-2, the Permittee shall monitor and record the following monthly:
  - i. Engine load (bhp);
  - ii. Ammonia or urea injection rate to the SCR system;
  - iii. Pressure drop across the oxidation catalyst;
  - iv. Temperature at the inlet of the oxidation catalyst; and
  - v. Temperatures at the outlet of the SCR catalyst.
- b. Periodic monitoring for Cogen-1 and Cogen-2 shall be conducted using a portable analyzer on a quarterly basis as follows:
  - i. The Permittee shall monitor and record the stack concentration of NO<sub>x</sub> (as NO<sub>2</sub>), CO, and O<sub>2</sub> using one of the following options:
    - 1. EPA Method 3A - Determination of Oxygen and Carbon Dioxide and Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure) and EPA Method 7E - Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)
    - 2. ASTM D6522-00(2005) Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers
  - ii. If the NO<sub>x</sub> or CO concentration, as measured by the portable analyzer, exceeds the emissions standards in Condition 38, the Permittee shall take corrective action to return the emissions to below this concentration as soon as possible, but no longer than one hour of operation after detection. If emissions continue to exceed the emissions standards in Condition 38 after one hour of operation after detection, the Permittee shall shut down the emission unit and not operate it again until the problem has been corrected. The Permittee shall report this as a deviation in accordance with Condition 63.

**Section 5: Recordkeeping Requirements**

- 49. The Permittee shall keep records required for compliance with each condition of this permit for at least five years from the date of origin, unless otherwise stated, either onsite or at a convenient location, such that they can be delivered to the EPA within 24 hours of a request.
- 50. The permit application and all documentation supporting that application shall be maintained by the Permittee for the duration of time the affected emissions unit(s) is covered under this permit.
- 51. *Records for Emergency Generators and Fire Pump*

The Permittee shall maintain records related to EG-7 through EG-11 (emergency generators) and FP-1 (fire pump) as follows:

- a. Monthly hours of operation, and current calendar year total hours of operation of emergency generators;

- b. Monthly hours used for emergency purposes and monthly hours used for non-emergency purposes of emergency generators; and
- c. For each fuel delivery for the fire pump, product transfer documents demonstrating the amount of diesel fuel purchased.

52. *Records for Continuous Natural Gas Generators*

- a. The Permittee shall maintain records and calculate NO<sub>x</sub>, VOC, and CO emissions for Cogen-1 and Cogen-2 on a monthly basis. The 12-month rolling total must be calculated each month by adding the current month's calculated emissions to the previous 11 months of calculated emissions.
- b. The Permittee shall use the emission factors of the most recent performance test for Cogen-1 and Cogen-2 emissions calculations except during startup and shutdown.
- c. The Permittee shall maintain records and calculate the total hours of startup and shutdown for all emission units on a monthly basis. The 12-month rolling total must be calculated each month by adding the current month's calculated emissions to the previous 11 months of calculated emissions.

53. *Records for Cooling Towers*

The Permittee shall maintain records showing that the cooling towers CT-7 through CT-12 are equipped with drift eliminators meeting the design standards specified in Condition 41.

54. The types and quantities of fuel combusted in each affected emissions unit, including engines and generators, shall be recorded each month.
55. The results of each performance test conducted pursuant to Conditions 12, 27, 28, and 40 shall be recorded. At a minimum, the Permittee shall maintain records of:
- a. The date of each test;
  - b. Each test plan;
  - c. Any documentation required to approve an alternate test method;
  - d. Test conditions and operational parameters;
  - e. The results of each test; and
  - f. The name of the company or entity conducting the analysis.
56. A log of all maintenance activities conducted on each engine, excluding nonroad mobile engines, shall be recorded.
57. The Permittee shall maintain a log of continuous and annual operational hours for the equipment listed in Table 1.
58. The Permittee shall maintain a log describing the maintenance and repair activities for the equipment listed in Table 1 including the following information:
- a. Date of activity;
  - b. Description of activity;
  - c. For scheduled maintenance, the elapsed time, hours of operation, or other applicable measure since the activity was last performed;

- d. For scheduled maintenance, the elapsed time, hours of operation, or other applicable measure until the activity should next be performed.

## **Section 6: Notification and Reporting Requirements**

### **59. *Notification of construction or modification, and operations***

The Permittee shall submit a written or electronic notice to the EPA within 30 days from when the Permittee begins actual construction of an emissions unit, or when the Permittee begins operations or resumes operation after a modification of an emissions unit.

### **60. *Notification of Change in Ownership***

If the permitted Source changes ownership, then the Permittee must submit a written or electronic notice to the EPA within 90 days after the change in ownership is effective. In the report, the Permittee must provide the EPA a written agreement containing a specific date for transfer of ownership, and an effective date on which the new owner assumes partial and/or full coverage and liability under this permit. The submittal must identify the previous owner, and update the name, street address, mailing address, contact information, and any other information about the permitted Source if it would change as a result of the change of ownership. The Permittee shall ensure that the permitted Source remains in compliance with the permit during any such transfer of ownership.

### **61. *Notification of Closure***

The Permittee must submit a report of any permanent or indefinite closure to the EPA in writing within 90 days after the cessation of all operations at the permitted Source. The notification must identify the owner, the current location, and the last operating location of the permitted Source. It is not necessary to submit a report of closure for regular, seasonal closures.

### **62. *Annual Reports***

The Permittee shall submit an annual report on or before March 15 of each year to the EPA. The annual report shall cover the period from January 1 to December 31 of the previous year and shall include:

- a. A compliance certification form indicating whether or not compliance is being met with each term or condition in Sections 2, 3, 4, 5, and 6 of the permit;
- b. The compliance certification form required under Condition 62.a shall contain a description of all emissions estimating methods used, including emission factors and their sources, a summary of materials usage, assumptions made and production data.

### **63. *Deviation Reports***

The Permittee shall promptly report to the EPA any deviations from permit requirements including deviations attributable to upset conditions. Deviation reports shall include:

- a. The identity of affected emissions unit where the deviation occurred.
- b. The nature of the deviation;
- c. The length of time of the deviation;
- d. The probable cause of the deviation; and
- e. Any corrective actions or preventive measures taken as a result of the deviation to minimize emissions from the deviation and to prevent future deviations.
- f. For the purposes of this permit, *promptly* shall be defined to mean:
  - i. Within 72 hours of discovery for deviations from any emission limit in Conditions 23 through 26, and 38; or

- ii. Within 30 days after the end of the month in which the Permittee discovered the deviation, for all other deviations.
- g. Notwithstanding the definition of “deviation” in Attachment B, for a deviation from a 12-month rolling permit limit in Condition 23 or Condition 24, once the deviation has been promptly reported, no additional deviation report will be required for such deviation unless and until the deviation continues into the following month's 12-month rolling totals.

#### 64. *Performance Test Reports*

The Permittee shall submit a test report to the EPA within 60 days after the completion of any required performance test. At a minimum, the test report shall include:

- a. A description of the affected emissions unit and sampling location(s);
- b. The time and date of each test;
- c. A summary of test results, reported in units consistent with the applicable standard;
- d. A description of the test methods and quality assurance procedures used;
- e. A summary of any deviations from the proposed test plan and justification for why the deviation(s) was necessary;
- f. The amount of fuel burned, raw material consumed, and product produced during each test run;
- g. Operating parameters of the affected emissions units and control equipment during each test run; and
- h. Sample calculations of equations used to determine test results in the appropriate units.
- i. The name of the company or entity performing the analysis.

#### 65. *Reporting and Notification Address*

The Permittee shall send all required reports to the EPA at the mailing address(es) specified in Section 2.

#### 66. *Signature Verifying Truth, Accuracy, and Completeness*

All reports required by this permit shall be signed by a responsible official as to the truth, accuracy, and completeness of the information. The report must state that, based on information and belief formed after reasonable inquiry, the statements and information are true, accurate, and complete. If the Permittee discovers that any reports or notification submitted to the EPA contain false, inaccurate, or incomplete information, the Permittee shall notify the EPA immediately and correct or amend the report as soon as practicable.

### **Section 7: Changes to this Permit**

#### 67. *Revising, Reopening, Revoking and Reissuing, or Terminating for Cause*

The permit may be revised, reopened, revoked and reissued, or terminated for cause. The filing of a request by you, the Permittee, for a permit revision, revocation and re-issuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition. This provision also applies to the documents incorporated by reference.

#### 68. *Change in ownership*

If the permitted Source changes ownership, the EPA may change the Permittee name and contact information in Section 1 to reflect the new ownership in accordance with the administrative amendment provisions in 40 CFR 49.159(f).

## Attachment A: Abbreviations and Acronyms

ASTM	American Society for Testing and Materials
Btu	British thermal units
CAA or the Act	Federal Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
ekW	electrical power (electrical kw)
EPA	United States Environmental Protection Agency
EU	Emission Unit
hr	Hour
kW	Kilowatt
lbs	Pounds
MMBTU	Million British thermal units
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO <sub>x</sub>	Oxides of Nitrogen except N <sub>2</sub> O
NSR	New Source Review
O <sub>2</sub>	Oxygen
PM	Total Particulate Matter
PM2.5	Particulate Matter less than 2.5 micrometers (µm) in diameter
PM10	Particulate Matter less than 10 micrometers (µm) in diameter
ppm	Parts per Million
ppmvd	Parts per Million by volume, dry basis
PSD	Prevention of Significant Deterioration
RICE	Reciprocating Internal Combustion Engine
San Manuel	San Manuel Entertainment Authority, dba San Manuel Casino
SCAQMD	South Coast Air Quality Management District
SCR	Selective catalytic reduction
Source	San Manuel Casino
SO <sub>2</sub>	Sulfur Dioxide
tpy	Tons Per Year
µm	Micrometer
VOC	Volatile Organic Compounds

## Attachment B: Definitions

### For the purposes of this permit:

*Cause* means with respect to the EPA's ability to terminate a permitted source's coverage under a permit that:

1. The Permittee is not in compliance with the provisions of this permit;
2. The EPA determines that the emissions resulting from the construction or modification of the permitted Source significantly contribute to National Ambient Air Quality Standard (NAAQS) violations, which are not adequately addressed by the requirements in this permit;
3. The EPA has reasonable cause to believe that the Permittee obtained approval of permit by fraud or misrepresentation; or
4. The Permittee failed to disclose a material fact required by the regulations applicable to the permitted Source of which the applicant had or should have had knowledge at the time the Permittee submitted the application.

*Construction* means any physical change or change in the method of operation including fabrication, erection, installation, demolition, or modification of an affected emissions unit that would result in a change of emissions.

*Deviation* means any situation in which an emissions unit fails to meet a permit term or condition. A deviation is not always a violation. A deviation can be determined by observation or through review of data obtained from any testing, monitoring, or recordkeeping established in accordance with the requirements of this permit. For a situation lasting more than 24 hours which constitutes a deviation, each 24-hour period is considered a separate deviation. Included in the meaning of deviation are any of the following:

1. A situation where emissions exceed an emission limitation or standard;
2. A situation where process or emissions control device parameter values indicate that an emission limitation or standard has not been met; and
3. A situation in which observations or data collected demonstrates noncompliance with an emission limitation or standard or any work practice or operating condition required by the permit.

*Emergency situation* includes producing power for critical networks or equipment (including power supplied to portions of a facility) during power outages (such as when electric power from the local utility, or the normal power source, is interrupted), or if an engine is used to pump water in the case of fire, flood, or other similar event.

*Permittee* means San Manuel Entertainment Authority (dba San Manuel Casino).

*Responsible official* means one of the following:

1. For a corporation: a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is directly responsible for the overall operation of the permitted Source.
2. For a partnership or sole proprietorship: a general partner or the proprietor, respectively.
3. For a public agency: Either a principal executive officer or ranking elected official, such as a chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

*Standard cubic foot* means a measure of the quantity of a gas equal to a cubic foot of volume at a temperature of 68 °F and a pressure of 29.92 in. Hg.



# United States Environmental Protection Agency Pacific Southwest – Region 9

[www.epa.gov/caa-permitting/tribal-minor-new-source-review-permitting-region-9](http://www.epa.gov/caa-permitting/tribal-minor-new-source-review-permitting-region-9)

## Technical Support Document

### Tribal Minor New Source Review Permit

February 20, 2020

**Permittee:** San Manuel Entertainment Authority  
dba San Manuel Casino  
777 San Manuel Blvd.  
Highland, CA 92346

**Source:** San Manuel Casino

**Location:** 777 San Manuel Boulevard  
Highland, California 92346

**Source Contact:** Clifford Batten, Environmental Manager  
(909) 425-3590 x 104311  
[cbatten@sanmanuel-nsn.gov](mailto:cbatten@sanmanuel-nsn.gov)

**Source ID #:** 34

**Application #:** 2019-014-AA

**Docket:** [EPA-R09-OAR-2019-0719](#)

Pursuant to the provisions of Clean Air Act (CAA) sections 110(a) and 301(d) and the Code of Federal Regulations (CFR) title 40, sections 49.151-161, the United States Environmental Protection Agency Region 9 (EPA) is issuing an administrative permit revision of a synthetic minor New Source Review (NSR) permit in Indian Country to the San Manuel Entertainment Authority (“Permittee”) for the San Manuel Casino (“Source”), located near Highland, CA. This administrative permit revision amends a preconstruction permit (permit no. TA-0003-CA-R1) that the EPA recently issued for the Source, which authorized construction of 22 new and replacement emissions units as part of a planned expansion of the existing facility. In this action, we are revising conditions applicable to five temporary replacement generators, two replacement emergency generators, one fire pump, and six cooling towers, to accommodate changes in design since the previous permit was issued. Consistent with the requirements at 40 CFR 49.159(f), this action will not cause an increase in allowable emissions above the minor NSR threshold of any regulated NSR pollutant.

This Technical Support Document (TSD) provides the EPA’s analysis of the application and describes the equipment that is addressed in this action, and the permit conditions that will be revised.

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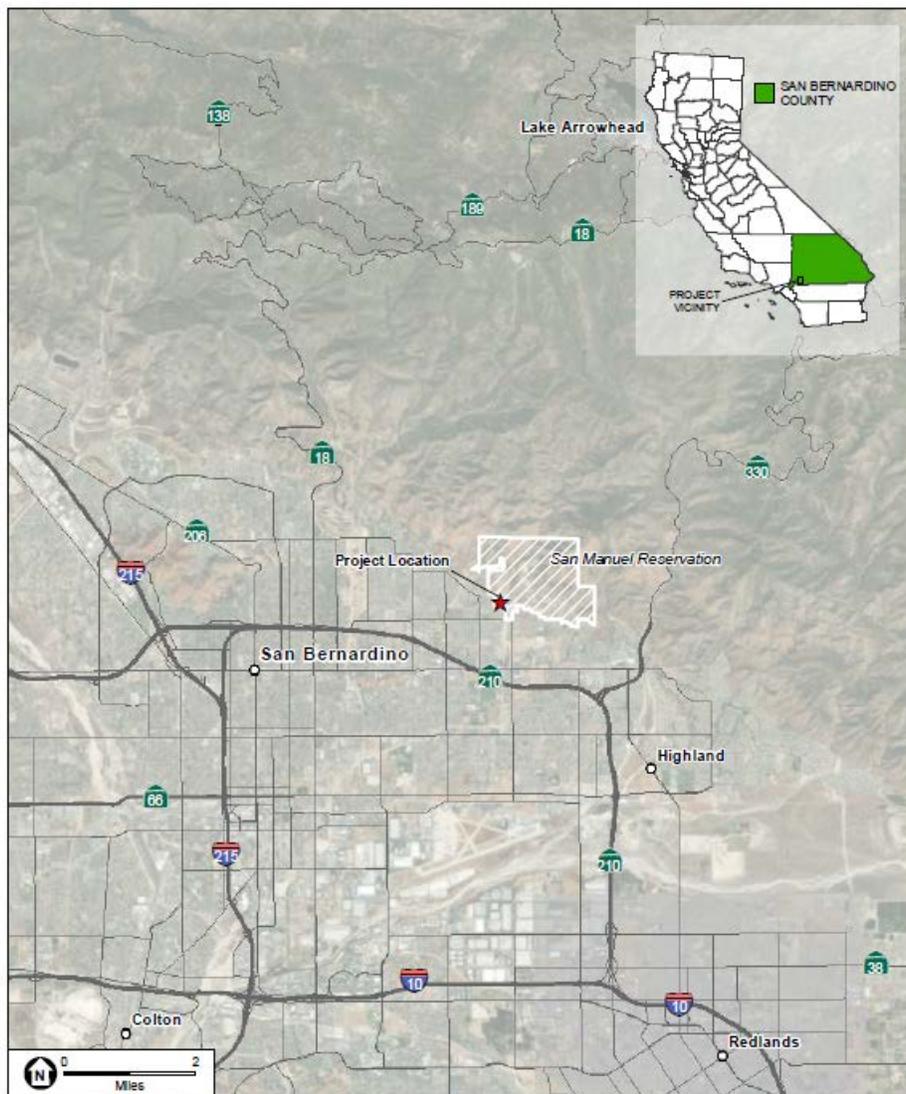
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# 1. Source and Permit Information

## 1.1. Source Description

San Manuel Casino is a gaming facility owned and operated by the San Manuel Entertainment Authority, an instrumentality of the federally recognized Indian tribe the San Manuel Band of Mission Indians. Construction of the Source began in 2003, and gaming operations there began in 2005. The Source is located on the southwest portion of the San Manuel Reservation, adjacent to the City of Highland, in San Bernardino County, California, and within the South Coast Air Basin (SCAB). Non-tribal lands in the urban areas of the San Bernardino County fall under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). Figure 1 below shows the general facility location.

**Figure 1: Source location**



Under a 1999 EPA policy memo<sup>1</sup> in place at the time of the Source's construction, sources in Indian country whose potential to emit (PTE) exceeded title V major source thresholds would be treated as nonmajor sources if their actual emissions were at or below 50 percent of the major source threshold. Following the EPA's promulgation of the CAA Tribal NSR Rule, 76 FR 38747 (July 1, 2011), to avoid regulation as a major source, these sources must now obtain synthetic minor limits under the Tribal Minor NSR Program (40 CFR 49.151-165). Consistent with these requirements, the Permittee applied for an initial synthetic minor permit pursuant to 40 CFR 49.158 on August 27, 2012. The EPA issued the Source a synthetic minor NSR permit on September 25, 2017 (Permit No. TA-0003-CA) and a revised synthetic minor NSR permit on August 6, 2019 (Permit No. TA-0003-CA-R1).

As permitted under Permit No. TA-0003-CA-R1, San Manuel Casino is currently authorized to construct 22 new and replacement emissions units: two new generators for a new 5-megawatt (MW) combined heat and power cogeneration system, six new cooling towers, a new emergency garage generator, 11 new water heaters, and two replacement Tier 4 emergency engines.

The SCAB is currently designated as extreme nonattainment for the 2015 and 2008 8-hour ozone national ambient air quality standards (NAAQS), moderate nonattainment for the 2012 and 1997 24-hour particulate matter less than 2.5  $\mu\text{m}$  in diameter ( $\text{PM}_{2.5}$ ) NAAQS, and serious nonattainment for the 2006 24-hr  $\text{PM}_{2.5}$  NAAQS. See 40 CFR 81.305. As an extreme ozone nonattainment area, the SCAB is subject to a lower major source threshold for volatile organic compounds (VOC) and nitrogen oxides ( $\text{NO}_x$ ) of 10 tons per year (tpy). In the existing permit for the Source, the Permittee elected to accept federally enforceable limits to stay below the major source threshold for  $\text{NO}_x$ , CO, and VOC. Thus, under the existing permit, the Source is considered a synthetic minor source of  $\text{NO}_x$ , CO, and VOC.

