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State of California
State Energy Resources Conservation and Development Commission

In the matter of:	
Sequoia Data Center	Docket 19-SPPE-03

Intervenor Sarvey's Reply Testimony April 28, 2021

Evaluating Emergency Operations

BAAQMD'S SUPPLEMENTNAL DATA DEMONSTRATES EMERGENCY OPERATIONS AT THE SDC ARE PROBABLE.

As I testified previously in this proceeding data center emergency operations occur much more frequently than reported by SVP and that outages occur from events other than SVP outages.[1] Although staff contested this in its previous testimony staff in its revised initial study admits that, "***emergency situations and use of the standby engines can arise from a wider range of causes than a power outage.***"[2]

Staff's previous emergency operations frequency analysis relied solely on data provided by SVP for outages between December 6, 2012 and August 2, 2019 at Santa Clara Data Centers. Staff hypothesized based on that data that, "*The combined probability of any one given data center, like SDC, to experience an outage would be the product of 60% (chance of outage for any data center within SVP) times the 1-out-of-37 (2.7%) chance of any one data center experiencing the outage. Therefore, out of the 37 or more data centers historically served by SVP, the probability of a given facility (such as SDC) experiencing an outage in a given year has*

[1] Exhibit 303 Pages 7,8
[2] TN 237528 Sequoia Compiled Revised Initial Study and Proposed Mitigated Negative Declaration Page 5.3-44

*historically been 60% * 2.7%, or 1.6% probability of an outage per year*."[3] In Staff's revised initial study issued on February 26, 2021 staff ignored BAAQMD's supplemental report on data center outages in the Bay Area submitted in the San Jose Data Center[4] and Great Oaks South[5] Data Center proceedings. The committee ordered Staff to consider the data provided by BAAQMD in its April 12, 2021 "*notice of prehearing conference, evidentiary hearing and further orders.*"

Staff's revised compiled initial study examines the new data submitted by BAAQMD but arrives at the same conclusion as its previous IS/MND. Staff's revised compiled initial study states, "***the supplemental data provided by BAAQMD does not change staff's conclusion that the likelihood of any given backup generator operating for non-testing/non-maintenance purposes remains extremely low.***[6]

Staff's analysis disagrees with BAAQMD's conclusions stated in its comments on the NOP for the San Jose Data Center, *"Air District staff has reviewed recent data regarding backup generator usage during non-testing/non-maintenance operations at several Bay Area data centers. Between September 1, 2019, and September 30, 2020, nearly half of the identified data centers in Santa Clara, San Jose, and Sunnyvale operated backup diesel generators for reasons other than routine testing and maintenance. Many of the data centers operated diesel generators during multiple non-testing/nonmaintenance events; non-testing/non-maintenance hours of operation approached 50 hours for one generator for one event; it appears 40 or more generators operated concurrently at two facilities; and one facility ran diesel generators for approximately 400 hours for non-testing/non-maintenance purposes during this time period."*[7]

According to BAAQMD's supplemental data Between September 1, 2019 and September 16, 2020 a period of one year seven **Santa Clara Data Centers** experienced emergency operations with one Santa Clara data center operating in emergency mode twice during that period. The outages lasted from 12 minutes up to 11 hours. The outages occurred for various reasons including lightning strikes,

[3] TN 236919 Revised Initial Study and Proposed Mitigated Negative Declaration Page 5.3-32
[4] Exhibit 315 Bay Area Air Quality Management District Comments - Comment Letter for San Jose Data Center NOP
[5] Exhibit 314 Bay Area Air Quality Management District Comments - Comment Letter for Great Oaks South Data Center NOP
[6] TN 237528 Sequoia Compiled Revised Initial Study and Proposed Mitigated Negative Declaration Page 5.3-48
[7] Exhibit 316 TN 236946 BAAQMD comment letter for the San Jose Data Center NOP Page 4of 17

power quality events, UPS repair, and utility power outages. Only the Santa Clara Data Center outages that are not connected to the August heat wave are summarized in Table 1 below.