## 1.2. Permit Action

On December 27, 2019, the EPA received an application from the Permittee for an administrative permit revision (Facility ID #34; Application #2019-014-AA) under the CAA Tribal Minor NSR Program to add some new equipment, remove existing permit limits, and replace some existing and previously permitted, but not yet installed equipments due to project redesign.

The EPA determined that not all of the proposed changes can be processed as an administrative permit revision. After discussions with the Permittee, the EPA is proceeding with those portions of the proposed changes that qualify for permitting as an administrative permit revision under 40 CFR 49.159(f): five temporary replacement Tier 2 generators,<sup>2</sup> two Tier 4 replacement emergency generators, one new fire pump, and six new cooling towers. The proposed administrative permit revision will also remove conditions applicable to the previously permitted cooling towers and two

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<sup>1</sup> Memorandum dated March 7, 1999, from John Seitz, Office of Air Quality Planning and Standards Director and Eric V. Schaeffer, Office of Regulatory Enforcement Director, Subject: "Potential to Emit (PTE) Transition Policy for Part 71 Implementation in Indian Country."

<sup>2</sup> These temporary replacement generators are designed as portable engines. However, portable engines that replace existing stationary engines at the same location on a temporary basis and that are intended to perform the same or similar functions are considered stationary engines. See 76 FR 37953, 37959 (June 28, 2011). Therefore, emissions from these units are included in the facility PTE calculations.

existing Tier 1 and 2 emergency engines. We expect to make the other permit revisions in a separate forthcoming permit action.

In addition, because the proposed changes represent a reworking of the overall project that has not completed construction, we are applying the tribal NSR requirements based on the changes in emissions relative to the source as it existed prior to the issuance of TA-0003-CA-R1. We are using the allowable emissions from the initial permit, T-0003-CA, as the starting point for evaluating emissions increases in Section 4.2. That is, we are treating these permit revisions as part of the same project.

This permit action will update the Source's equipment description table and will add some new emissions units by an amount below the Tribal Minor NSR permitting thresholds and replace some emissions units that does not cause an increase in the emissions units' allowable emissions.

### 1.3. Permit History

**Table 1. Permit Revision History**

Application No.	Issue Date	Description/Category	Revised Permit Conditions
2012-003-SM	9/25/2017	Synthetic Minor Permit	Docket #EPA-R09-OAR-2017-0269 <ul style="list-style-type: none"> <li>• Initial permit</li> </ul>
2018-010-SM	8/6/2019	Synthetic Minor Permit/Modification	Docket #EPA-R09-OAR-2019-0150 <ul style="list-style-type: none"> <li>• Revised cover page and made minor administrative edits throughout</li> <li>• Updated Table 1               <ul style="list-style-type: none"> <li>○ Removed EG-3 to EG-6</li> <li>○ Added two new generators for a new 5-MW combined heat and power cogeneration system</li> <li>○ Added six new cooling towers</li> <li>○ Added a new emergency garage generator</li> <li>○ Added 11 new water heaters</li> <li>○ Added two replacement Tier 4 emergency engines</li> </ul> </li> <li>• Added Condition 22 – Permit Becomes Invalid</li> <li>• Added synthetic minor limits for VOC and CO</li> <li>• Added monitoring, recordkeeping, and reporting requirements for the new and replacement emissions units</li> <li>• Removed monitoring, recordkeeping, and reporting requirements for removed emissions unit</li> </ul>
2019-014-AA	TBD	Administrative Permit Revision	Docket #EPA-R09-OAR-2019-0719 <ul style="list-style-type: none"> <li>• Revises cover page and makes minor administrative edits throughout</li> <li>• Updates Table 1               <ul style="list-style-type: none"> <li>○ Remove CT-1 through CT-6, EG-1, and EG-2</li> <li>○ Add six new cooling towers, CT-7 through CT-12</li> <li>○ Add two replacement Tier 4 emergency engines, EG-10, EG-11</li> <li>○ Add five temporary replacement engines, TEMP-1 through TEMP-5</li> <li>○ Add one new fire pump, FP-2</li> </ul> </li> <li>• Add fuel limits for TEMP-1 through TEMP-5 under Condition 24</li> <li>• Added monitoring, recordkeeping, and reporting requirements for the new and replacement emissions units</li> <li>• Removed monitoring, recordkeeping, and reporting requirements for removed emissions unit</li> </ul>

## 2. Public Participation

Because this action consists of administrative permit revisions under 40 CFR 49.159(f), it is not subject to the public participation or administrative and judicial review requirements of the Tribal Minor NSR Program.<sup>3</sup> The final permit and other key documents relevant to the revised permit are available at [www.regulations.gov](http://www.regulations.gov) under docket ID number EPA-R09-OAR-2019-0719.

## 3. Tribal Minor NSR Program Requirements

The Tribal Minor NSR Program is potentially applicable to owners and operators of sources located, or planning to locate, on Indian reservations, and in other areas of Indian country where no EPA-approved tribal air permit program is in place and where an Indian tribe or the EPA has demonstrated that the tribe has jurisdiction. Because the Source is located on tribal land of the San Manuel Band of Mission Indians, where no EPA-approved tribal air permit program is in place, the Source is subject to the requirements of the Tribal Minor NSR Program.

The Tribal Minor NSR Program requires owners and operators of certain new and modified sources of air pollution in Indian country to obtain a minor NSR permit prior to constructing or modifying a source. This preconstruction permitting program is triggered for new or modified sources based on potential increases in air pollutants according to the applicability criteria in 40 CFR 49.153. Under 49.153(a)(2), if a physical or operational change would increase an emissions unit's allowable emissions of a regulated NSR pollutant above its existing annual allowable emissions limit, the Source must obtain a permit revision to reflect the increase in the limit. For a physical or operational change that is not otherwise subject to review under major or minor NSR, such increase in the annual allowable emissions limit may be accomplished through an administrative permit revision as provided in 49.159(f). Under 40 CFR 49.159(f)(2), an administrative permit revision is not subject to the permit application, issuance, public participation or administrative and judicial review requirements of the Tribal Minor NSR Program.

As discussed in detail below, the changes made to the permit in this action qualify as administrative permit revisions under 49.159(f).

Because this action consists of administrative permit revisions under 49.159(f)(1), the action is not subject to the permit application, issuance, public participation or administrative and judicial review requirements of the Minor NSR program per 40 CFR 49.159(f)(2).

## 4. Administrative Permit Revision

### 4.1. New and Replacement Units

**Existing Generators (EG-1 through EG-6), Temporary Replacement Generators (TEMP-1 through TEMP-5), and Tier 4 Replacement Generators (EG-8 through EG-11)**

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<sup>3</sup> 40 CFR 49.159(f)(2).

The six existing Caterpillar generators (EG-1 through EG-6, with EG-4 already removed) are used for emergency power during periods when electrical power from the local utilities is not available. In the previous permitting action for permit TA-0003-CA-R1, the plan was to remove EG-3, EG-4, EG-5 and EG-6, and replace EG-3 and EG-4 with Tier 4 generators (EG-8 and EG-9). In addition, EG-1 and EG-2 were converted from stand-by generators to emergency generators.

In this application 2019-014-AA, the Permittee proposes to replace existing Tier 1 and Tier 2 emergency generators, EG-1 and EG-2, with two new Tier 4 emergency generators EG-10 and EG-11. EG-10 and EG-11 are the same model generators as EG-8 and EG-9, and all will provide emergency backup power. The Permittee also confirmed that to continuously fulfill the necessary backup power needs of 9MW for the existing Source and 13.5 MW for the Project (5 MW Cogen and 8.5 MW backup generators), temporary generators will be used to provide emergency power until the Cogen (Cogen-1 and Cogen-2) and Tier 4 emergency generators (EG-8 through EG-11) are fully operational.

### **Cooling Towers (CT-7 through CT-12)**

Instead of the permitted CT-1 through CT-6, the Permittee is proposing to cancel those units and put in CT-7 through CT-12. CT-1 through CT-6 have not yet been procured or installed, and the Source requests this replacement due to the projected need for a slight increase (2%) in cooling capacity and equipment operators' recommendation to change to a similar model that they are familiar with for ease of operation and maintenance. These new cooling towers are high performance units and will be equipped with cellular type drift eliminators to reduce particulate matter (PM) emissions, and are assumed to operate 24 hours per day, year-round.

### **Fire Pump (FP-2)**

The Source has determined that an additional fire pump is needed, and therefore proposes to install a new emergency standby direct-drive fire pump engine (FP-2). FP-2 will be located outside the new San Manuel Casino podium building next to the parking lot, and will be certified to EPA Tier 3 emission standards.

## **4.2. Changes to Emissions**

Attachment 1 includes detailed emissions calculations and emissions factors used in the emissions calculations. The permit limits for the existing permit are summarized in Table 2 below, alongside the application thresholds for minor NSR and title V and for major NSR.

**Table 2. Allowable Emissions (tpy) for the 2018 San Manuel Casino Permit TA-0003-CA-R1**

	VOC	NO <sub>x</sub>	CO	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	Total HAPs <sup>4</sup>
Existing Allowable Emissions	5.50	9.87	10.74	0.15	2.66	2.66	1.46
Title V Threshold <sup>5</sup>	10	10	100	70	100	70	25
NSR Major Source Threshold <sup>6</sup>	10	10	250	70	250	70	25
Tribal Minor NSR Threshold <sup>7</sup>	2	5	10	10	5	0.6	NA

Table 3 shows the emissions increase resulting from this action. As explained below, because this action does not modify the existing synthetic minor limits or cause an increase in emissions above the minor NSR threshold it qualifies as an administrative amendment under 40 CFR 49.153(a)(2) and 40 CFR 49.159(f)(1)(v).

The increase from FP-2 and CT-7 through CT-12 are based on the potential to emit of each unit, such that the allowable increase is the same as the units' PTE with no operational limits. These units are not a part of the existing synthetic minor limits for the Source.

TEMP-1 through TEMP-5 will take on similar operational limits to the units they are replacing, EG-1 through EG-6, which have existing synthetic minor limits and will not cause an increase in allowable emissions. Each temporary replacement generator will only be installed when the unit it is replacing has been removed. When the temporary replacement generators are removed, the new and previously permitted Tier 4 engines (EG-8 through EG-11) will be installed. Emissions from EG-8 through EG-11 are calculated as emergency generators using 200 hours/year for the PTE.

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<sup>4</sup> Maximum emissions from any one HAP for the existing source are < 0.07 tpy, which is lower than the major source threshold of any one HAP of 10 tpy.

<sup>5</sup> Major source thresholds for the title V operating permit program are described at 40 CFR 71.2 and sources subject to title V permitting requirements are described at 40 CFR 71.3(a).

<sup>6</sup> Major source thresholds for attainment/unclassifiable areas (PSD) are described at 40 CFR 52.21(b)(1); major source thresholds for nonattainment areas (nonattainment NSR) are listed at 40 CFR part 51, Appendix S, Section II.A.4.

<sup>7</sup> Minor source thresholds are listed at 40 CFR 49.153, Table 1.

**Table 3. 2018-014-AA Emissions Increase by Emissions Unit (tpy)**

Proposed New Emissions Unit Increases/PTE							
Source Description	VOC	NO <sub>x</sub>	CO	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	HAP
FP-2	0.06	0.15	0.05	0.05	0.01	0.01	0.00
CT-7					0.06	0.06	
CT-8					0.06	0.06	
CT-9					0.06	0.06	
CT-10					0.06	0.06	
CT-11					0.06	0.06	
CT-12					0.06	0.06	
Temporary Replacement Generator Increases							
Source Description	VOC	NO <sub>x</sub>	CO	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	HAP
EG-1 Replacement (TEMP-1 – EG-1 Allowable)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EG-2 Replacement (TEMP-2 – EG-2 Allowable)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EG-3 Replacement (TEMP-3 – EG-3 Allowable)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EG-4 Replacement (TEMP-4 – EG-4 Allowable)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EG-6 Replacement (TEMP-5 – EG-6 Allowable)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Final Replacement Modification Increases							
Source Description	VOC	NO <sub>x</sub>	CO	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	HAP
EG-8 Replacement (EG-8 PTE - TEMP-3)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EG-9 Replacement (EG-9 PTE – TEMP-4)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EG-10 Replacement (EG-10 PTE – TEMP-1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EG-11 Replacement (EG-11 PTE – TEMP-2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions Increase	0.06	0.15	0.05	0.06	0.38	0.38	0.00
Tribal Minor NSR Threshold	2.00	5.00	10.00	10.00	5.00	0.60	NA
Exceed minor NSR source threshold?	No	No	No	No	No	No	No

#### 4.3. Changes to Permit

We are revising the Source’s Tribal Minor NSR permit to incorporate language that reflects the addition of the new cooling towers, fire pump, temporary replacement generators, and Tier 4 emergency generators. Specific changes include: adding fuel limits for temporary replacement generators under Condition 24; applying existing permit requirements to new and replacement emissions units under Conditions 25, 30 through 35, 41, 51, and 53; adding Condition 35 to require the fire pumps to be equipped with non-resettable hour meters; deleting requirements for the removed emissions units; and revising Conditions 45 and 46 to incorporate the updated implementation schedule, including temporary units. We are also making minor administrative updates to the first page of the permit and updating the equipment description in Table 1 to reflect the changes to the permitted equipment.

A red-line version of the revised permit showing all edits is included in the docket.

## 5. Control Technology Review for Proposed Modifications to Emission-Generating Units

Because this action consists of administrative permit revisions, the action is not subject to the requirement at 40 CFR 49.154(c) to conduct a control technology review. The EPA conducted a control technology review as part of our recent permitting action for TA-0003-CA-R1.

## 6. Air Quality Impact Analysis

For projects that trigger minor NSR review, the reviewing authority may require an air quality impact analysis (AQIA) if there is reason to believe that construction or modification will cause or contribute to a NAAQS or Prevention of Significant Deterioration (PSD) increment violation. *See* 40 CFR 49.154(d). Because this action consists of administrative permit revisions, under 40 CFR 49.159(f)(2), it is not subject to the permit application or issuance requirements of the Tribal Minor NSR Program. Because of the very low emissions increase from the fire pump and cooling towers, their construction and operation is consistent with the AQIA conducted for the EPA's issuance of Permit TA-0003-CA-R1, demonstrating that the permitted project would not cause or contribute to a NAAQS or PSD increment violation.

## 7. Listed Species-Related Requirements

Pursuant to section 7 of the Endangered Species Act (ESA), 16 U.S.C. 1536, and its implementing regulations at 50 CFR part 402, the EPA is required to ensure that any action authorized, funded, or carried out by the EPA is not likely to jeopardize the continued existence of any federally endangered or federally threatened species listed under the ESA, or result in the destruction or adverse modification of such species' designated critical habitat. This project will not involve any new ground disturbances and will not directly impact federally listed species or modify natural habitat that could support federally listed species. Because the recent permit action for Permit TA-0003-CA-R1 addressed potential effects within the construction area based on recent information about species presence (including considerations related to the ESA, Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act (Eagle Act)), we are determining that this permit action is covered by the previous analysis and the EPA does not anticipate any species-related concerns under the ESA, MBTA, or Eagle Act. The EPA therefore finds that issuance of this permit will have no effect on listed species or critical habitats and has determined that no further formal consultation or action is required. See Section 9 of our TSD for Permit TA-0003-CA-R1, which provides additional information.

## 8. Historic Properties-Related Requirements

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies, including the EPA, to take into account the effects of an undertaking on historic properties. The implementing regulations of the NHPA can be found at 36 CFR part 800. An "undertaking," as defined at 36 CFR 800.16(y), includes projects requiring a federal permit. This project will not involve any new ground disturbances and will be completely constructed within the existing casino building. Thus, the EPA is determining that the project will have no potential to cause effects to historic properties. See Section 10 of our TSD for Permit TA-0003-CA-R1, which provides additional information. Pursuant to 36

CFR 800.3(a)(1), the EPA has no further obligations under NHPA Section 106 or 36 CFR part 800.

## 9. Environmental Justice Analysis

Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” calls on each federal agency to make environmental justice a part of its mission by “identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations.”

The EPA defines “environmental justice” (EJ) to include the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The EPA’s goal is to provide an opportunity for overburdened populations or communities to participate in the permitting process. “Overburdened” is used to describe the minority, low-income, tribal and indigenous populations or communities in the United States that potentially experience disproportionate environmental harms and risks due to exposures or cumulative impacts or greater vulnerability to environmental hazards.

The EPA considered EJ issues associated with changes to the Source as part of our recent permitting action for Permit TA-0003-CA-R1, and determined that our analysis of EJ considerations Permit TA-0003-CA-R1 remains valid. This permit continues to serve as an enforceable mechanism to protect air quality in the surrounding community. Issuance of this administrative permit revision will continue to require the Source to meet certain emissions rates, performance standards, recordkeeping and reporting requirements to control emissions of NO<sub>x</sub>, VOC, and CO to be lower than title V thresholds.

## 10. Authority

The CAA provides the EPA with broad authority to protect air resources throughout the nation, including air resources in Indian country. Unlike states, Indian tribes are not required to develop CAA NSR permitting programs. *See, e.g.,* Indian Tribes: Air Quality Planning and Management, 63 FR 7253 (Feb. 12, 1998) (also known as the Tribal Authority Rule). In the absence of an adequately implemented EPA-approved NSR program on the tribal lands of the San Manuel Band of Mission Indians, the EPA has the authority to implement a federal implementation plan (FIP) in order to protect tribal air resources from impacts due to the construction of new or modified stationary sources of air pollutants. In 2011, the EPA established the Tribal Minor NSR Program under the CAA as part of a FIP for Indian country, through the Tribal NSR Rule. 76 FR 38748 (July 1, 2011) (codified at 40 CFR part 49). The EPA has followed the Tribal Minor NSR Program in this permit action.

**ATTACHMENT 2-2**

PERMITS & SUPPORTING DOCUMENTS FOR TIER 4 GENERATOR ENGINES  
LOCATED AT THE BANK OF AMERICA NATIONAL ASSOCIATION



# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF ENVIRONMENTAL QUALITY

PIEDMONT REGIONAL OFFICE

4949A Cox Road, Glen Allen, Virginia 23060

(804) 527-5020 Fax (804) 527-5106

[www.deq.virginia.gov](http://www.deq.virginia.gov)

Molly Joseph Ward  
Secretary of Natural Resources

David K. Paylor  
Director

Jeffery Steers  
Regional Director

August 1, 2017

Mr. Terry R. Myatt,  
Integrated Facility Manager  
CBRE / Bank of America Account  
6050 White Oak Creek Drive  
Sandston, Virginia 23150

Location: Henrico County  
Registration No.: 52403

Dear Mr. Myatt,

Attached is a significant amendment to your new source review permit dated October 12, 2016 to construct and operate a banking and data center in accordance with the provisions of the Virginia Regulations for the Control and Abatement of Air Pollution. This permit supersedes your permit dated October 12, 2016.

In the course of evaluating the application and arriving at a final decision to approve the project, the Department of Environmental Quality (DEQ) deemed the application complete on July 27, 2017.

This permit contains legally enforceable conditions. Failure to comply may result in a Notice of Violation and/or civil charges. Please read all permit conditions carefully.

This permit approval to construct and operate shall not relieve Bank of America National Association of the responsibility to comply with all other local, state, and federal permit regulations.

The generators (Ref. Nos. 1-5, 12, 14 and 15) are subject to 40 CFR 63, Maximum Achievable Control Technology, (MACT) Subpart ZZZZ and 40 CFR 60, New Source Performance Standard (NSPS), Subpart IIII. Virginia has not accepted delegation of these rules. In summary, the units are required to comply with certain federal emission standards and operating limitations. DEQ advises you to review the referenced MACT and NSPS to ensure compliance with applicable

emission and operational limitations. As the owner/operator you are also responsible for any monitoring, notification, reporting and recordkeeping requirements of the MACT and NSPS. Notifications shall be sent to EPA, Region III.

To review any federal rules referenced in the above paragraph or in the attached permit, the US Government Publishing Office maintains the text of these rules at [www.ecfr.gov](http://www.ecfr.gov), Title 40, Parts 60 and 63.

The Board's Regulations as contained in Title 9 of the Virginia Administrative Code 5-170-200 provide that you may request a formal hearing from this case decision by filing a petition with the Board within 30 days after this case decision notice was mailed or delivered to you. Please consult the relevant regulations for additional requirements for such requests.

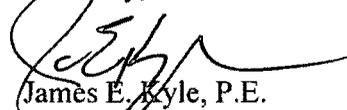
As provided by Rule 2A:2 of the Supreme Court of Virginia, you have 30 days from the date you actually received this permit or the date on which it was mailed to you, whichever occurred first, within which to initiate an appeal of this decision by filing a Notice of Appeal with:

David K. Paylor, Director  
Department of Environmental Quality  
P. O. Box 1105  
Richmond, VA 23218

If this permit was delivered to you by mail, three days are added to the thirty-day period in which to file an appeal. Please refer to Part Two A of the Rules of the Supreme Court of Virginia for information on the required content of the Notice of Appeal and for additional requirements governing appeals from decisions of administrative agencies.

If you have any questions concerning this permit, please contact the regional office at 804-527-5020.

Sincerely,

  
James E. Kyle, P.E.  
Air Permit Manager

JEK/JH/52403-5 NSR

Attachments: Permit

cc: Manager, Data Analysis (electronic file submission)  
Manager/Inspector, Air Compliance



# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF ENVIRONMENTAL QUALITY

PIEDMONT REGIONAL OFFICE

4949A Cox Road, Glen Allen, Virginia 23060

(804) 527-5020 Fax (804) 527-5106

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Molly Joseph Ward  
Secretary of Natural Resources

David K. Paylor  
Director

Jeffery Steers  
Regional Director

### STATIONARY SOURCE PERMIT TO CONSTRUCT AND OPERATE

This permit supersedes your permits dated October 12, 2016.

In compliance with the Federal Clean Air Act and the Commonwealth of Virginia Regulations for the Control and Abatement of Air Pollution,

Bank of America National Association  
6050 White Oak Creek Drive  
Sandston, Virginia 23150  
Registration No.: 52403

is authorized to construct and operate

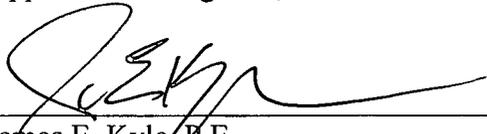
a banking and data center

located at

6050 White Oak Creek Drive  
Sandston, Virginia 23150

in accordance with the Conditions of this permit.

Approved on August 1, 2017.

  
\_\_\_\_\_  
James E. Kyle, P.E.  
Air Permit Manager

Permit consists of 9 pages.  
Permit Conditions 1 to 24.

INTRODUCTION

This permit approval is based on the permit application dated December 2, 2011, July 20, 2012, August 30, 2016 and June 6, 2017, including amendment information dated January 9, 2012, April 2, 2012, April 13, 2012, August 13, 2012, September 11, 2012, and October 10, 2016 and supplemental information dated July 6 and 27, 2017. Any changes in the permit application specifications or any existing facilities which alter the impact of the facility on air quality may require a permit. Failure to obtain such a permit prior to construction may result in enforcement action. In addition, this facility may be subject to additional applicable requirements not listed in this permit.

Words or terms used in this permit shall have meanings as provided in 9 VAC 5-10-10 of the State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution. The regulatory reference or authority for each condition is listed in parentheses () after each condition.

Annual requirements to fulfill legal obligations to maintain current stationary source emissions data will necessitate a prompt response by the permittee to requests by the DEQ or the Board for information to include, as appropriate: process and production data; changes in control equipment; and operating schedules. Such requests for information from the DEQ will either be in writing or by personal contact.

The availability of information submitted to the DEQ or the Board will be governed by applicable provisions of the Freedom of Information Act, §§ 2.2-3700 through 2.2-3714 of the Code of Virginia, § 10.1-1314 (addressing information provided to the Board) of the Code of Virginia, and 9 VAC 5-170-60 of the State Air Pollution Control Board Regulations. Information provided to federal officials is subject to appropriate federal law and regulations governing confidentiality of such information.

**Equipment List** - Equipment at this facility consists of the following:

<b>Equipment included in the project:</b>			
<b>Reference No.</b>	<b>Equipment Description</b>	<b>Rated Capacity</b>	<b>Federal Delegated Requirements</b>
1	Cummins Model DQKAC diesel generator, engine model QSK60-G14 NR2	2,446 kW/3280 hp (engine rating)	None
2	Cummins Model DQKAC diesel generator, engine model QSK60-G14 NR2	2,446 kW/3280 hp (engine rating)	None
3	Cummins Model DQKAC diesel generator, engine model QSK60-G14 NR2	2,446 kW/3280 hp (engine rating)	None

<b>Equipment included in the project:</b>			
<b>Reference No.</b>	<b>Equipment Description</b>	<b>Rated Capacity</b>	<b>Federal Delegated Requirements</b>
4	Cummins Model DQKAC diesel generator, engine model QSK60-G14 NR2	2,446 kW/3280 hp (engine rating)	None
5	Cummins Model DQKAC diesel generator, engine model QSK60-G14 NR2	2,446 kW/3280 hp (engine rating)	None

<b>Equipment permitted prior to the date of this permit:</b>			
<b>Reference No.</b>	<b>Equipment Description</b>	<b>Rated Capacity</b>	<b>Federal Delegated Requirements</b>
14	Caterpillar diesel emergency generator, engine Model 3512C	1,645 kW/2206 hp (engine rating)	None
15	Caterpillar diesel emergency generator, engine Model 3512C	1,645 kW/2206 hp (engine rating)	None

<b>Equipment Exempt from Permitting</b>			
<b>Reference No.</b>	<b>Equipment Description</b>	<b>Rated Capacity</b>	<b>Exemption Citation 9 VAC 5-80-</b>
6	Lochinvar Crest FBN3000 natural gas boiler	3.0 MMBtu/hr	1105 B.1
7	Lochinvar Crest FBN3000 natural gas boiler	3.0 MMBtu/hr	1105 B.1
8	Pressure storage tank (diesel)	33,000 gal	1105 B.8.e
9	Pressure storage tank (diesel)	33,000 gal	1105 B.8.e
10	Pressure storage tank (diesel)	15,000 gal	1105 B.8.e
11	Pressure storage tank (urea)	15,000 gal	1105
12	Cummins diesel emergency generator	250 kW	1105 B.2.b
13	Pressure storage tank (diesel)	300 gal	1105 B.8.e
16	Storage tank (diesel)	5,900 gal	1105 B.8.e
17	Storage tank (diesel)	5,900 gal	1105 B.8.e

Specifications included in the above tables are for informational purposes only and do not form enforceable terms or conditions of the permit.

**PROCESS REQUIREMENTS**

1. **Storage** - The permittee is authorized to store only the petroleum product specified in the equipment list for each respective storage tank. A change in the materials stored may require a permit to modify and operate.  
(9 VAC 5-80-1180)
2. **Emissions Controls** – Emissions shall be controlled by proper operation and maintenance of combustion equipment. The permittee shall develop, maintain, and have available to all operators good written operating procedures and a maintenance schedule for the engine-generator sets (Ref. Nos. 1-5, 14 and 15). These procedures shall be based on the manufacturer's recommendations, at minimum.  
(9 VAC 5-80-1180)
3. **Emission Controls** – Nitrogen oxides (NO<sub>x</sub>) emissions from the engine-generator sets (Ref. Nos. 14 & 15) shall be controlled by the following: electronic fuel injection, turbocharged engine, and an aftercooler. The permittee shall maintain documentation that demonstrates the control devices have been installed on the engine-generator sets.  
(9 VAC 5-80-1180 and 9 VAC 5-50-260)
4. **Monitoring Devices** – The engine-generator sets (Ref. Nos. 1-5, 14 and 15) shall be equipped with non-resettable hour meters. Each monitoring device shall be provided with adequate access for inspection and shall be in operation when the generators are operating.  
(9 VAC 5-80-1180)

**OPERATING LIMITATIONS**

5. **Operating Hours** – Each engine-generator set (Ref. Nos. 1-5), shall not operate more than 1000 hours per year, calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.  
(9 VAC 5-80-1180 and 9 VAC 5-50-260)
6. **Operating Hours** – Each engine-generator set (Ref. Nos. 14 and 15), shall not operate more than 500 hours per year, calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.  
(9 VAC 5-80-1180 and 9 VAC 5-50-260)
7. **Fuel** - The approved fuel for the engine-generator sets (Ref. Nos. 1-5, 14 and 15) is distillate oil. A change in the fuel may require a permit to modify and operate.  
(9 VAC 5-80-1180)

8. **Fuel** - The distillate oil shall meet the specifications below:

DISTILLATE OIL which meets the ASTM D396 specification for numbers 1 or 2 fuel oil:

Maximum sulfur content per shipment: **0.0015%**

(9 VAC 5-80-1180)

9. **Fuel Certification** - The permittee shall obtain a certification from the fuel supplier with each shipment of distillate oil. Each fuel supplier certification shall include the following:

- a. The name of the fuel supplier;
- b. The date on which the distillate oil was received;
- c. The quantity of distillate oil delivered in the shipment;
- d. A statement that the distillate oil complies with the American Society for Testing and Materials specifications (ASTM D396) for numbers 1 or 2 fuel oil; and
- e. The sulfur content of the distillate oil.

Fuel sampling and analysis, independent of that used for certification, as may be periodically required or conducted by DEQ may be used to determine compliance with the fuel specifications stipulated in Condition 8. Exceedance of these specifications may be considered credible evidence of the exceedance of emission limits.

(9 VAC 5-80-1180)

**EMISSION LIMITS**

10. **Process Emission Limits** - Emissions from the operation of the engine-generator sets (Ref. Nos. 1-5) shall not exceed the limits specified below:

Particulate Matter	3.4 lbs/hr	1.7 tons/yr
PM-10	3.4 lbs/hr	1.7 tons/yr
Nitrogen Oxides (as NO <sub>2</sub> )	27.0 lbs/hr	13.5 tons/yr
Carbon Monoxide	94.4 lbs/hr	47.2 tons/yr
Volatile Organic Compounds	10.8 lbs/hr	5.4 tons/yr

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the

exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 5 and 8.  
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

11. **Process Emission Limits** - Emissions from the operation of the engine-generator sets (Ref. Nos. 14 and 15) shall not exceed the limits specified below:

Particulate Matter	3.2 lbs/hr	0.8 tons/yr
PM-10	3.2 lbs/hr	0.8 tons/yr
Nitrogen Oxides (as NO <sub>2</sub> )	6.0 g/hp-hr*	25.6 tons/yr
Carbon Monoxide	41.4 lbs/hr	10.3 tons/yr
Volatile Organic Compounds	3.2 lbs/hr	0.8 tons/yr

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 2, 3, 6, 7 and 8. \*Grams/hp-hr limit is for each generator.  
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

12. **Visible Emission Limit** - Visible emissions from the engine-generator sets (Ref. Nos. 1-5, 14 and 15) each shall not exceed 10 percent opacity except during one six-minute period in any one hour in which visible emissions shall not exceed 20 percent opacity as determined by the EPA Method 9 (reference 40 CFR 60, Appendix A). This condition applies at all times except during startup, shutdown, and malfunction.  
(9 VAC 5-80-1180)

**RECORDS**

13. **On Site Records** - The permittee shall maintain records of emission data and operating parameters as necessary to demonstrate compliance with this permit. The content and format of such records shall be arranged with the Director, Piedmont Region. These records shall include, but are not limited to:
- Annual hours of operation for each engine-generator set, calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
  - All fuel supplier certifications.
  - Scheduled and unscheduled maintenance and operator training.

- d. Results of all stack tests, visible emission evaluations and performance evaluations.

These records shall be available for inspection by the DEQ and shall be current for the most recent five years.

(9 VAC 5-80-1180 and 9 VAC 5-50-50)

#### PROCESS REQUIREMENTS

14. **Emissions Testing** - The facility shall be constructed so as to allow for emissions testing upon reasonable notice at any time, using appropriate methods. Sampling ports shall be provided when requested at the appropriate locations and safe sampling platforms and access shall be provided.

(9 VAC 5-50-30 F and 9 VAC 5-80-1180)

#### NOTIFICATIONS

15. **Initial Notifications** - The permittee shall furnish written notification to the Piedmont Regional Office of the actual start-up date of the engine-generator sets (Ref. Nos. 14 and 15) within 15 days after such date.

(9 VAC 5-50-50 and 9 VAC 5-80-1180)

#### GENERAL CONDITIONS

16. **Permit Invalidity** – This permit to construct the engine-generator sets (Ref. Nos. 14 and 15) shall become invalid, unless an extension is granted by the DEQ, if:

- a. A program of continuous construction or modification is not commenced within 9 months from the date of this permit.
- b. A program of construction or modification is discontinued for a period of 18 months or more, or is not completed within a reasonable time, except for a DEQ approved period between phases of the phased construction of a new stationary source or project.

(9 VAC 5-80-1210)

17. **Permit Suspension/Revocation** - This permit may be suspended or revoked if the permittee:

- a. Knowingly makes material misstatements in the permit application or any amendments to it;
- b. Fails to comply with the conditions of this permit;
- c. Fails to comply with any emission standards applicable to a permitted emissions unit, ;

- d. Causes emissions from the stationary source which result in violations of, or interfere with the attainment and maintenance of, any ambient air quality standard; or
- e. Fails to operate in conformance with any applicable control strategy, including any emission standards or emission limitations, in the State Implementation Plan in effect at the time an application for this permit is submitted.

(9 VAC 5-80-1210 F)

**18. Right of Entry** - The permittee shall allow authorized local, state, and federal representatives, upon the presentation of credentials:

- a. To enter upon the permittee's premises on which the facility is located or in which any records are required to be kept under the terms and conditions of this permit;
- b. To have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit or the State Air Pollution Control Board Regulations;
- c. To inspect at reasonable times any facility, equipment, or process subject to the terms and conditions of this permit or the State Air Pollution Control Board Regulations; and
- d. To sample or test at reasonable times.

For purposes of this condition, the time for inspection shall be deemed reasonable during regular business hours or whenever the facility is in operation. Nothing contained herein shall make an inspection time unreasonable during an emergency.

(9 VAC 5-170-130 and 9 VAC 5-80-1180)

**19. Maintenance/Operating Procedures** – At all times, including periods of start-up, shutdown, and malfunction, the permittee shall, to the extent practicable, maintain and operate the affected source, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions.

The permittee shall take the following measures in order to minimize the duration and frequency of excess emissions, with respect to air pollution control equipment and process equipment which affect such emissions:

- a. Develop a maintenance schedule and maintain records of all scheduled and non-scheduled maintenance.
- b. Maintain an inventory of spare parts.
- c. Have available written operating procedures for equipment. These procedures shall be based on the manufacturer's recommendations, at a minimum.

- d. Train operators in the proper operation of all such equipment and familiarize the operators with the written operating procedures, prior to their first operation of such equipment. The permittee shall maintain records of the training provided including the names of trainees, the date of training and the nature of the training.

Records of maintenance and training shall be maintained on site for a period of five years and shall be made available to DEQ personnel upon request.

(9 VAC 5-50-20 E and 9 VAC 5-80-1180 D)

20. **Record of Malfunctions** – The permittee shall maintain records of the occurrence and duration of any bypass, malfunction, shutdown or failure of the facility or its associated air pollution control equipment that results in excess emissions for more than one hour. Records shall include the date, time, duration, description (emission unit, pollutant affected, cause), corrective action, preventive measures taken and name of person generating the record.  
(9VAC 5-20-180 J and 9 VAC 5-80-1180 D)
21. **Notification for Facility or Control Equipment Malfunction** - The permittee shall furnish notification to the Director, Piedmont Region of malfunctions of the affected facility or related air pollution control equipment that may cause excess emissions for more than one hour, by facsimile transmission, telephone or telegraph. Such notification shall be made as soon as practicable but no later than four daytime business hours after the malfunction is discovered. The permittee shall provide a written statement giving all pertinent facts, including the estimated duration of the breakdown, within two weeks of discovery of the malfunction. When the condition causing the failure or malfunction has been corrected and the equipment is again in operation, the permittee shall notify the Director, Piedmont Region.  
(9 VAC 5-20-180 C and 9 VAC 5-80-1180)
22. **Violation of Ambient Air Quality Standard** - The permittee shall, upon request of the DEQ, reduce the level of operation or shut down a facility, as necessary to avoid violating any primary ambient air quality standard and shall not return to normal operation until such time as the ambient air quality standard will not be violated.  
(9 VAC 5-20-180 I and 9 VAC 5-80-1180)
23. **Change of Ownership** - In the case of a transfer of ownership of a stationary source, the new owner shall abide by any current permit issued to the previous owner. The new owner shall notify the Director, Piedmont Region of the change of ownership within 30 days of the transfer.  
(9 VAC 5-80-1240)
24. **Permit Copy** - The permittee shall keep a copy of this permit on the premises of the facility to which it applies.  
(9 VAC 5-80-1180)

## ENGINEERING ANALYSIS- Minor NSR Permit

Source Name Bank of America National Association

Registration No 52403-5

Source Location: Sandston, Virginia

Date July 12, 2017

Permit Writer Initials JH

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### I. Introduction and Background

#### A. Company Background

Bank of America National Association is a banking and data center located at 6050 Elko Tract Road in Sandston, Virginia. The facility is a synthetic minor source for NO<sub>x</sub>. The facility is located in an attainment area for all criteria pollutants, and is in a VOC and NO<sub>x</sub> Emission Control Areas.

The facility is located on a site that is suitable from an air pollution standpoint. An air inspection has not been conducted at the facility to date. Additionally, this facility is not a Greenfield site and the permit is not for a major modification, therefore the county Local Government Ordinance Form was not required. This permit action will supersede the permit dated October 12, 2016.

#### B. Proposed Project Summary

The Bank of America has requested a permit amendment to update the permit for generators Ref. Nos. 1-5 to reflect emission factors based on manufacturer data not to exceed emission rates.

#### C. Process and Equipment Description- No equipment will be constructed as a result of the proposed project.

#### D. Project Schedule

Date permit application received in region: 6/14/17

Date application was deemed complete: 7/6/17

Proposed construction commencement date: None provided

Proposed start-up date: None provided

### II. Emissions Calculations- see attached spreadsheets which include the details on the basis of emissions.

### III. Regulatory Review

The proposed project is not applicable to Article 6 permitting because the emission increase is below project exemption levels. This permit action is considered a significant amendment because it required a case-by-case determination of an emission limitation as described in 9 VAC 5-80-1290.

The generators were manufactured after April 1, 2006, have a displacement less than 30 liters per cylinder and are compression ignition (CI) engines, thus are subject to NSPS Subpart IIII. The letter from Cummins Power Generation dated January 24, 2012 that was submitted with the application indicates that the generators will meet EPA Tier 4 standards with the recommended not to exceed limits provided. The generators are reciprocating internal combustion engine and

are being operated at an area source of HAP emissions therefore, the generators are subject to MACT Subpart ZZZZ. Owner/operators may demonstrate compliance with the MACT by complying with NSPS Subpart IIII. However, Virginia has not accepted delegation to enforce the NSPS or the MACT for area HAP sources.