Table 1 BAAQMD Reported Outages Summary.[8]

Santa Clara Data Center Number	Date	Number of Engines	Duration	Reason for Outage
Number 4	9-16-20	44	0.5 hours	Lightning Strike
Number 7	9-6-20	13	3.5 hours	Power Outage
Number 8	11-27-19	24	12 minutes	Power Outage
Number 8	2-15-20	24	0.3 hours	Power Quality
Number 10	Unspecified	4	4-11 hours	Power Bump
Number 14	11-27-19	4	4 hours	Utility Sag
Number 15	Various	7	2 hours	UPS Repair etc
Number 16	7-30-02	4	2.5 hours	Power Outage

According to CEC Staff's testimony there are 39 operating data centers in Santa Clara[9] and in less than a one-year period seven of the data centers experienced outages not related to the extreme heat events in August and one data center experienced an outage twice. Utilizing CEC staff's previous methodology for determining the frequency of data center outages eight data center emergency operations were conducted at the 39 Santa Clara Data Centers between September 1, 2019 and September 16, 2020. According to BAAQMD's data the probability of a Santa Clara Data Center experiencing an outage in any one year is 8/39 or approximately 20.5% a year without considering any interruptions due to extreme heat or PSPS events. Staff's position that emergency operations will not occur over the lifetime of the SDC is unfounded when considering the data provided by BAAQMD. It is obvious why CEC staff abandoned its previous method of calculating data center outage frequency because it did not support its position that data center outages occur infrequently.

EMERGENCY OPERATIONS ANALYSIS IS NOT SPECULATIVE AND HAS ALREADY BEEN CONDUCTED IN THIS PROCEEDING FOR CO EMISSIONS.

[8] Exhibit 314 Bay Area Air Quality Management District Comments - Comment Letter for Great Oaks South Data Center NOP Pages 7-18
Exhibit 315 Bay Area Air Quality Management District Comments - Comment Letter for San Jose Data Center NOP Pages 7-17

[9] TN 237528 Sequoia Compiled Revised Initial Study and Proposed Mitigated Negative Declaration Page 5.3-43

Energy Commission Staff continues to argue in its revised initial study, "*staff assessed the likelihood of emergency events, but finds that assessing the air quality impacts of emergency operations would require a host of unvalidated, unverifiable, and speculative assumptions about when and under what circumstances such a hypothetical emergency would occur. Such a speculative analysis is not required under CEQA (CEQA Guidelines § 15064(d)(3*))."

The fact is the applicant in this proceeding has already modeled the CO air quality impacts of emergency operation of all 54 generators to determine if potential CO emissions violate any National or California ambient air quality standard. Table 4 from the application is illustrated below. Staff can easily follow the applicant's protocol in assessing air quality impacts from emergency operations at the SDC for the other criteria pollutants and adjusting the inputs as necessary.

Table 4. CO NAAQS and CAAQS Results

Standard	UTM East (m)	UTM North (m)	Total Ambient Conc.[a] (ppm)	Limiting Threshold (ppm)	Above Threshold?
1-Hour	593,709	4,136,304	5.08	20	No
8-Hour	593,680	4,136,160	3.52	9	No

Notes:
(a) The value shown is the maximum assuming all generators are tested at the same time for 1-hour at any analyzed load. This is a conservative estimate because generators will only be tested one at a time, consistent with the NO_2 analysis.

[10]

BAAQMD required the Santa Clara Data Center applicant to model the air quality impacts from emergency operations in the Santa Clara Data Center proceeding in 2011-SPPE-01. BAAQMD stated in the engineering evaluation that ***"Pursuant to Appendix of the state CEQA Guidelines the Districts analysis of air quality impacts of proposed project includes an examination into whether the project would violate any air quality standard."***[11] BAAQMD examined modeling results from the applicants City of Santa Clara's initial study and stated in the engineering evaluation, "*The modeling results that*

[10] Exhibit 3 TN 229419-3 Appendices A-N - part 2 Page 17 of 208

[11] Exhibit 316 Santa Clara Data Center 2011-SPPE-01BAAQMD Authority, Engineering Evaluation Report (Jul. 7, 2010) Xeres Ventures LLC P18801 535 Reed Street Santa Clara Application 17020 Page 11 of 110

were attached to the Initial Study estimated an……overall worst case 1-hour N02 concentration of 1276 ug/m3 which would exceed the state 1- hour N02 standard of 338 jig/m3."