- A Criteria Pollutants - No modeling is required because the proposed project is not subject to Article 6 permitting.
- B Toxic Pollutants - The generators are an affected source under a MACT, therefore the source is specifically exempt per 9 VAC 5-60-300 C. 5 and 7, and 9 VAC 5-80-1105 F.
- C Control Technology- The emissions increases from the generators are below project exemption levels, therefore, they are not subject to BACT and do not require a review of control technology.

**IV. Initial Compliance Determination (including references)**

- A Stack Testing – None required
- B VEEs – None required.

**V. Continuing Compliance Determination**

- A CEMS – CEMS are not required for this source type
- B Recordkeeping- there have been no changes made to the permit.
- C Further VEE testing may be required if there are any compliance issues with the facility.

**VI. Public Participation**

No public comment period is required for a minor NSR permit action and no public interest in project has been indicated.

**VII. Other Considerations**

- A File Consistency Review – The facility's files, including permit and compliance records, were reviewed for this permit action. Because the initial notifications for actual construction and anticipated start-up have been received for generators 14 and 15 they have been removed from the permit.
- B PRO Policy Consistency Review – The permit conforms to the latest boilerplate format.
- C Confidentiality – The source did not request that any information be kept confidential.
- D Permit History –

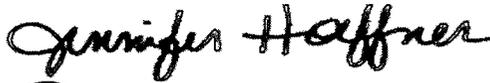
October 12, 2016 – NSR modification for the construction and operation of two generators (Ref. Nos. 14 and 15) Supersedes September 25, 2012 and June 5, 2012 permits.

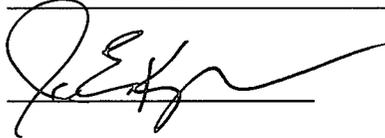
September 25, 2012 – NSR modification for construction of generator, increase in operating hours and facility name change.

June 5, 2012 (superseded) – NSR permit issued to construct and operate 5 diesel generators

**VIII. Recommendations**

Based on the information submitted, it is recommended that this permit be issued.

Regional Engineer:  Date July 12, 2017

Reviewing Engineer:  Date: 8/1/2017

Company Name Bank of America National Association  
 Source Location Sandston  
 Registration No 52403

Date 07/05/17  
 Engineer JH  
 Diesel Generators

Sulfur Content 0.0015 % (by weight)

Unit Ref No	MRC (kW)	MRC (hp)	MRC (MMBtu/hr)	Hours of Oper (hrs/yr)	Emission Factors (lb/kW-hr)						Hourly Emissions (lb/hr)					Permitted Criteria Pollutant Emissions (tons/yr)					New Uncontrolled Emissions (tons/yr)					Current Uncontrolled Emissions (tons/yr)								
					PM	PM <sub>10</sub>	SO <sub>2</sub>	CO	VOC	NO <sub>x</sub>	PM	PM <sub>10</sub>	SO <sub>2</sub>	CO	VOC	NO <sub>x</sub>	PM	PM <sub>10</sub>	SO <sub>2</sub>	CO	VOC	NO <sub>x</sub>	PM	PM <sub>10</sub>	SO <sub>2</sub>	CO	VOC	NO <sub>x</sub>	PM	PM <sub>10</sub>	SO <sub>2</sub>	CO	VOC	NO <sub>x</sub>
1	2,250	3,280	19.4	1000	0.0003	0.0003	0.0000	0.0077	0.0009	0.002	0.62	0.62	0.03	17.36	1.98	4.96	0.31	0.31	0.01	8.68	0.99	2.48	0.31	0.31	0.01	8.68	0.99	2.48	0.25	0.25	0.01	1.74	0.99	3.32
2	2,250	3,280	19.4	1000	0.0003	0.0003	0.0000	0.0077	0.0009	0.002	0.62	0.62	0.03	17.36	1.98	4.96	0.31	0.31	0.01	8.68	0.99	2.48	0.31	0.31	0.01	8.68	0.99	2.48	0.25	0.25	0.01	1.74	0.99	3.32
3	2,250	3,280	19.4	1000	0.0003	0.0003	0.0000	0.0077	0.0009	0.002	0.62	0.62	0.03	17.36	1.98	4.96	0.31	0.31	0.01	8.68	0.99	2.48	0.31	0.31	0.01	8.68	0.99	2.48	0.25	0.25	0.01	1.74	0.99	3.32
4	2,250	3,280	19.4	1000	0.0003	0.0003	0.0000	0.0077	0.0009	0.002	0.62	0.62	0.03	17.36	1.98	4.96	0.31	0.31	0.01	8.68	0.99	2.48	0.31	0.31	0.01	8.68	0.99	2.48	0.25	0.25	0.01	1.74	0.99	3.32
5	2,250	3,280	19.4	1000	0.0003	0.0003	0.0000	0.0077	0.0009	0.002	0.62	0.62	0.03	17.36	1.98	4.96	0.31	0.31	0.01	8.68	0.99	2.48	0.31	0.31	0.01	8.68	0.99	2.48	0.25	0.25	0.01	1.74	0.99	3.32
<b>Total</b>					<b>3.10 3.10 0.14 86.81 9.92 24.80</b>						<b>1.55 1.55 0.07 43.40 4.96 12.40</b>					<b>1.6 1.6 0.1 43.4 5.0 12.4</b>					<b>1.2 1.2 0.1 8.7 5.0 16.6</b>													

**References**

(1) PM, PM-10, CO, VOC and NOx emission factors are from manufacturer specifications not to exceed emission rates dated January 24, 2012

PM 0.125 g/kW-hr  
 PM-10 0.125 g/kW-hr  
 CO 3.5 g/kW-hr  
 VOC 0.40 g/kW-hr  
 NOx 1 g/kW-hr

(2) Assume PM10 equals PM  
 (3) Sulfur emissions based on AP-42 Table 3.4-1 dated 10/96 Emission Factors for Large Stationary Diesel Engines  
 (4) conversion grams to pounds 453.60 g/lb

**March 19, 2013 Stack Test Results**

	lb/hr*	lb/hr**
PM	0.08	0.42
CO	0.68	3.40
VOC	0.11	0.53
NOx	2.44	12.2

\* Emissions based on one generator  
 \*\* Emissions based on 5 generators

**CURRENT UNCONTROLLED EMISSIONS**

Emissions based on October 12, 2016 NSR permit

Unit Ref No	MRC (kW)	MRC (hp)	MRC (MMBtu/hr)	Hours of Oper (hrs/yr)	Emission Factors (lb/kW-hr)						Hourly Emissions (lb/hr)					Current Uncontrolled Emissions (tons/yr)												
					PM	PM <sub>10</sub>	SO <sub>2</sub>	CO	VOC	NO <sub>x</sub>	PM	PM <sub>10</sub>	SO <sub>2</sub>	CO	VOC	NO <sub>x</sub>	PM	PM <sub>10</sub>	SO <sub>2</sub>	CO	VOC	NO <sub>x</sub>						
1	2,250	3,280	19.4	1000	0.0002	0.0002	0.0000	0.0015	0.0009	0.003	0.50	0.50	0.03	3.47	1.98	6.65	0.25	0.25	0.01	1.74	0.99	3.32	0.25	0.25	0.01	1.74	0.99	3.32
2	2,250	3,280	19.4	1000	0.0002	0.0002	0.0000	0.0015	0.0009	0.003	0.50	0.50	0.03	3.47	1.98	6.65	0.25	0.25	0.01	1.74	0.99	3.32	0.25	0.25	0.01	1.74	0.99	3.32
3	2,250	3,280	19.4	1000	0.0002	0.0002	0.0000	0.0015	0.0009	0.003	0.50	0.50	0.03	3.47	1.98	6.65	0.25	0.25	0.01	1.74	0.99	3.32	0.25	0.25	0.01	1.74	0.99	3.32
4	2,250	3,280	19.4	1000	0.0002	0.0002	0.0000	0.0015	0.0009	0.003	0.50	0.50	0.03	3.47	1.98	6.65	0.25	0.25	0.01	1.74	0.99	3.32	0.25	0.25	0.01	1.74	0.99	3.32
5	2,250	3,280	19.4	1000	0.0002	0.0002	0.0000	0.0015	0.0009	0.003	0.50	0.50	0.03	3.47	1.98	6.65	0.25	0.25	0.01	1.74	0.99	3.32	0.25	0.25	0.01	1.74	0.99	3.32
<b>Total</b>					<b>2.48 2.48 0.14 17.36 9.92 33.23</b>						<b>1.24 1.24 0.07 8.68 4.96 16.62</b>																	

**References**

(1) CO and NOx emission factors are from manufacturer specifications and include a 100% factor of safety

PM, PM-10 and VOC emission factors are based on NSPS

PM 0.1 g/kW-hr NSPS  
 PM-10 0.1 g/kW-hr NSPS  
 CO 0.7 g/kW-hr  
 VOC 0.40 g/kW-hr NSPS  
 NOx 1.34 g/kW-hr

(2) Assume PM10 equals PM  
 (3) PM, PM-10 and VOC manufacturer specifications were above the NSPS standard therefore, the standard was used as the emission factor  
 (4) Sulfur emissions based on AP-42 Table 3.4-1 dated 10/96 Emission Factors for Large Stationary Diesel Engines

Company Name Bank of America National Association  
 Source Location Sandston  
 Registration No 52403

Date 09/27/16  
 Engineer JH  
 Diesel Generators

Sulfur Content 0.0015 % (by weight)

Unit Ref. No	MRC (kW)	MRC (hp)	MRC (MMBtu/hr)	Hours of Oper (hrs/yr)	Emission Factors (lb/hp-hr)						Hourly Emissions (lb/hr)					Uncontrolled Emissions (tons/yr)					Annual Emissions (tons/yr)								
					PM	PM <sub>10</sub>	SO <sub>2</sub>	CO	VOC	NO <sub>x</sub>	PM	PM <sub>10</sub>	SO <sub>2</sub>	CO	VOC	NO <sub>x</sub>	PM	PM <sub>10</sub>	SO <sub>2</sub>	CO	VOC	NO <sub>x</sub>	PM	PM <sub>10</sub>	SO <sub>2</sub>	CO	VOC	NO <sub>x</sub>	
14	1,645	2,206		500	0.0006	0.0006	0.000	0.0075	0.0007	0.019	1.58	1.58	0.03	20.67	1.56	51.19	0.32	0.32	0.01	4.13	0.39	10.24	0.40	0.40	0.01	5.17	0.39	12.80	
15	1,645	2,206		500	0.0006	0.0006	0.000	0.0075	0.0007	0.019	1.58	1.58	0.03	20.67	1.56	51.19	0.32	0.32	0.01	4.13	0.39	10.24	0.40	0.40	0.01	5.17	0.39	12.80	
<b>Total:</b>					<b>3.16</b>	<b>3.16</b>	<b>0.05</b>	<b>41.34</b>	<b>3.11</b>	<b>102.37</b>	<b>0.63</b>	<b>0.63</b>	<b>0.01</b>	<b>8.27</b>	<b>0.78</b>	<b>20.47</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>10.3</b>	<b>0.8</b>	<b>25.6</b>							

References

Manufacturer nominal worse case emissions data      Nominal emission factor  
 PM      0.001 lb/hp hr      PM      1.26 lb/hr  
 CO      0.01 lb/hp hr      CO      16.54 lb/hr  
 NMHC + NOx      0.01856 lb/hp hr      NMHC + NOx      40.95 lb/hr

- (1) lb/hr PM, CO & NOx emissions based on manufacturer nominal worse case + 25% (per diesel engine procedures)
- (2) SO<sub>2</sub> & VOC emissions based on AP-42 Table 3.4-1 dated 10/96 Emission Factors for Large Stationary Diesel Engines
- (3) Assume PM10 equals PM
- (4) Uncontrolled PM, CO, & NOx emissions based on manufacturer nominal worse case load/pollutant (per diesel engine procedures)
- (5) annual PM, CO & NOx emissions based on manufacturer nominal worse case + 25% (per diesel engine procedures)
- (6) conversion grams to pounds 453.60 g/lb

Tier 2 standards      Converted (1kW = 1.341 hp)  
 PM      0.2 g/kW-hr      PM      0.15 g/hp hr  
 CO      3.5 g/kW-hr      CO      2.61 g/hp hr  
 NMHC + NOx      6.4 g/kW-hr      NMHC + NOx      4.77 g/hp hr

**Diesel Generators (1-5)**      Input:      19.4 MMBtu/hr      Hours of operation:      1000 hr/yr

CO2				Methane					
Emission Factor	tons/yr	5 units		Emission Factor	tons/yr	5 units			
165 lb/mmbtu	1600.5	8,003		0.09 lb/mmbtu	0.8730	4,365.0			
GWP factc	1	CO2e	1,600.5	8,003	GWP factc	21	CO2e	18.33	92

Total CO2e tpy	
Per Unit	Total Units
1,619	8,094

Emission factors from AP-42 Table 3.41

No factor for N2O could be found for diesel generators

SF6, HFC and PFC are not typically emitted from fuel combustion

GWP factor see 40 CFR Part 98, Subpart A, Table A-1

**ATTACHMENT 2-3**

PERMITS & SUPPORTING DOCUMENTS FOR TIER 4 GENERATOR ENGINES  
LOCATED AT THE MOUNTRAIL WILLIAMS ELECTRIC COOPERATIVE FACILITY

May 29, 2019

Mr. Dale Haugen  
Mountrail Williams Electric Cooperative  
P.O. Box 1346  
Williston, ND 58802

FILE

Re: Peaking Units

Dear Mr. Haugen:

We have reviewed the information received May 28, 2019 for the installation/operation of two peaking units at the Mountrail Williams Electric Cooperative facility located at 218 - 58<sup>th</sup> Street SW in Williston, ND. Based upon the information submitted, the Department has determined that the facility is an air pollution source of minor significance and a Permit to Construct is not required per Subdivision 33-15-14-02.13.n of the North Dakota Air Pollution Control Rules. This determination is contingent upon the following conditions:

1. Construction/operation of the facility (with respect to sources of air pollution) shall be in accordance with information provided to the Department as well as any plans, specifications and supporting data submitted to the Department. The Department shall be notified ten days in advance of any significant deviations from the specifications furnished. This determination may be invalidated if the Department determines that a significant deviation from the plans and specifications furnished has been or is to be made.
2. Even though a permit is not required, emissions from your facility must still comply with the applicable requirements of the rules. This includes the applicable requirements of 40 CFR 60, Subpart IIII. The Department is the implementing/enforcement agency for the requirements of Subpart IIII and any required reports should be submitted to our Department at the address on this letter or by email at [AirQuality@nd.gov](mailto:AirQuality@nd.gov).

Note that the above determination only pertains to air quality requirements. Other divisions (Water Quality, Waste Management and Municipal Facilities) within the Department may have additional requirements. Contact information for the various divisions is listed at the bottom of this letter.

If you should have any questions, feel free to contact me at 701-328-5198 or [cthorstenson@nd.gov](mailto:cthorstenson@nd.gov).

Sincerely,



Craig D. Thorstenson  
Environmental Engineer  
Division of Air Quality

CDT:csc

---

918 East Divide Avenue | Bismarck ND 58501-1947 | Fax 701-328-5200 | [deq.nd.gov](http://deq.nd.gov)

Director's Office  
701-328-5150

Division of  
Air Quality  
701-328-5188

Division of  
Municipal Facilities  
701-328-5211

Division of  
Waste Management  
701-328-5166

Division of  
Water Quality  
701-328-5210

Division of Chemistry  
701-328-6140  
2635 East Main Ave  
Bismarck ND 58501



**PERMIT APPLICATION FOR  
AIR CONTAMINANT SOURCES**  
NORTH DAKOTA DEPARTMENT OF HEALTH  
DIVISION OF AIR QUALITY  
SFN 8516 (06-13)



**SECTION A - FACILITY INFORMATION**

Name of Firm or Organization Mountrail Williams Electric Cooperative		
Contact Person for Air Pollution Matters Dale Haugen		
Title General Manager	Telephone Number (701) 770-0755	E-mail Address dhaugen@mwec.com
Applicant's Name Dale Haugen		
Title General Manager	Telephone Number (701) 770-0755	E-mail Address dhaugen@mwec.com
Mailing Address (Street & No.) PO Box 1346		
City Williston	State ND	ZIP Code 58802
Facility Address (Street & No.) 218 58th St W		
City Williston	State ND	ZIP Code 58102
County Williams	Latitude (Nearest Second) 48.147 N	Longitude (Nearest Second) 103.6180 W
Legal Description of Facility Site _____ 1/4 _____ 1/4, Section _____ Twp. _____ Range	Land Area at Facility Site Acres (or) 20.4 Ac (campus) Sq. Ft.	MSL Elevation at Facility

**SECTION B - GENERAL NATURE OF BUSINESS**

Describe Nature of Business	North American Industry Classification System Number	Standard Industrial Classification Number (SIC)
Headquarters Office	551114	
Electric Utility		4911

**SECTION C - GENERAL PERMIT INFORMATION**

Type of Permit? Permit to Construct (PTC) <input checked="" type="checkbox"/> Permit to Operate (PTO) <input checked="" type="checkbox"/>	
If application is for a Permit to Construct, please provide the following data:	
Planned Start Construction Date 2018	Planned End Construction Date 10/1/2019

**SECTION D – SOURCE IDENTIFICATION AND CATEGORY OF EACH SOURCE INCLUDED ON THIS PERMIT APPLICATION**

Your Source ID Number	Source or Unit (Equipment, Machines, Devices, Boilers, Processes, Incinerators, Etc.)	Permit to Construct				Minor Source Permit to Operate						
		New Source	Existing Source Modification	Existing Source Expansion	Existing Source Change of Location	New Source	Existing Source Initial Application	Existing Source After Modification	Existing Source After Expansion	Existing Source After Change of Location	Existing Source After Change of Ownership	Other
1	Generator 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Generator 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Add additional pages if necessary

**SECTION E – IDENTIFICATION OF AIR CONTAMINANTS**

Check all which are emitted in measurable quantities into the atmosphere from any operation at facility

<input type="checkbox"/> Arsenic	<input type="checkbox"/> Chlorine Compounds	<input checked="" type="checkbox"/> Sulfur Compounds	<input type="checkbox"/> Radioisotopes
<input type="checkbox"/> Asbestos	<input type="checkbox"/> Chromium Compounds	<input type="checkbox"/> Hydrogen Sulfide	<input type="checkbox"/> Visible Emissions
<input type="checkbox"/> Beryllium	<input type="checkbox"/> Fluoride Compounds	<input checked="" type="checkbox"/> Odors	<input checked="" type="checkbox"/> Particulates (specify)
<input type="checkbox"/> Cadmium	<input type="checkbox"/> Volatile Organic Compounds	<input checked="" type="checkbox"/> Carbon Monoxide	<input type="checkbox"/> Dust
<input type="checkbox"/> Lead	<input checked="" type="checkbox"/> Other Organic Compounds	<input checked="" type="checkbox"/> Nitrogen Compounds	<input type="checkbox"/> Silica
<input type="checkbox"/> Mercury	<input checked="" type="checkbox"/> Greenhouse Gases (CO <sub>2</sub> e)	<input type="checkbox"/> Pesticides	<input type="checkbox"/> Other (specify)

List Specific Compounds  
Agglomerated Carbon

Has Source Testing Been Done at the Facility? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Last Date when a Testing Program was Completed	If Program is Continuous, Give Approximate Testing Frequency
--	--	--

**SECTION F1 – ADDITIONAL FORMS**

Indicate which of the following forms are attached and made part of the application

<input type="checkbox"/> Air Pollution Control Equipment (SFN 8532)	<input type="checkbox"/> Fuel Burning Equipment Used for Indirect Heating (SFN 8518)
<input type="checkbox"/> Construct/Operate Incinerators (SFN 8522)	<input type="checkbox"/> Hazardous Air Pollutant (HAP) Sources (SFN 8329)
<input type="checkbox"/> Natural Gas Processing Plants (SFN 11408)	<input type="checkbox"/> Manufacturing or Processing Equipment (SFN 8520)
<input type="checkbox"/> Glycol Dehydration Units (SFN 58923)	<input type="checkbox"/> Volatile Organic Compounds Storage Tank (SFN 8535)
<input type="checkbox"/> Flares (SFN 59652)	<input checked="" type="checkbox"/> Internal Combustion Engines and Turbines (SFN 8891)
<input type="checkbox"/> Rock, Sand, and Gravel Plants (SFN 8530)	<input type="checkbox"/> Oil/Gas Production Facility Registration (SFN 14334)
<input type="checkbox"/> Asphalt Concrete Plants (SFN 8526)	<input type="checkbox"/> Grain, Feed, and Fertilizer Operations (SFN 8524)

**SECTION F2 – OTHER ATTACHMENTS INCLUDED AS PART OF THIS APPLICATION**

1.	SFN 8532	4.	EPA Certificate KCPXL78.1NSF-015
2.	SFN 8891	5.	CAT Performance Data
3.	CAT Engine Emission Data	6.	

I, the undersigned applicant, am fully aware that statements made in this application and the attached exhibits and statements constitute the application for Permit(s) to Construct and/or Operate Air Contaminant sources from the North Dakota Department of Health and certify that the information in this application is true, correct and complete to the best of my knowledge and belief. Further, I agree to comply with the provisions of Chapter 23-25 of the North Dakota Century Code and all rules and regulations of the Department, or revisions thereof. I also understand the permit is nontransferable and, if granted a permit, I will promptly notify the Department upon sale or legal transfer of this permitted establishment.

Signature of Applicant 	Date 5/14/19
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**PERMIT APPLICATION FOR  
INTERNAL COMBUSTION ENGINES AND TURBINES**  
NORTH DAKOTA DEPARTMENT OF HEALTH  
DIVISION OF AIR QUALITY  
SFN 8891 (09-12)

**SECTION A – GENERAL INFORMATION**

Name of Firm or Organization Mountrail Williams Electric Cooperative		
Applicant's Name Dale Haugen		
Title General Manager	Telephone Number 701 770 0755	E-mail Address dhaugen@@MWEC.com
Mailing Address (Street & No.) PO Box 1346		
City Williston	State ND	ZIP Code 58802
Contact Person for Air Pollution Matters Dale Haugen		
Title General Manager	Telephone Number 701 770 0755	E-mail Address dhaugen@mwec.com

**SECTION B – FACILITY AND UNIT INFORMATION**

Facility Location 218 58th St W, Williston, ND		
County Williams	Source ID Number (From SFN 8516) 1	
Type of Unit (check all that apply)	<input type="checkbox"/> Stationary Natural Gas-Fired Engine <input checked="" type="checkbox"/> Stationary Diesel and Dual Fuel Engine <input type="checkbox"/> Stationary Gasoline Engine <input type="checkbox"/> Stationary Natural Gas-Fired Turbine <input type="checkbox"/> Other – Specify:	<input type="checkbox"/> Emergency Use Only <input type="checkbox"/> Non-Emergency Use <input checked="" type="checkbox"/> Peaking <input type="checkbox"/> Demand Response

**SECTION C – MANUFACTURER DATA**

Make Caterpillar	Model 3516C (Part # 516DLR2)	Date of Manufacture 2018/2019
Reciprocating Internal Combustion Engine		
<input type="checkbox"/> Spark Ignition		<input checked="" type="checkbox"/> Compression Ignition
<input checked="" type="checkbox"/> 4 Stroke	<input type="checkbox"/> 2 Stroke	<input type="checkbox"/> Rich Burn <input type="checkbox"/> Lean Burn
Maximum Rating (BHP @ rpm) 2944 @ 1800	Operating Capacity (BHP @ rpm) 2944 @ 1800	
Engine Subject to: <input checked="" type="checkbox"/> 40 CFR 60, Subpart IIII <input type="checkbox"/> 40 CFR 60, Subpart JJJJ <input checked="" type="checkbox"/> 40 CFR 63, Subpart ZZZZ		
Turbine		Dry Low Emissions? <input type="checkbox"/> Yes <input type="checkbox"/> No
Heat Input (MMBtu/hr)	Maximum Rating (HP)	75% Rating (HP)    Efficiency
Turbine Subject to: <input type="checkbox"/> 40 CFR 60, Subpart GG <input type="checkbox"/> 40 CFR 60, Subpart KKKK		

**SECTION D – FUELS USED**

Natural Gas (10 <sup>6</sup> cu ft/year)	Percent Sulfur	Percent H <sub>2</sub> S
Oil (gal/year) 400	Percent Sulfur 0.5	Grade No. #1
LP Gas (gal/year)	Other – Specify:	

**SECTION E – NORMAL OPERATING SCHEDULE**

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year 100	Peak Production Season (if any)
---------------	---------------	----------------	-----------------------	------------------------------------

**SECTION F – STACK PARAMETERS**

Emission Point 1	Stack Height Above Ground Level (feet) 18 (estimated)		
Stack Diameter (feet at top)	Gas Discharged (SCFM) 16,301.3	Exit Temp (°F) 1205.6	Gas Velocity (FPS) 5806.5 FT3/Min

**SECTION G – EMISSION CONTROL EQUIPMENT**

Is any emission control equipment installed on this unit? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes – Complete and attach form SFN 8532
--

**SECTION H – MAXIMUM AIR CONTAMINANTS EMITTED**

Emission Point	Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
1 & 2	NO <sub>x</sub>	2.54	508	Manufacturer
1 & 2	CO	0.16	32	Manufacturer
1 & 2	PM	0.08	16	Manufacturer
NA	PM <sub>10</sub> (filterable and condensable)	N/A		Manufacturer
NA	PM <sub>2.5</sub> (filterable and condensable)	N/A		Manufacturer
NA	SO <sub>2</sub>	N/A		Manufacturer
NA	VOC	N/A		Manufacturer
1 & 2	GHG (as CO <sub>2</sub> e)	3,178	635,600	Manufacturer
1 & 2	Formaldehyde	0.02 PPM	4	Manufacturer
	Total HAPS**	N/A		

\* If performance test results are available for the unit, submit a copy of test with this application

\*\* Total HAPS includes formaldehyde

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

YES     NO

If "NO" a Compliance Schedule must be completed and attached.

Signature of Applicant

*Dale L. Hanson*

Date

*5/14/19*

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health  
Division of Air Quality  
918 E Divide Ave., 2nd Floor  
Bismarck, ND 58501-1947  
(701) 328-5188



**SECTION D – GAS CONDITIONS**

Gas Conditions		Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)			
Gas Temperature (°F)			
Gas Pressure (in. H <sub>2</sub> O)			
Gas Velocity (ft/sec)			
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
Pressure Drop Through Gas Cleaning Device (in. H <sub>2</sub> O)			

Signature of Applicant <i>Dan L. Hansen</i>	Date <i>5/14/17</i>
--	------------------------

## **INSTRUCTIONS FOR PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT**

1. Complete this form for each piece of equipment or process, which has air pollution control equipment installed, described in the following Permit Applications: Hazardous Air Pollutant (HAP) Sources (SFN 8329), Fuel Burning Equipment for Indirect Heating (SFN 8518); Manufacturing or Processing Equipment (SFN 8520); Incinerators/Crematories (SFN 8522); Internal Combustion Engines and Turbines (SFN 8891); and Glycol Dehydration Units (SFN 58923). Print or type all information. If an item does not apply, place NA in the appropriate space.
2. Type of Equipment - If the type is not one of those listed; provide enough information so the operating principal of the equipment can be determined.
3. List each pollutant which the device is intended to control, the efficiency of removal intended by the designer, and the actual efficiency under operating conditions.
4. Please attach the following:
  - A brief description and sketch of the air pollution control device if it is of unusual design, or used in conjunction with other control devices. Show any bypass of the device and specify the conditions under which the bypass is used.
  - A description of what is done with collected air contaminants from the time they are collected until they reach the final disposal point. Include a description of the transportation methods used.
  - If a stack test has been conducted, attach a copy of the results, date of the test, a description of the techniques used, and the name and address of the organization which performed the test.
5. If the control device is a combustor (e.g.: thermal oxidizer, vapor combustion unit, etc.), include an estimate of potential greenhouse gas emissions (CO<sub>2</sub>e).

**SUBMIT YOUR APPLICATION WITH ALL SUPPORTING DOCUMENTS, ALONG WITH THE FORMS SPECIFIED IN THE FIRST PARAGRAPH ABOVE, TO:**

North Dakota Department of Health  
Division of Air Quality  
918 E Divide Ave., 2nd Floor  
Bismarck, ND 58501-1947  
(701) 328-5188



## Engine Emissions Data

For Emissions / Certification feedback and questions, please submit a ticket via our [ERC Request Portal](#)

This emission data is Caterpillar's best estimate for this rating. If actual emissions are required then an emission test needs to be run on your engine.

Serial Number (Machine)	
Serial Number (Engine)	<b>LY600126</b>
Sales Model	3516C
Regulatory Build Date	05-FEB-2019
<b>As Shipped Data</b>	
Engine Arrangement Number	5157722
Certification Arrangement	
Test Spec Number	4581574
Regulatory Status	EPA Nonroad and EPA/ARB Stationary @ Constant Spd
Labeled Model Year	2019
EPA Family Code	KCPXL78.1NSF
EPA Emissions Level	<b>EPA TIER 4f</b>
Current Flash file	5153556
Flash File Progression	5153556
CORR FL Power at RPM	3,064 HP (2,285.0 KW )1800 RPM
Advertised Power	2,937 HP 1,800RPM
Total Displacement	78.1

**Disclaimer:** The information provided has been compiled from third party sources and is accurate to the best of Caterpillar's knowledge. However, Caterpillar cannot guarantee the accuracy, completeness, or validity of the information and is not liable for any errors or omissions contained therein. All information provided should be independently verified and confirmed, including by examining the emissions label located on the engine.

[Need emission replacement label? Click here!](#)

Caterpillar Confidential: **Green**

Content Owner: Commercial Processes Division

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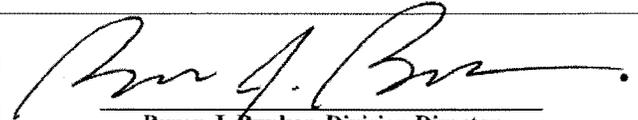
**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2019 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT**

**OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN**

**Caterpillar Inc.**  
(U.S. Manufacturer or Importer)  
KCPXL78.1NSF-015

Effective Date:  
07/24/2018

Expiration Date:  
12/31/2019

  
 Byron J. Bunker, Division Director  
 Compliance Division

Original Engine Manufacturer  
KCPXL78.1NSF

**Mobile/Stationary Indicator:** Both  
**Emissions Power Category:** kW>900  
**Fuel Type:** Diesel  
**After Treatment Devices:** Diesel Oxidation Catalyst, Ammonia Slip Catalyst Reduction  
**Non-after Treatment Devices:** Electronic Control, Engine Design Modification  
**FELs:** PM 0.09 g/kW-hr

and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Parts 60 and 1039, and subject to the terms and conditions prescribed in this certificate, this certificate 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 model year, and documentation required by 40 CFR Parts 60 and 1039 and produced in the stated model year.

This certificate covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in 40 CFR Parts 60 and 1039 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Parts 60 and 1039. It is a condition 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 this certificate may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Parts 60 and 1039. It is also a term of this certificate that this certificate is void *ab initio* for other reasons specified in 40 CFR Parts 60 and 1039.

This certificate covers 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.

This certificate is conditional upon compliance of said manufacturer with the averaging, banking and trading provisions of 40 CFR Part 1039, Subpart H. Failure to comply with these provisions will render this certificate void *ab initio*.

Performance Number: DM9368

Change Level: 02

SALES MODEL: 3516C  
 BRAND: CAT  
 ENGINE POWER (BHP): 2,944  
 GEN POWER WITH FAN (EKW): 2,000.0  
 COMPRESSION RATIO: 14  
 RATING LEVEL: STANDBY  
 PUMP QUANTITY: 1  
 FUEL TYPE: DIESEL  
 MANIFOLD TYPE: DRY  
 GOVERNOR TYPE: ADEM4  
 ELECTRONICS TYPE: ADEM4  
 CAMSHAFT TYPE: STANDARD  
 IGNITION TYPE: CI  
 INJECTOR TYPE: EUI  
 REF EXH STACK DIAMETER (IN): 12

COMBUSTION: DIRECT INJECTION  
 ENGINE SPEED (RPM): 1,800  
 HERTZ: 60  
 FAN POWER (HP): 130.1  
 ASPIRATION: TA  
 AFTERCOOLER TYPE: ATAAC  
 AFTERCOOLER CIRCUIT TYPE: JW+OC, ATAAC  
 INLET MANIFOLD AIR TEMP (F): 113  
 JACKET WATER TEMP (F): 210.2  
 TURBO CONFIGURATION: PARALLEL  
 TURBO QUANTITY: 4  
 TURBOCHARGER MODEL: GTB6041BN-48T-1.04  
 CERTIFICATION YEAR: 2011  
 FUEL RATE (RATED RPM) NO LOAD (GAL/HR): 16.4  
 PISTON SPD @ RATED ENG SPD (FT/MIN): 2,539.4

INDUSTRY	SUBINDUSTRY	APPLICATION
OIL AND GAS	LAND PRODUCTION	PACKAGED GENSET
ELECTRIC POWER	STANDARD	PACKAGED GENSET

General Performance Data

THE INLET MANIFOLD AIR TEMP LISTED IN THE HEADER, AND IN THE GENERAL PERFORMANCE DATA, IS THE AVERAGE INLET MANIFOLD TEMP FRONT TO REAR ON THE ENGINE.

GENSET POWER WITH 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
2,000.0	100	2,941	272	0.332	139.4	58.4	111.5	1,204.7	49.7	916.8
1,800.0	90	2,660	246	0.333	126.4	51.5	108.3	1,175.1	44.3	910.4
1,600.0	80	2,382	220	0.335	114.0	45.0	105.5	1,144.6	39.3	898.3
1,500.0	75	2,243	207	0.337	108.1	42.0	104.3	1,129.6	37.0	891.6
1,400.0	70	2,104	194	0.341	102.4	39.4	103.4	1,114.9	34.9	884.8
1,200.0	60	1,828	169	0.350	91.3	34.3	102.1	1,086.2	31.1	869.9
1,000.0	50	1,552	143	0.354	78.5	27.6	99.2	1,039.8	26.3	841.7
800.0	40	1,282	118	0.361	66.1	21.5	98.6	981.3	21.9	807.4
600.0	30	1,010	93	0.375	54.1	16.1	97.7	904.6	18.2	760.3
500.0	25	872	81	0.384	47.8	13.4	96.3	850.1	16.2	717.9
400.0	20	731	67	0.392	40.9	10.3	94.7	778.0	13.9	657.1
200.0	10	438	40	0.445	27.8	5.6	92.5	616.7	10.5	529.7

GENSET POWER WITH 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
2,000.0	100	2,941	63	370.0	6,117.8	16,296.7	26,679.4	27,655.5	5,821.1	5,313.4
1,800.0	90	2,660	56	346.3	5,649.7	14,919.1	24,540.7	25,426.4	5,353.9	4,890.6
1,600.0	80	2,382	49	322.3	5,233.5	13,623.3	22,636.4	23,434.5	4,932.6	4,514.1
1,500.0	75	2,243	46	310.4	5,044.5	13,036.8	21,779.2	22,536.4	4,743.5	4,345.6
1,400.0	70	2,104	43	299.9	4,872.6	12,509.4	21,010.6	21,728.4	4,574.6	4,195.7
1,200.0	60	1,828	38	278.9	4,529.8	11,461.7	19,497.9	20,136.8	4,238.6	3,897.3
1,000.0	50	1,552	31	249.0	4,081.8	10,058.8	17,503.2	18,052.8	3,800.4	3,505.0
800.0	40	1,282	24	220.0	3,648.3	8,709.5	15,591.9	16,054.7	3,379.6	3,128.5
600.0	30	1,010	18	191.9	3,264.0	7,477.9	13,930.3	14,309.0	3,013.6	2,804.2
500.0	25	872	16	176.6	3,074.2	6,792.8	13,112.0	13,446.6	2,836.3	2,648.4
400.0	20	731	12	158.5	2,849.6	5,937.6	12,132.8	12,419.2	2,614.1	2,450.9
200.0	10	438	7	131.6	2,527.3	4,684.4	10,754.6	10,949.4	2,327.8	2,206.2

Heat Rejection Data

HEAT REJECTION TO ATMOSPHERE SHOWN HERE IS ENGINE ONLY. CEM HEAT REJECTION TO ATMOSPHERE SHOWN IN THE SUPPLEMENTARY DATA IS THE ADDITIONAL HEAT REJECTED TO ATMOSPHERE FROM THE CEM. THIS ADDITIONAL HEAT IS INCLUDED IN THE HEAT REJECTION TO EXH AND EXH RECOVERY SHOWN HERE AND WOULD NEED TO BE DEDUCTED FROM THE

# PERFORMANCE DATA[DM9368]

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EXH AND EXH RECOVERY VALUES WHEN SIZING EXHAUST RECOVERY HEAT EQUIPMENT.