To address the exceedance BAAQMD required the applicant to *perform, "a refined modeling analysis using the AERMOD air dispersion model to more accurately predict maximum 1-hour ambient air concentrations"….. "The scenarios considered in the AERMOD analysis included discretionary operation of one engine-generator at time commissioning activities for 16 sources at one time as well as operation of all 32 engine-generators at this facility under emergency conditions*.[12] BAAQMD the permitting authority clearly does not consider emergency operations modeling speculative or meaningless as the emergency emissions impacts are required to be modeled to comply with CEQA in BAAQMD's opinion.

Modeling emergency emissions from the 54 diesel generators is not speculative as it was done in this proceeding to determine if the applicant violated any CO air quality standards. It was done in the Santa Clara Data Center proceeding as BAAQMD determined it was necessary to comply with CEQA as can be seen in exhibit 316. Emergency operations were also modeled in the recent Laurelwood Data Center case.

Historically the CEC has required the modeling of emergency operations at data centers. Executive Director Melissia Jones stated in her 2008 letter to the Santa Clara Data Center applicant,

> "The generators have the common purpose of serving as power conditioning and backup generators for computer server campus being developed by single project proponent **Their operation is likely to be triggered by the same event for example lightning storms or grid failure Moreover the potential for the generators to operate simultaneously should be analyzed in comprehensive environmental document in accordance with the California Environmental Quality Act Such analysis would identify the projects emissions assess their impacts identify feasible mitigation and assess the potential health risks from this concentration of diesel engines."**[13]

BAAQMD has continually encouraged the CEC Staff to model emergency operations of the data centers it permits. In its comments on the Great Oaks South Data Center notice of preparation BAAQMD stated, "***The EIR should include various scenarios of backup power generation operations beyond routine testing and maintenance.*** *District staff recommends that the EIR include GHG, criteria pollutant, and TAC impacts due to the non testing/nonmaintenance operations of backup power generators.*

[12] Exhibit 316 Page 11 of 110
[13] Exhibit 318 April 21, 2008 Letter CEC Executive Director Melissa Jones to W. Tate Cantrell

Various scenarios should be considered for non-testing/non-maintenance operations, including non-zero hours of operation and concurrent generator operations." [14] BAAQMD repeated the same request for emergency operations analysis of the, "***various scenarios of backup power generation operations beyond routine testing and maintenance*,"** in the comments on the Notice of Preparation for the San Jose Data Center.[15]

BAAQMD and CARB would not be requesting the analysis of air quality impacts from emergency operations at the SDC if the analysis was speculative and unnecessary CARB stated in its comments on the CEC Staff's Sequoia air quality analysis, "*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."*[16]

THE AMBIENT AIR QUALITY STANDARDS ARE THE THRESHOLD OF SIGNIFICANCE FOR EMERGENCY OPERATIONS.

Another excuse utilized by CEC Staff for not performing emergency operations modeling in the revised IS/MND *is* that*, "neither the CEC nor any other agency has established or used in practice a threshold of significance by which to interpret air quality modeling results from emergency operations."*[17] Clearly the threshold of significance for any emergency operations would be the ambient air quality standards.

BAAQMD AND CARB ARE THE RELEVANT PERMITTING AUTHORITIES.