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST RECOVERY TO 350F	FROM OIL COOLER	FROM 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
2,000.0	100	2,941	40,137	8,595	117,592	66,550	15,934	27,755	124,739	299,165	318,686
1,800.0	90	2,660	37,265	8,230	107,071	60,439	14,452	23,576	112,812	271,341	289,046
1,600.0	80	2,382	34,765	7,921	96,968	54,405	13,027	19,880	100,998	244,583	260,543
1,500.0	75	2,243	33,626	7,807	92,267	51,635	12,352	18,062	95,121	231,910	247,042
1,400.0	70	2,104	32,494	7,660	88,043	49,106	11,709	16,552	89,226	219,828	234,172
1,200.0	60	1,828	30,269	7,310	79,707	44,130	10,432	13,963	77,505	195,863	208,643
1,000.0	50	1,552	27,435	6,926	68,593	37,291	8,972	10,585	65,823	168,453	179,445
800.0	40	1,282	24,601	6,521	58,060	30,727	7,559	7,637	54,383	141,923	151,184
600.0	30	1,010	21,553	6,025	47,781	24,426	6,182	5,286	42,840	116,063	123,636
500.0	25	872	20,101	5,692	42,164	20,481	5,460	4,213	36,971	102,516	109,205
400.0	20	731	18,971	5,327	35,071	15,693	4,675	3,089	30,983	87,777	93,505
200.0	10	438	14,511	4,702	24,157	7,981	3,182	1,703	18,564	59,734	63,631

## Sound Data

SOUND DATA REPRESENTATIVE OF NOISE PRODUCED BY THE "ENGINE AND CEM" AS A UNIT WITHOUT A MUFFLER INSTALLED

### EXHAUST: Sound Power (1/3 Octave Frequencies)

GENSET POWER WITH 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
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,941	97.8	68.7	75.2	74.3	82.8	87.5	87.1	84.5	88.6	88.2
1,800.0	90	2,660	95.8	67.9	74.7	72.8	80.9	85.7	85.4	83.1	86.6	86.1
1,600.0	80	2,382	94.0	67.4	74.6	71.3	79.2	84.1	84.0	82.4	85.0	84.3
1,500.0	75	2,243	93.2	67.2	74.7	70.6	78.4	83.4	83.5	82.1	84.2	83.4
1,400.0	70	2,104	92.3	67.0	74.7	69.8	77.5	82.7	82.8	81.8	83.4	82.5
1,200.0	60	1,828	90.7	66.6	74.9	68.3	75.7	81.2	81.5	81.3	81.8	80.8
1,000.0	50	1,552	89.4	64.9	75.8	67.5	74.6	79.5	79.8	80.5	80.4	79.6
800.0	40	1,282	88.0	65.1	75.5	65.7	72.7	78.2	78.9	80.2	78.9	77.6
600.0	30	1,010	86.6	64.6	75.5	64.9	70.8	76.6	77.4	79.4	77.3	75.9
500.0	25	872	86.2	62.8	76.3	65.9	70.4	75.4	75.9	78.6	76.4	75.6
400.0	20	731	85.9	60.9	77.1	67.0	70.1	74.4	74.5	77.8	75.5	75.5
200.0	10	438	85.8	60.5	77.3	67.2	70.0	74.2	74.2	77.6	75.3	75.5

### EXHAUST: Sound Power (1/3 Octave Frequencies)

GENSET POWER WITH 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
EKW	%	BHP	dB(A)									
2,000.0	100	2,941	90.3	85.2	82.8	79.8	77.1	73.8	69.3	63.6	63.3	55.1
1,800.0	90	2,660	87.9	82.9	80.7	77.9	75.4	72.0	67.7	62.3	62.1	55.2
1,600.0	80	2,382	85.5	80.4	78.5	76.3	74.0	70.6	66.5	61.7	61.7	55.6
1,500.0	75	2,243	84.3	79.1	77.4	75.6	73.3	70.0	66.0	61.5	61.6	56.0
1,400.0	70	2,104	83.1	77.9	76.3	74.9	72.6	69.3	65.5	61.3	61.5	56.3
1,200.0	60	1,828	80.7	75.5	74.1	73.5	71.2	67.9	64.5	60.9	61.3	57.0
1,000.0	50	1,552	79.5	74.8	73.0	73.1	70.8	67.4	63.5	60.8	61.4	55.0
800.0	40	1,282	76.6	71.5	70.3	71.3	69.0	65.7	62.5	60.2	61.1	56.8
600.0	30	1,010	74.2	69.3	68.4	69.9	67.7	64.5	61.7	59.8	60.8	57.3
500.0	25	872	74.5	70.6	69.2	70.2	68.2	65.0	61.6	59.9	60.9	54.2
400.0	20	731	75.0	72.2	70.2	70.8	68.9	65.6	61.5	60.1	61.0	51.2
200.0	10	438	75.1	72.5	70.4	70.9	69.0	65.7	61.5	60.1	61.0	50.5

## Sound Data (Continued)

### MECHANICAL: Sound Power (1/3 Octave Frequencies)

GENSET POWER WITH 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
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,941	97.8	68.7	75.2	74.3	82.8	87.5	87.1	84.5	88.6	88.2
1,800.0	90	2,660	95.8	67.9	74.7	72.8	80.9	85.7	85.4	83.1	86.6	86.1
1,600.0	80	2,382	94.0	67.4	74.6	71.3	79.2	84.1	84.0	82.4	85.0	84.3
1,500.0	75	2,243	93.2	67.2	74.7	70.6	78.4	83.4	83.5	82.1	84.2	83.4
1,400.0	70	2,104	92.3	67.0	74.7	69.8	77.5	82.7	82.8	81.8	83.4	82.5
1,200.0	60	1,828	90.7	66.6	74.9	68.3	75.7	81.2	81.5	81.3	81.8	80.8
1,000.0	50	1,552	89.4	64.9	75.8	67.5	74.6	79.5	79.8	80.5	80.4	79.6
800.0	40	1,282	88.0	65.1	75.5	65.7	72.7	78.2	78.9	80.2	78.9	77.6
600.0	30	1,010	86.6	64.6	75.5	64.9	70.8	76.6	77.4	79.4	77.3	75.9
500.0	25	872	86.2	62.8	76.3	65.9	70.4	75.4	75.9	78.6	76.4	75.6
400.0	20	731	85.9	60.9	77.1	67.0	70.1	74.4	74.5	77.8	75.5	75.5
200.0	10	438	85.8	60.5	77.3	67.2	70.0	74.2	74.2	77.6	75.3	75.5

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2,000.0	100	2,941	123.0	89.3	107.2	96.2	99.4	100.3	102.8	101.0	105.5	106.8
1,800.0	90	2,660	122.2	88.6	106.6	95.4	98.5	99.4	102.5	100.9	105.4	106.5
1,600.0	80	2,382	121.4	88.1	106.0	94.6	97.5	98.5	102.0	100.9	104.7	106.1
1,500.0	75	2,243	121.1	88.0	105.7	94.1	97.0	98.1	101.8	100.8	104.2	106.0
1,400.0	70	2,104	120.8	87.8	105.4	93.5	96.3	97.5	101.4	100.5	103.8	105.9
1,200.0	60	1,828	120.3	87.7	104.7	92.0	94.5	96.2	100.4	99.7	103.4	106.1
1,000.0	50	1,552	119.9	87.8	104.3	91.0	93.7	95.8	99.7	101.4	103.4	106.2
800.0	40	1,282	119.5	87.9	103.9	90.9	93.3	95.6	98.5	101.6	103.9	106.0
600.0	30	1,010	119.3	87.6	103.4	90.9	93.6	95.3	97.8	100.6	105.1	106.1
500.0	25	872	119.1	87.1	103.3	90.5	94.3	95.2	98.2	100.3	105.9	106.6
400.0	20	731	119.0	86.5	103.1	90.2	94.9	95.0	98.8	100.2	106.6	107.1
200.0	10	438	119.0	85.8	102.4	90.0	94.7	95.5	99.2	101.4	106.4	107.7

**MECHANICAL: Sound Power (1/3 Octave Frequencies)**

GENSET POWER WITH 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
EKW	%	BHP	dB(A)									
2,000.0	100	2,941	112.2	113.0	111.8	111.5	110.6	110.0	109.1	108.6	107.3	106.4
1,800.0	90	2,660	112.1	112.5	111.3	111.2	110.3	109.7	108.8	108.3	106.8	106.2
1,600.0	80	2,382	111.8	111.9	110.9	110.7	109.8	109.2	108.2	107.8	106.2	106.4
1,500.0	75	2,243	111.6	111.6	110.7	110.3	109.6	109.0	108.2	107.5	105.9	106.8
1,400.0	70	2,104	111.4	111.3	110.5	109.9	109.4	108.7	107.5	107.2	105.7	108.0
1,200.0	60	1,828	111.1	110.8	110.3	109.5	109.0	108.2	106.9	106.6	105.4	111.2
1,000.0	50	1,552	110.9	110.7	110.0	109.4	108.8	108.1	106.5	106.2	105.2	109.7
800.0	40	1,282	110.9	110.6	109.5	109.1	108.7	107.7	106.0	105.9	107.0	105.7
600.0	30	1,010	110.8	110.2	108.8	108.8	108.4	107.3	105.4	105.6	107.7	101.8
500.0	25	872	110.7	109.9	108.6	108.7	108.3	107.0	105.1	105.7	106.0	100.6
400.0	20	731	110.7	109.7	108.4	108.6	108.2	106.8	104.8	105.7	104.0	99.7
200.0	10	438	110.3	109.8	108.1	108.4	108.1	106.8	105.7	104.9	102.0	98.7

**Emissions Data**

EMISSIONS VALUES ARE TAILPIPE OUT WITH AFTERTREATMENT. VALUES SHOWN AS ZERO MAY BE GREATER THAN ZERO BUT WERE BELOW THE DETECTION LEVEL OF THE EQUIPMENT USED AT TIME OF MEASUREMENT.

CATERPILLAR EMISSIONS CERTIFIED ENGINES TESTED WITHIN EPA SPECIFIED TEST CONDITIONS, AND USING TITLE 40 CFR PART 1065 TEST PROTOCOL, MEET THE NEW SOURCE PERFORMANCE STANDARDS. POTENTIAL SITE VARIATION DATA ACCOUNT FOR PRODUCTION ENGINE AND SYSTEM VARIABILITY IN ADDITION TO MEASUREMENT VARIABILITY FOR TYPICAL FIELD TEST METHODS AS DESCRIBED IN DM1176. THIS DATA ASSUMES SITE CORRECTIONS FOR AMBIENT HUMIDITY TO 75 GRAINS, AND STANDARD CONDITIONS OF 25 C (77 F) AIR TO TURBO TEMPERATURE AND 152.4 M (500 FT) ALTITUDE. GUIDANCE ON HUMIDITY CORRECTION METHODS ARE AVAILABLE IN TITLE 40 CFR SECTION 1065.670. FOR APPLICATIONS WITH GEOGRAPHIC OR AMBIENT CONDITIONS BEYOND THESE PUBLISHED VALUES, CONSULT CATERPILLAR (APPLICATION SUPPORT CENTER) FOR ADDITIONAL VARIABILITY INFORMATION.

**RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM**

GENSET POWER WITH FAN	EKW	2,000.0	1,500.0	1,000.0	500.0	200.0
PERCENT LOAD	%	100	75	50	25	10
ENGINE POWER	BHP	2,941	2,243	1,552	872	438
TOTAL NOX (AS NO2)	G/HR	1,788	1,240	740	438	537
TOTAL CO	G/HR	367	251	165	102	81
TOTAL HC	G/HR	95	108	102	81	99
PART MATTER	G/HR	69.3	68.2	61.4	55.3	24.3
TOTAL NOX (AS NO2)	(CORR 5% O2) MG/NM3	269.4	243.1	200.9	196.9	429.7
TOTAL CO	(CORR 5% O2) MG/NM3	58.0	51.6	46.6	47.3	65.3
TOTAL HC	(CORR 5% O2) MG/NM3	12.9	19.3	25.0	32.6	68.5
PART MATTER	(CORR 5% O2) MG/NM3	9.1	11.8	14.8	22.4	17.8
TOTAL NOX (AS NO2)	(CORR 5% O2) PPM	131	118	98	96	209
TOTAL CO	(CORR 5% O2) PPM	46	41	37	38	52
TOTAL HC	(CORR 5% O2) PPM	24	36	47	61	128
TOTAL NOX (AS NO2)	G/HP-HR	0.61	0.56	0.48	0.50	1.23
TOTAL CO	G/HP-HR	0.13	0.11	0.11	0.12	0.19
TOTAL HC	G/HP-HR	0.03	0.05	0.07	0.09	0.23
PART MATTER	G/HP-HR	0.02	0.03	0.04	0.06	0.06
TOTAL NOX (AS NO2)	LB/HR	3.94	2.73	1.63	0.96	1.18
TOTAL CO	LB/HR	0.81	0.55	0.36	0.22	0.18
TOTAL HC	LB/HR	0.21	0.24	0.22	0.18	0.22
PART MATTER	LB/HR	0.15	0.15	0.14	0.12	0.05

**RATED SPEED NOMINAL DATA: 1800 RPM**

GENSET POWER WITH FAN	EKW	2,000.0	1,500.0	1,000.0	500.0	200.0
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**PERFORMANCE DATA[DM9368]**

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PERCENT LOAD	%	100	75	50	25	10
<b>ENGINE POWER</b>	<b>BHP</b>	<b>2,941</b>	<b>2,243</b>	<b>1,552</b>	<b>872</b>	<b>438</b>
TOTAL NOX (AS NO2)	G/HR	1,117	775	462	274	336
TOTAL CO	G/HR	72	49	32	20	16
TOTAL HC	G/HR	21	24	23	18	22
TOTAL CO2	KG/HR	1,445	1,110	805	489	287
PART MATTER	G/HR	26.7	26.2	23.6	21.3	9.3
TOTAL NOX (AS NO2)	(CORR 5% O2) MG/NM3	168.4	151.9	125.6	123.1	268.6
TOTAL CO	(CORR 5% O2) MG/NM3	11.4	10.1	9.1	9.3	12.8
TOTAL HC	(CORR 5% O2) MG/NM3	2.9	4.3	5.6	7.3	15.2
PART MATTER	(CORR 5% O2) MG/NM3	3.5	4.5	5.7	8.6	6.9
TOTAL NOX (AS NO2)	(CORR 5% O2) PPM	82	74	61	60	131
TOTAL CO	(CORR 5% O2) PPM	9	8	7	7	10
TOTAL HC	(CORR 5% O2) PPM	5	8	10	14	28
FORMALDEHYDE	(CORR 15% O2) PPM	0.02	0.02	0.02	0.04	0.14
ACROLEIN	(CORR 15% O2) PPM	0.00	0.00	0.00	0.00	0.00
ACETALDEHYDE	(CORR 15% O2) PPM	0.00	0.00	0.00	0.00	0.01
METHANOL	(CORR 15% O2) PPM	0.00	0.00	0.00	0.00	0.01
TOTAL NOX (AS NO2)	G/HP-HR	0.38	0.35	0.30	0.32	0.77
TOTAL CO	G/HP-HR	0.02	0.02	0.02	0.02	0.04
TOTAL HC	G/HP-HR	0.01	0.01	0.01	0.02	0.05
PART MATTER	G/HP-HR	0.01	0.01	0.02	0.02	0.02
TOTAL NOX (AS NO2)	LB/HR	2.46	1.71	1.02	0.60	0.74
TOTAL CO	LB/HR	0.16	0.11	0.07	0.04	0.03
TOTAL HC	LB/HR	0.05	0.05	0.05	0.04	0.05
TOTAL CO2	LB/HR	3,185	2,447	1,776	1,077	632
PART MATTER	LB/HR	0.06	0.06	0.05	0.05	0.02
OXYGEN IN EXH	%	9.6	10.3	11.4	13.2	15.5
DRY SMOKE OPACITY	%	0.3	0.4	0.8	1.5	0.9
BOSCH SMOKE NUMBER		0.17	0.20	0.32	0.50	0.33

**Regulatory Information**

EPA TIER 4 FINAL		2015 - ----			
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 1039 SUBPART F AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS BY PARTICIPATING IN THE AVERAGE, BANKING, AND TRADING PROGRAM.					
Locality	Agency	Regulation	Tier/Stage	Max Limits - G/BKW - HR	
U.S. (INCL CALIF)	EPA	NON-ROAD GENSET	TIER 4 FINAL	CO: 3.5 NOx: 0.67 HC: 0.19 PM: 0.03	

EPA TIER 4 INTERIM		2011 - 2014			
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 1039 SUBPART F AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW 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	NON-ROAD GENSET	TIER 4 INTERIM	CO: 3.5 NOx: 0.67 HC: 0.4 PM: 0.10	

EPA NON-EMERGENCY STATIONARY GENSET		2015 - ----			
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-EMERGENCY STATIONARY REGULATIONS BY PARTICIPATING IN THE AVERAGE, BANKING, AND TRADING PROGRAM.					
Locality	Agency	Regulation	Tier/Stage	Max Limits - G/BKW - HR	
U.S. (INCL CALIF)	EPA	STATIONARY	NON-EMERGENCY STATIONARY GENSET	CO: 3.5 NOx: 0.67 HC: 0.19 PM: 0.03	

**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	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944
1,000	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944
2,000	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944
3,000	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944

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4,000	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944
5,000	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944
6,000	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,935	2,885	2,837	2,944
7,000	2,944	2,944	2,944	2,944	2,944	2,944	2,944	2,926	2,874	2,825	2,777	2,730	2,944
8,000	2,944	2,944	2,944	2,944	2,944	2,919	2,866	2,815	2,766	2,718	2,672	2,627	2,944
9,000	2,944	2,944	2,944	2,916	2,861	2,808	2,757	2,708	2,660	2,614	2,570	2,527	2,944
10,000	2,944	2,916	2,859	2,804	2,751	2,700	2,651	2,604	2,558	2,514	2,471	2,430	2,853
11,000	2,861	2,804	2,749	2,696	2,645	2,596	2,549	2,503	2,459	2,417	2,376	2,336	2,762
12,000	2,750	2,695	2,642	2,591	2,542	2,495	2,449	2,406	2,363	2,323	2,283	2,245	2,673
13,000	2,642	2,589	2,539	2,490	2,443	2,397	2,354	2,312	2,271	2,232	2,194	2,157	2,587
14,000	2,539	2,488	2,439	2,392	2,347	2,303	2,262	2,221	2,182	2,144	2,108	2,073	2,504
15,000	2,439	2,390	2,343	2,298	2,255	2,213	2,173	2,134	2,096	2,060	2,025	1,991	2,423

## Cross Reference

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
3704798	LL6338	3709874	GS538	-	SCJ00001	SCJ00114
3704981	GG0624	3994250	GS718	-	DD700001	
3704981	GG0624	5075758	GS538	-	SCJ01000	
4581574	LL6763	5157722	PG238	-	LY600001	

## Supplementary Data

Type	Classification	Performance Number
AFTERTREATMENT	SCR	DM8842

## Performance Parameter Reference

### Parameters Reference:DM9600-11

#### 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%
- Specific DEF consumption +/- 3%
- DEF rate +/- 5%
- Heat rejection +/- 5%
- Heat rejection exhaust only +/- 10%
- Heat rejection CEM only +/- 10%

Heat Rejection values based on using treated water.

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%

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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 AUG2002 for marine engines, and J1995 JAN2014 for other engines, reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity at the stated aftercooler water temp, or inlet manifold temp.

FOR 3600 ENGINES

Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JANJAN2014 reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 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.

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 deg C (84.2 deg F), 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. For Tier 4 ratings additional Parasitic losses would also include Intake, and Exhaust Restrictions.

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.

When viewing the altitude capability chart the ambient temperature is the inlet air temp at the compressor inlet.

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.

Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.

EMISSIONS DEFINITIONS:

Emissions : DM1176

EMISSION CYCLE DEFINITIONS

1. For constant-speed marine engines for ship main propulsion, including diesel-electric drive, test cycle E2 shall be applied, for controllable-pitch propeller sets

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test cycle E2 shall be applied.

2. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied.

3. For constant-speed auxiliary engines test cycle D2 shall be applied.

4. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.

### HEAT REJECTION DEFINITIONS:

Diesel Circuit Type and HHV Balance : DM9500

### HIGH DISPLACEMENT (HD) DEFINITIONS:

3500: EM1500

### 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

### SOUND DEFINITIONS:

Sound Power : DM8702

Sound Pressure : TM7080

Date Released : 11/29/18

**ATTACHMENT 2-4**

PERMITS & SUPPORTING DOCUMENTS FOR TIER 4 GENERATOR ENGINES  
LOCATED AT THE CAL POLY UNIVERSITY (WILLIAM & LINDA FROST CENTER FOR  
RESEARCH AND INNOVATION)

San Luis Obispo County Air Pollution Control District

Authority to Construct  
ENGINEERING EVALUATION

**I. Permit Processing Summary:**

Owner:	Cal Poly 1 Grand Avenue San Luis Obispo, CA 93408	Engineer:	SEW
		Appl No:	6856
		Site ID:	0171
		Date Rcvd:	Jul 22, 2019
Contact:	Ms. Christina Juarez 805-756-6674	Incomplete:	Jul 24, 2019
		Additional Info:	
Facility:	Cal Poly State University Risk Management Office San Luis Obispo, CA 93407	Complete:	Aug 28, 2020
Process Address:	Cal Poly State University, BLDG 181 San Luis Obispo, CA 93407		
Reason for Appl:	Install 500Kw Tier 4 Emergency Generator	(a) Filling Fee Rcvd:	\$220.00
Permit Number:	890-5	(b) Processing Fee:	\$1,062.50
Process ID:	1074-7	(b-a) Total Fee Due:	\$842.50
Facility ID:	24		

**II. Proposal/Process Description:**

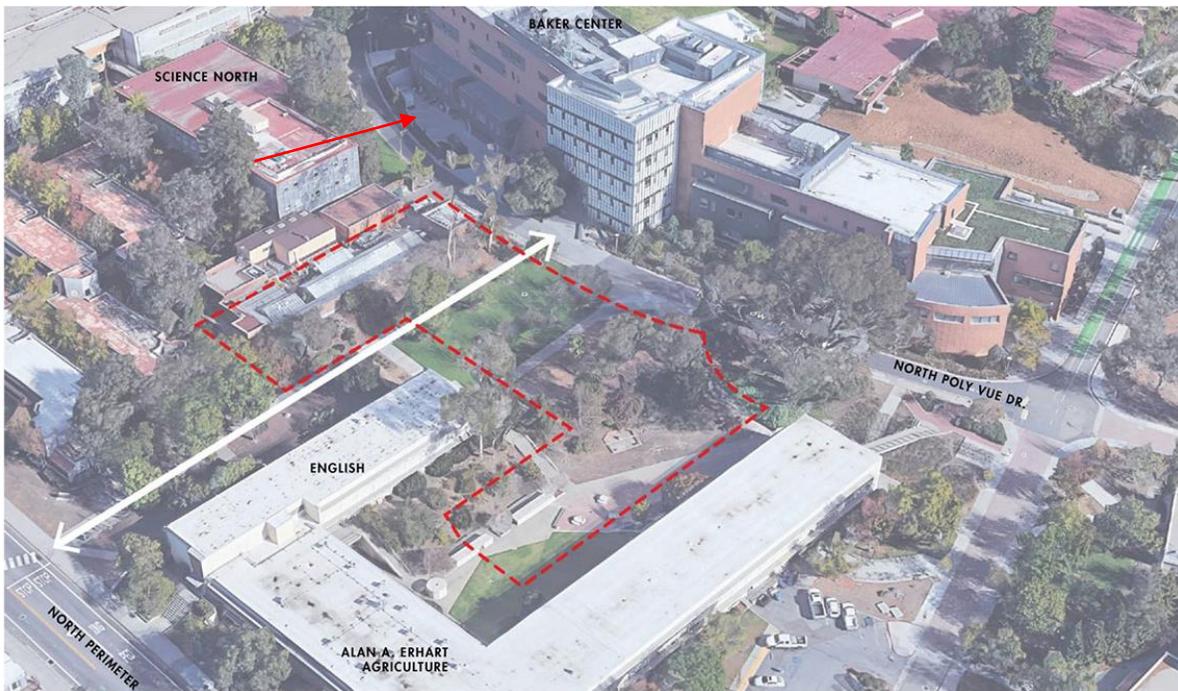
An application was submitted for a backup generator for the new William and Linda Frost Center for Research and Innovation (Frost Center) building at Cal Poly. The generator will be powered by a Tier 4 final diesel engine and will be placed adjacent to the existing engine for the Baker Science (Center for Science) building.

Considering the open Health Risk Assessment (HRA) action for application 6539, the facility was required to add the new engine to the review, as the addition of the new engine would trigger the same requirement. There was miscommunication between the District and Trinity Consultants, and Trinity was set up to do a 2017 emission-inventory based HRA for compliance with the Air Toxics HotSpots program (AB2588). The HRA mandated by application 6539 should have been for District Rule 219, Toxic New Source Review, so the District came to a consensus with Trinity to do two runs of the health risk: one with 2017 emission inventory data to satisfy AB2588 and one for District Rule 219 to include: newer engines that were not installed in 2017, engines that didn't run in 2017 (and therefore weren't quantified in the AB2588 HRA), and the newly proposed equipment under this application. The gaps in data were filled in by hour limits and potential to emit rather than actual run time. For the 219 HRA, Trinity Consultants used 50 hours/year for the Frost Center engine, as that is what the applicant proposed, however the District would not allow more than 30 hours and therefore this estimate is deemed more conservative.

The AB2588 HRA was submitted on May 1, 2020 following complications with the estimates used for the meat consumption by the receptors. The results demonstrated a cancer risk less than 10-in-a-million and a Health Hazard Index (HHI) less than 1.0. The 219 HRA was submitted on August 28, 2020 and demonstrated a cancer risk less than 10-in-a-million and an HHI less than 1.0. Results are tabulated below. The 219 HRA excluded non-permitted sources, therefore resulting in a lower risk.

**Table 1.** Health Risk Assessment Results for AB2588 and Rule 219 review at maximum exposed individual resident (MEIR).

Parameter for MEIR	AB2588 Result (2017 data)	Rule 219 Result (2017 data and PTE)	Limit and Compliance
Cancer risk (in-a-million)	7.13	5.88	10-in-a-million, in compliance
Chronic risk (HHI)	0.0782	0.0467	1.0 HHI, in compliance
Acute risk (HHI)	0.794	0.470	1.0 HHI, in compliance



**Figure 1.** Facility map with planned Frost Center building location and engine location in red.

In light of the fact that the facility will be expanding per their Master Plan, the facility was informed that future changes will likely trigger this requirement again and they should consider health risk implications on new installations of backup power generation equipment.

**III. Applicable Rules:**

17CCR93115, Stationary Diesel IC Engine ATCM: Exhaust particulate controls are required for new and existing standby and prime use stationary diesel engines. New standby generators operating <50 hr/yr are limited to the more stringent of 0.15 g/bhph or the current non-road engine standard. Existing generator engines do not have an exhaust particulate matter limit if maintenance operation

is <20 hr/yr; limited to <0.4 g/bhph for 21-30hr/yr; <0.15 g/bhph for 31-50 hr/yr, and <0.01 g/bhph for 51-100 hr/yr. Section 93115.9 requires that new engines less than or equal to 50 brake horsepower meet the current off-road compression ignition engine standards for an off-road engine of the same maximum rated power. **The engine meets the new engine requirements of 0.15 g PM/hp-hr, 4.8 g NMHC+NOx/hp-hr and 2.6 g CO/hp-hr. The non-emergency operation will be limited to less than or equal to 30 hours per year of maintenance operation. The owner has also agreed to use only CARB certified fuel. Compliance is indicated.**

Rule 201, Equipment Not Requiring a Permit: Specific equipment exemptions are identified along with a general exemption for emissions of less than two pounds per day (<2 lb/day) on a monthly operating day average. **The proposed equipment includes a diesel engine greater than 50 hp that emits toxic air contaminants. A permit is required per sections B.1 and A.1.b of the Rule, respectively.**

Rule 204, Requirements (New Source Review): RACT is required for <25 lb/day, BACT for >=25 lb/day, and offsets for >=25 tpy. Section 204.C.2 exempts projects from control technology & offsets if NEI is <200 lb/yr. Section D requires that the project's emissions not result in an exceedance of an ambient air quality standard. Section E requires certification of statewide compliance for facilities with PTE >=25 tpy. **The potential to emit for all affected pollutants is less than 25 lb/day so RACT is required and will be satisfied by compliance with the hour limit and opacity requirements. Emissions should not exceed 25 tons per year, so offsets are not required. Compliance is indicated.**

Rule 214, Notification: Newspaper public notice is required for an authority to construct which will increase PTE 100 lb/day for NOx, ROG, or SOx; 80 lb/day for PM10; and 550 lb/day for CO. **Not required because the potential to emit will not increase above notification thresholds.**

Rule 219, Toxics New Source Review: Applies to permitted sources that increase toxic emissions that result in >=1.0E-6 risk or >=0.10 HHI. Modified sources must increase toxic emissions above permitted or normal operating values to be subject. New and modified sources of toxic air contaminants must show that their emissions will cause a facility-wide cancer risk of <1.0E-6 and a non-cancer hazard index of <0.1, unless they employ toxics best available control technology (TBACT). A facility-wide cancer risk equal to or greater than ten-in-a-million and/or a non-cancer hazard index equal to or greater than 1.0 are not allowed, unless the Air Toxics "Hot Spots" audit and reduction plan program is required along with Public Notification. **The facility was in the process of conducting a Rule 219 Health Risk Assessment triggered by application 6539 for the Health Center generator, so the District requested that this new engine be placed on the assessment as well, in an incomplete letter issued on July 24, 2019. The HRA was submitted on August 28, 2020 and as shown above in Table 1, demonstrates a cancer risk between 1 and 10-in-a-million, an acute risk between 0.1 and 1.0 HHI, and a chronic risk less than 0.1 HHI. The engine triggers Toxics Best Available Control Technology requirements, which are satisfied by the use of a Tier 4 final engine. Cal Poly has historically agreed to only install Tier 4 final/TBACT if installing diesel engines.**

**Table 2.** Diesel equipment and emissions analyzed in Rule 219 Health Risk Assessment.

Device ID	Device Description	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)
10002	465 HP Cummins, #230	2.011	0.231
10003	164 HP John Deere, #601	0.634	0.083
10004	120 HP Allis Chalmers, #603	0.216	0.033
10005	192 HP Caterpillar, #605	1.438	0.120
10006	749 HP Caterpillar, #613	4.619	0.385
10007	742 HP Caterpillar, #618	0.662	0.078
10008	207 HP Cummins, #619	1.701	0.106
10009	80 HP Generac #622	0.061	0.012
10010	95 HP Caterpillar/Perkins, #631	0.409	0.023
10011	80 HP John Deere, #663	0.128	0.010
10012	230 HP Caterpillar 3202, #302	0.303	0.303
10014	375 HP Caterpillar 3306B, #712	1.273	0.053
10103	755 HP Cummins, #1091	0.287	0.017
10104	116 BHP Ag Irrigation Pump Engine (P-104)	3.048	0.057
10105	116 BHP Ag Irrigation Pump Engine (P-105)	0.308	0.057
10107	62 BHP Low Use Demonstration Pump Engine	0.484	0.117
10108	132 HP Perkins	0.022	0.001
10109	778 HP Caterpillar	0.044	0.001
6856	779 HP Tier 4 Diesel Engine	1.717	0.034

Rule 302, Schedule of Fees: Establishes the fee amounts for application filing, permit issuance, permit renewal, and various other actions. Filing fees are credited toward subsequent permit action fees. **A \$220.00 filing fee was submitted with the application. An evaluation fee will be charged based on the actual time spent to review the application and issue the Authority to Construct. One additional Category 28d equipment fee will be charged upon permit issuance, bringing the total count to thirteen (13) category 28d fees.**

Rule 308, Fees for Air Toxics "Hot Spots" (ATHS) Program: Establishes the fees to be paid for the ATHS program as set by the California Air Resources Board. Fee categories are based off of the prioritization and/or health risk assessment result from actual emissions reported in an approved inventory year. Facilities are categorized as "simple, medium or complex" based on the number processes at the facility as determined by the number of six-digit SCC codes. **This facility was previously prioritized using the 2017 emissions inventory data and resulted in a cancer score above 10 and a non-cancer score above 1. A Health Risk Assessment was required and was submitted on May 1, 2020. The HRA resulted in a cancer risk of 7.13 in-a-million and a non-cancer Health Hazard Index of 0.794. With a total of six (6) six-digit SCC codes as described below, the fee category F for a complex Tracking Facility applies and will be billed a \$134 fee this month with the other HotSpots facilities.**

1. SCC 103006: External Combustion Boilers, Natural Gas
2. SCC 202001: Internal Combustion Engines, Diesel
3. SCC 401003: Chemical Evaporation from Organic Solvent Evaporation, Cold Solvent Cleaning/Stripping
4. SCC 402001: Chemical Evaporation from Surface Coating Operations, Surface Coating Application
5. SCC 405004: Chemical Evaporation from Printing/Publishing, Lithographic

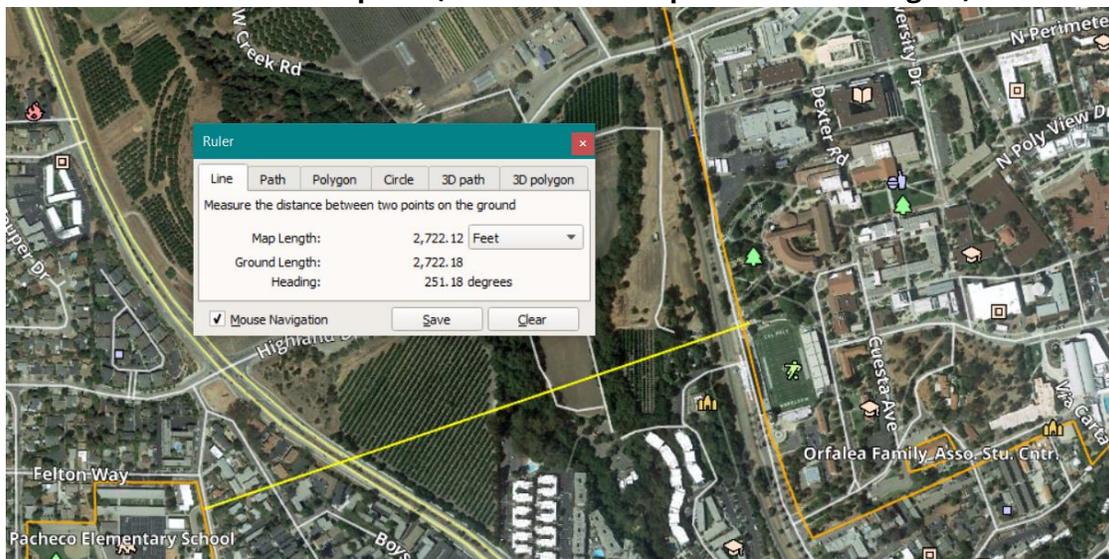
## 6. SCC 406888: Chemical Evaporation from Transportation and Marketing of Petroleum Products, Fugitive Emissions

Rule 401, Visible Emissions: This rule limits visible emissions to 20% opacity. **A more stringent opacity of five percent (5%), or Ringelmann ¼ is applied as RACT for a Tier 4 Final engine.**

Rule 402, Nuisance: No source of air pollution is allowed to create a public nuisance. **The applicant has demonstrated that they can operate equipment of this type without causing nuisance complaints. Continued compliance with this rule is expected.**

Rule 431, Stationary Internal Combustion Engines: Rich burn, spark ignited engines are limited to 50 ppm NOx (D.1) or 90% control (D.2); lean burn, spark ignited engines are limited to 125 ppm NOx (D.1) or 80% control (D.2); and diesel engines are limited to 600 ppm NOx or 30% control (D.3). CO emissions are limited to 4500 ppmv. **Compliance with the Stationary ATCM ensures compliance with the emission limits of this Rule. Per section C.2, since the engine will be operated less than 200 hours per year, no source testing is required.**

H&SC 42301.6, Schools Notification: Projects that increase the emission of a toxic air contaminant within 1,000 feet of a school must distribute a notification to the students at the school and the surrounding residences. **The new engine is not within 1,000 feet of a school so a notification is not required. The nearest school is Pacheco Elementary School, which is approximately 2,722 feet from the nearest emission point (measured from Spanos Stadium engine).**



**Figure 2. Google Earth measurement between nearest emission point (Spanos Stadium) and Pacheco Elementary School.**

H&SC 44300, Air Toxics "Hot Spots": A prioritization score should be evaluated for all new or modified sources, except in the case of non-diesel modified sources where there is no increase in emissions. All stationary diesel engines should be prioritized or screened for facility-wide cancer risk, including modified or replacement engines with a decrease or no increase in emissions.

Facilities with a prioritization score less than or equal to 1.0 are exempt from further reporting requirements. Facilities with a score > 1.0 must perform a screening or refined HRA. **The facility conducted a Toxics emission inventory plan, report and Health Risk Assessment using 2017 emission inventory data as required by application 6539. The facility wide emissions resulted in a cancer score between 1 and 10 and a non-cancer score between 0.1 and 1. The submittal of the Health Risk Assessment changes the facility from a "Prioritization Greater than 10.0" facility to a "tracking facility." With at least six (6) SCC codes, it is deemed a complex facility.**

**IV. Equipment Description:**

Installation of a backup generator for the new William and Linda Frost Center for Research and Innovation (Frost Center) building consisting of:

One (1) Caterpillar 500 kW backup generator, fueled by a 779 hp 2019 Caterpillar diesel engine, Model C18, S/N TBD, EPA Tier 4 final certified, EPA Family #KCPXL18.1HTH.

**V. Emissions:**

Engine is 779 hp, emissions are as certified by the California Air Resources Board for EPA engine family #KCPXL18.1HTH, Executive Order U-R-001-0609.

**Table 2.** Emissions of the Frost Center engine.

	<b>CO</b>	<b>NMHC</b>	<b>NOx</b>	<b>PM</b>
<b>g/kW-hr</b>	0.01	0.02	0.10	0.01
<b>lb/hr</b>	0.01	0.03	0.13	0.01
<b>lb/day</b>	0.31	0.61	3.07	0.31
<b>lb/yr</b>	0.38	0.77	3.84	0.38

$0.01 \text{ g CO/kW-hr} \times 1 \text{ lb}/453.59 \text{ g} \times 1 \text{ kW}/1.341 \text{ hp} \times 779 \text{ hp} \times 30 \text{ hrs/yr} = 0.38 \text{ lb CO/yr}$

$0.02 \text{ g NMHC/kW-hr} \times 1 \text{ lb}/453.59 \text{ g} \times 1 \text{ kW}/1.341 \text{ hp} \times 779 \text{ hp} \times 30 \text{ hrs/yr} = 0.77 \text{ lb NMHC/yr}$

$0.10 \text{ g NOx/kW-hr} \times 1 \text{ lb}/453.59 \text{ g} \times 1 \text{ kW}/1.341 \text{ hp} \times 779 \text{ hp} \times 30 \text{ hrs/yr} = 3.84 \text{ lb NOx/yr}$

$0.01 \text{ g PM/kW-hr} \times 1 \text{ lb}/453.59 \text{ g} \times 1 \text{ kW}/1.341 \text{ hp} \times 779 \text{ hp} \times 30 \text{ hrs/yr} = 0.38 \text{ lb PM/yr}$

**VI. Basis for Conditions:** Standard Authority to Construct conditions for a stationary diesel emergency engine.

**VII. Conclusions/Recommendations:** I recommend that an Authority to Construct for the equipment listed in Section IV be issued subject to the conditions listed below.

1. The Air Pollution Control Officer (APCO) shall be notified of the completion of construction within three (3) days. This Authority to Construct will then serve as a temporary Permit to Operate for a period of time not to exceed ninety (90) days.
2. Non-Emergency Operation

- a. Non-emergency operation of the William and Linda Frost Center for Research and Innovation (Frost Center) engine shall be limited to maintenance and performance testing only and shall not exceed thirty (30) hours per calendar year. Operation for emissions testing required by the District shall not be limited by this condition.
  - b. The APCO shall be notified in writing within seven (7) days of exceeding the yearly non-emergency operation limit.
  - c. An emergency is defined as failure of normal electrical power service that is beyond the control of the permit holder and does not include voluntarily disconnecting from utility grid power.
3. Only diesel fuel that meets the California Air Resources Board's specifications for on-road use shall be used to fuel the engine(s) unless otherwise approved by the APCO. Records of the fuel purchases shall be maintained to demonstrate compliance with this condition.
4. Visible emissions from the engine shall not exceed Ringelmann No.  $\frac{1}{4}$  or five percent (5%) opacity for periods aggregating more than three (3) minutes in any hour.
5. A non-resettable hour meter for each engine shall be installed and maintained unless an APCO approved alternative tracking procedure is approved.
6. An operating log for the current calendar year shall be maintained for each engine on a monthly basis. Entries shall also be made for any day that the engine is operated and for any day that the engine receives fuel. The logs shall be retained for at least three (3) years and shall include the following data:
  - a. Operating mode: emergency, maintenance, or District required testing
  - b. Engine hour meter reading at start-up,
  - c. Engine hour reading at shutdown,
  - d. Operating hours for the calendar day,
  - e. Running total calendar year to date operating hours,
  - f. Running total calendar year to date operating hours in maintenance mode,
  - g. Running total calendar year to date operating hours in emergency mode,
  - h. Estimated fuel use for the day in gallons,
  - i. Running total calendar year to date fuel use in gallons,
  - j. Fuel purchased in gallons, and
  - k. Total costs of any engine repair or reconstruction, excluding consumable items associated with standard maintenance activities.
7. Within fourteen (14) days of a request, the following information shall be submitted to the APCO for the previous calendar year for each engine:
  - a. Maintenance operating hours,
  - b. Emergency operating hours,

- c. District required testing operating hours,
  - d. Total engine operating hours,
  - e. Total fuel usage,
  - f. Copies of all fuel purchase records, and
  - g. Total cost of engine repairs to date for each engine.
8. The APCO shall be notified prior to the repair or reconstruction of any diesel engine under permit. Consumable items used for regular maintenance, such as filters, hoses, belts, fluids, and glow plugs, are not considered repairs. In addition, replacement parts costing less than \$1,000.00 can be omitted from this requirement. This condition is a result of a state regulation on rebuilds or repairs. Extensive repairs could trigger lower allowable emission rates. If lower emission rates apply, they may not be achievable with a simple rebuild.
9. Temporary Engine Replacement: Any engine subject to this permit may be temporarily replaced with another engine if all the requirements listed in sections a. through e. below are satisfied:
- a. The APCO shall be notified in writing or by fax at (805) 781-1002 within seventy-two (72) hours of a permitted engine being replaced. The notification shall include the replacement engines make, model, rated horsepower, engine family number if available, the current engine hour meter reading, manufacturer's particulate matter and oxides of nitrogen (NO<sub>x</sub>) emission rates in grams per horsepower-hour (g/hp-hr) and the reason for the replacement.
  - b. The permitted engine is in need of routine repair or maintenance and is returned to its original service within 180 days of installation of the temporary engine.
  - c. The temporary replacement engine has the same or lower emission rate in g/hp-hr for particulate matter and NO<sub>x</sub> as the permitted engine that is being temporarily replaced or if written approval from the APCO is obtained for an engine that meets current permitting requirements. For breakdown conditions reported under the procedures of Rule 107, Breakdowns or Upset Conditions and Emergency Variances, the APCO may approve the use of any replacement engine that meets the requirements of the State Airborne Toxic Control Measure and would not create a public nuisance.
  - d. The temporary replacement engine shall comply with all conditions of this permit, including but not limited to, engine operating hour limits, recordkeeping and reporting requirements.
  - e. The APCO shall be notified in writing or by fax at (805) 781-1002 within fourteen (14) days of removal of the temporary engine.
10. The engine exhaust shall discharge vertically free of obstructions.

11. This equipment shall be operated and maintained in accordance with the manufacturer's recommendations and the information presented in the application under which this permit was issued.
12. If the APCO determines that the operation of this equipment is causing a public nuisance, the owner/operator shall take immediate action and eliminate the nuisance.
13. All information needed to estimate air pollution emissions shall be provided to the District upon request. This information may consist of, but is not limited to: throughput data, process variables, device characteristics, and pollutant release characteristics.
14. The APCO shall be notified and authorization obtained prior to making any changes in operating procedures, equipment, or materials used which have the potential to increase the emission of any air contaminant or which would change the equipment description or the applicability of a permit condition.
15. This Authority to Construct is not transferable to a new owner or location without the APCO's approval. A change of ownership application shall be submitted to the APCO at least ten (10) working days prior to any change in the person, partnership, company, corporation, or agency that is responsible for the operation of the equipment described above. An authority to construct application must be submitted and approved by the APCO prior to moving the permitted equipment to a new location.

BY: *Sarah Wade* DATE: 09/18/2020  
Air Pollution Control Engineer

APPROVED: *Dora K. Drexler* DATE: 09/18/2020  
Division Manager

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## **ATTACHMENT 3**

### **FUEL CELLS**

**Table A-3: Fuel Cell Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Unit_Type:</b>	<b>Industry Use of Installation:</b>
Doosan Fuel Cell America, Inc.	M400	460	2012	CA	91309	Certified Natural Gas Fuel Cell (DG)	PAFC	Professional, Scientific, and Technical Services
Doosan Fuel Cell America, Inc.	M400	460	2010	CA	92111	Certified Natural Gas Fuel Cell (DG)	PAFC	Retail Trade
Doosan Fuel Cell America, Inc.	M400	460	2012	CA	92357	Certified Natural Gas Fuel Cell (DG)	PAFC	Health Care and Social Assistance
Doosan Fuel Cell America, Inc.	M400	460	2011	CA	94588	Certified Natural Gas Fuel Cell (DG)	PAFC	Manufacturing
Doosan Fuel Cell America, Inc.	M400	460	2010	CA	92688	Certified Natural Gas Fuel Cell (DG)	PAFC	Telecommunications
Doosan Fuel Cell America, Inc.	M400	460	2010	CA	92105	Certified Natural Gas Fuel Cell (DG)	PAFC	Telecommunications
Doosan Fuel Cell America, Inc.	M400	460	2011	CA	95118	Certified Natural Gas Fuel Cell (DG)	PAFC	Retail Trade
Doosan Fuel Cell America, Inc.	M400	460	2010	CA	94574	Certified Natural Gas Fuel Cell (DG)	PAFC	Health Care and Social Assistance
Doosan Fuel Cell America, Inc.	M400	460	2012	CA	92081	Certified Natural Gas Fuel Cell (DG)	PAFC	Utilities
Doosan Fuel Cell America, Inc.	M400	460	2013	CA	91604	Certified Natural Gas Fuel Cell (DG)	PAFC	Arts, Entertainment, and Recreation
Doosan Fuel Cell America, Inc.	M400	460	2013	CA	90036	Certified Natural Gas Fuel Cell (DG)	PAFC	Arts, Entertainment, and Recreation
Doosan Fuel Cell America, Inc.	M400	460	2013	CA	91765	Certified Natural Gas Fuel Cell (DG)	PAFC	Other Services (except Public Administration)
Doosan Fuel Cell America, Inc.	M400	460	2013	CA	95134	Certified Natural Gas Fuel Cell (DG)	PAFC	Data Center
Doosan Fuel Cell America, Inc.	M400	460	2013	CA	95605	Certified Natural Gas Fuel Cell (DG)	PAFC	Telecommunications
Doosan Fuel Cell America, Inc.	M400	460	2013	CA	92860	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2015	CA	92096	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2017	CA	92101	Certified Natural Gas Fuel Cell (DG)	PAFC	Accommodation and Food Services

**Table A-3: Fuel Cell Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Unit_Type:</b>	<b>Industry Use of Installation:</b>
Doosan Fuel Cell America, Inc.	M400	460	2019	CA	91342	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2019	CA	90802	Certified Natural Gas Fuel Cell (DG)	PAFC	Arts, Entertainment, and Recreation
Doosan Fuel Cell America, Inc.	M400	460	2010	CT	6510	Certified Natural Gas Fuel Cell (DG)	PAFC	Other Services (except Public Administration)
Doosan Fuel Cell America, Inc.	M400	460	2010	CT	6790	Certified Natural Gas Fuel Cell (DG)	PAFC	Retail Trade
Doosan Fuel Cell America, Inc.	M400	460	2011	CT	6457	Certified Natural Gas Fuel Cell (DG)	PAFC	Professional, Scientific, and Technical Services
Doosan Fuel Cell America, Inc.	M400	460	2011	CT	6510	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2011	CT	6118	Certified Natural Gas Fuel Cell (DG)	PAFC	Manufacturing
Doosan Fuel Cell America, Inc.	M400	460	2011	CT	6457	Certified Natural Gas Fuel Cell (DG)	PAFC	Retail Trade
Doosan Fuel Cell America, Inc.	M400	460	2011	CT	6824	Certified Natural Gas Fuel Cell (DG)	PAFC	Retail Trade
Doosan Fuel Cell America, Inc.	M400	460	2011	CT	6517	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2011	CT	6074	Certified Natural Gas Fuel Cell (DG)	PAFC	Manufacturing
Doosan Fuel Cell America, Inc.	M400	460	2012	CT	6106	Certified Natural Gas Fuel Cell (DG)	PAFC	Public Administration
Doosan Fuel Cell America, Inc.	M400	460	2012	CT	6269	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2012	CT	6510	Certified Natural Gas Fuel Cell (DG)	PAFC	Public Administration
Doosan Fuel Cell America, Inc.	M400	460	2012	CT	6226	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2012	CT	6141	Certified Natural Gas Fuel Cell (DG)	PAFC	Public Administration
Doosan Fuel Cell America, Inc.	M400	460	2012	CT	6122	Certified Natural Gas Fuel Cell (DG)	PAFC	Health Care and Social Assistance

**Table A-3: Fuel Cell Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Unit_Type:</b>	<b>Industry Use of Installation:</b>
Doosan Fuel Cell America, Inc.	M400	460	2013	CT	6105	Certified Natural Gas Fuel Cell (DG)	PAFC	Health Care and Social Assistance
Doosan Fuel Cell America, Inc.	M400	460	2013	CT	6810	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2013	CT	6457	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2015	CT	6103	Certified Natural Gas Fuel Cell (DG)	PAFC	Other Services (except Public Administration)
Doosan Fuel Cell America, Inc.	M400	460	2015	CT	6517	Certified Natural Gas Fuel Cell (DG)	PAFC	Public Administration
Doosan Fuel Cell America, Inc.	M400	460	2015	CT	6383	Certified Natural Gas Fuel Cell (DG)	PAFC	Manufacturing
Doosan Fuel Cell America, Inc.	M400	460	2016	CT	6484	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2016	CT	6457	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2016	CT	6051	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2017	CT	6770	Certified Natural Gas Fuel Cell (DG)	PAFC	Public Administration
Doosan Fuel Cell America, Inc.	M400	460	2017	CT	6824	Certified Natural Gas Fuel Cell (DG)	PAFC	Public Administration
Doosan Fuel Cell America, Inc.	M400	460	2017	CT	6708	Certified Natural Gas Fuel Cell (DG)	PAFC	Public Administration
Doosan Fuel Cell America, Inc.	M400	460	2018	CT	6516	Certified Natural Gas Fuel Cell (DG)	PAFC	Public Administration
Doosan Fuel Cell America, Inc.	M400	460	2019	CT	6074	Certified Natural Gas Fuel Cell (DG)	PAFC	Manufacturing
Doosan Fuel Cell America, Inc.	M400	460	2019	CT	6074	Certified Natural Gas Fuel Cell (DG)	PAFC	Manufacturing
Doosan Fuel Cell America, Inc.	M400	460	2019	CT	6010	Certified Natural Gas Fuel Cell (DG)	PAFC	Public Administration
Doosan Fuel Cell America, Inc.	M400	460	2019	CT	6074	Certified Natural Gas Fuel Cell (DG)	PAFC	Utilities

**Table A-3: Fuel Cell Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Unit_Type:</b>	<b>Industry Use of Installation:</b>
Doosan Fuel Cell America, Inc.	M400	460	2013	NE	68102	Certified Natural Gas Fuel Cell (DG)	PAFC	Finance and Insurance
Doosan Fuel Cell America, Inc.	M400	460	2013	NJ	7920	Certified Natural Gas Fuel Cell (DG)	PAFC	Telecommunications
Doosan Fuel Cell America, Inc.	M400	460	2010	NY	10006	Certified Natural Gas Fuel Cell (DG)	PAFC	Wholesale Trade
Doosan Fuel Cell America, Inc.	M400	460	2010	NY	10006	Certified Natural Gas Fuel Cell (DG)	PAFC	Wholesale Trade
Doosan Fuel Cell America, Inc.	M400	460	2010	NY	12205	Certified Natural Gas Fuel Cell (DG)	PAFC	Retail Trade
Doosan Fuel Cell America, Inc.	M400	460	2010	NY	10523	Certified Natural Gas Fuel Cell (DG)	PAFC	Manufacturing
Doosan Fuel Cell America, Inc.	M400	460	2011	NY	10047	Certified Natural Gas Fuel Cell (DG)	PAFC	Other Services (except Public Administration)
Doosan Fuel Cell America, Inc.	M400	460	2011	NY	10036	Certified Natural Gas Fuel Cell (DG)	PAFC	Wholesale Trade
Doosan Fuel Cell America, Inc.	M400	460	2013	NY	14623	Certified Natural Gas Fuel Cell (DG)	PAFC	Educational Services
Doosan Fuel Cell America, Inc.	M400	460	2013	NY	11237	Certified Natural Gas Fuel Cell (DG)	PAFC	Telecommunications
Doosan Fuel Cell America, Inc.	M400	460	2013	NY	11432	Certified Natural Gas Fuel Cell (DG)	PAFC	Telecommunications
Doosan Fuel Cell America, Inc.	M400	460	2013	NY	11233	Certified Natural Gas Fuel Cell (DG)	PAFC	Telecommunications
Doosan Fuel Cell America, Inc.	M400	460	2013	NY	11238	Certified Natural Gas Fuel Cell (DG)	PAFC	Telecommunications
Doosan Fuel Cell America, Inc.	M400	460	2013	NY	11301	Certified Natural Gas Fuel Cell (DG)	PAFC	Telecommunications
Doosan Fuel Cell America, Inc.	M400	460	2015	NY	11530	Certified Natural Gas Fuel Cell (DG)	PAFC	Telecommunications
Doosan Fuel Cell America, Inc.	M400	460	2015	NY	10523	Certified Natural Gas Fuel Cell (DG)	PAFC	Data Center
Doosan Fuel Cell America, Inc.	M400	460	2011	WI	53177	Certified Natural Gas Fuel Cell (DG)	PAFC	Manufacturing

**Table A-3: Fuel Cell Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Unit_Type:</b>	<b>Industry Use of Installation:</b>
Bloom Energy	ES5	300	2020	CA	91125	Certified Natural Gas Fuel Cell (DG)	SOFC	Educational Services
Bloom Energy	ES5	300	2019	CA	91403	Certified Natural Gas Fuel Cell (DG)	SOFC	Telecommunications
Bloom Energy	ES5	300	2019	CA	94089	Certified Natural Gas Fuel Cell (DG)	SOFC	Manufacturing
Bloom Energy	ES5	300	2019	CA	95119	Certified Natural Gas Fuel Cell (DG)	SOFC	Manufacturing
Bloom Energy	ES5	300	2019	MA	2125	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2019	CA	95119	Certified Natural Gas Fuel Cell (DG)	SOFC	Telecommunications
Bloom Energy	ES5	300	2019	CT	6477	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	MA	2322	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	NJ	7069	Certified Natural Gas Fuel Cell (DG)	SOFC	Manufacturing
Bloom Energy	ES5	300	2018	NJ	7069	Certified Natural Gas Fuel Cell (DG)	SOFC	Manufacturing
Bloom Energy	ES5	300	2018	NY	13057	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	NY	12205	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	NY	10591	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES5	300	2018	CT	6118	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	CA	95403	Certified Natural Gas Fuel Cell (DG)	SOFC	Manufacturing
Bloom Energy	ES5	300	2018	NY	13413	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	NY	12144	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	MA	1752	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	MA	2169	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	MA	1906	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	NY	13031	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	NY	12205	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	NY	12065	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	NY	12010	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	NY	12304	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade

**Table A-3: Fuel Cell Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Unit_Type:</b>	<b>Industry Use of Installation:</b>
Bloom Energy	ES5	300	2018	NY	13090	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	NY	13039	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	NY	12866	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	CA	93313	Certified Natural Gas Fuel Cell (DG)	SOFC	Manufacturing
Bloom Energy	ES5	300	2018	CT	6611	Certified Natural Gas Fuel Cell (DG)	SOFC	Data Center
Bloom Energy	ES5	300	2018	CT	6611	Certified Natural Gas Fuel Cell (DG)	SOFC	Data Center
Bloom Energy	ES5	300	2018	MA	1095	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	MA	2132	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	CT	6473	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	MA	1606	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	MA	2538	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	MA	1844	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	MA	2703	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2018	MA	2747	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2017	MA	2771	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2017	MA	2360	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2017	CA	95054	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES5	300	2017	NY	10532	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2017	CA	95014	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES5	300	2017	CA	95014	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES5	300	2017	CA	95014	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES5	300	2017	CA	95014	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES5	300	2017	NY	11420	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade

**Table A-3: Fuel Cell Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Unit_Type:</b>	<b>Industry Use of Installation:</b>
Bloom Energy	ES5	300	2017	NY	11743	Certified Natural Gas Fuel Cell (DG)	SOFC	Telecommunications
Bloom Energy	ES5	300	2016	NY	11214	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2016	CA	95131	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES5	300	2016	CA	94544	Certified Natural Gas Fuel Cell (DG)	SOFC	Telecommunications
Bloom Energy	ES-5700	200	2016	NY	10303	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES-5700	200	2016	NY	10309	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2016	NY	11239	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2016	CA	95691	Certified Natural Gas Fuel Cell (DG)	SOFC	Telecommunications
Bloom Energy	ES5	300	2016	CT	6106	Certified Natural Gas Fuel Cell (DG)	SOFC	Public Administration
Bloom Energy	ES-5700	200	2016	NY	10547	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES5	300	2016	DE	19713	Certified Natural Gas Fuel Cell (DG)	SOFC	Data Center
Bloom Energy	ES5	300	2015	CA	95119	Certified Natural Gas Fuel Cell (DG)	SOFC	Data Center
Bloom Energy	ES-5710	250	2015	CA	94085	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES-5700	200	2015	NY	10566	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES-5710	250	2015	CA	90301	Certified Natural Gas Fuel Cell (DG)	SOFC	Health Care and Social Assistance
Bloom Energy	ES-5710	250	2015	UT	84095	Certified Natural Gas Fuel Cell (DG)	SOFC	Data Center
Bloom Energy	ES-5710	250	2015	CA	92614	Certified Natural Gas Fuel Cell (DG)	SOFC	Data Center
Bloom Energy	ES-5700	200	2015	CT	6037	Certified Natural Gas Fuel Cell (DG)	SOFC	Telecommunications
Bloom Energy	ES-5710	250	2015	CA	92618	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES-5710	250	2015	CA	95630	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES-5710	250	2015	CA	95054	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES-5710	250	2014	NY	10550	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade

**Table A-3: Fuel Cell Installations**

<b>Manufacturer:</b>	<b>Model Name:</b>	<b>Rated Power: (kW)</b>	<b>Install Year:</b>	<b>Installation State:</b>	<b>Installation Zip:</b>	<b>Energy_Tech_Type:</b>	<b>Unit_Type:</b>	<b>Industry Use of Installation:</b>
Bloom Energy	ES-5710	250	2014	CA	94085	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES-5710	250	2014	CA	92408	Certified Natural Gas Fuel Cell (DG)	SOFC	Professional, Scientific, and Technical Services
Bloom Energy	ES-5710	250	2014	NY	10577	Certified Natural Gas Fuel Cell (DG)	SOFC	Finance and Insurance
Bloom Energy	ES-5710	250	2014	CT	6385	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES-5700	200	2014	CT	6513	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES-5700	200	2013	UT	84095	Certified Natural Gas Fuel Cell (DG)	SOFC	Data Center
Bloom Energy	ES-5700	200	2013	CA	92008	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES-5710	250	2013	CA	90064	Certified Natural Gas Fuel Cell (DG)	SOFC	Retail Trade
Bloom Energy	ES-5700	200	2013	CT	6410	Certified Natural Gas Fuel Cell (DG)	SOFC	Transportation and Warehousing
Bloom Energy	ES-5700	200	2011	CA	90222	Certified Natural Gas Fuel Cell (DG)	SOFC	Manufacturing