In the latest version of its initial study CEC Staff continues to argue that other air quality agencies do not model emergency operations in their permitting evaluations. *Staff's testimony states that, "The air quality impacts of emergency operations are generally exempted from modelling by air*

[14] Exhibit 314 Bay Area Air Quality Management District Comments - Comment Letter for Great Oaks South Data Center NOP Page 2
[15] Exhibit 315 Bay Area Air Quality Management District Comments - Comment Letter for San Jose Data Center NOP
[16] Exhibit 319 Sequoia Data Center TN 235271 California Air Resources Board Comments - CARB Comments on Air Quality Analysis Page 7
[17] TN 237528 Sequoia Compiled Revised Initial Study and Proposed Mitigated Negative Declaration Page 5.3-48

districts in their permitting evaluations, and such is the ***practice of BAAQMD*** *(and other air districts), in whose jurisdiction SBGF would be locate."* [18] The modeling practices of other air districts is entirely irrelevant here since BAAQMD is the agency with authority over this project. Contrary to staff's testimony BAAQMD has been actively advocating for an emergency operations air quality assessments of data centers in Santa Clara.[19] BAAQMD in their comments on the Great Oaks South Data Center NOP stated, "***The EIR should include various scenarios of backup power generation operations beyond routine testing and maintenance.*** *Air District staff recommends that the EIR include GHG, criteria pollutant, and TAC impacts due to the non testing/ non maintenance operations of backup power generators."*[20]

BAAQMD in its comments on the Santa Clara Data Center NOP stated that, *"***The EIR should include various scenarios of backup power generation operations beyond routine testing and maintenance.** *Air District staff recommends that the EIR include GHG, criteria pollutant, and TAC impacts due to the non-testing/non-maintenance operations of backup power generators. Various scenarios should be considered for non-testing/nonmaintenance operations, including non-zero hours of operation and concurrent generator operations."* [21]

The Air Resources Board who is in charge of the air districts in California is also requesting that the CEC model emergency operations at the data centers it permits.[22] No other air agency has any jurisdiction over this project as the project is located in BAAQMD's jurisdiction and the Air Resources Board is in charge of all California air districts.

Cumulative Impacts

A CUMULATIVE AIR QUALITY IMPACT ASSESMENT HAS NOT BEEN PERFORMED.

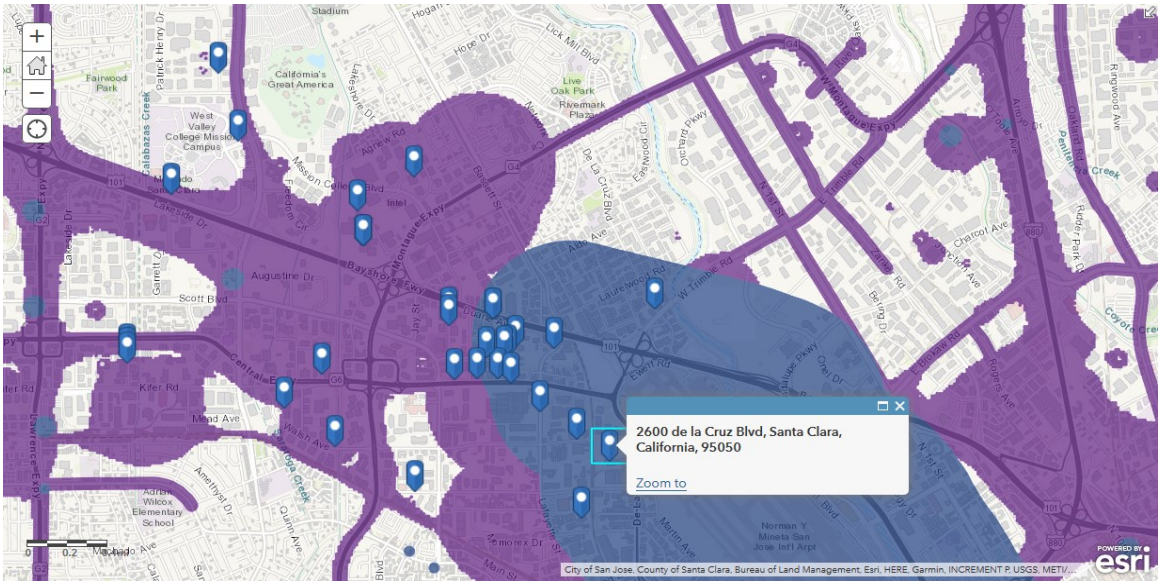
CARB recommends in its comments on CEC Staff air quality analysis for the SDC that, "*it would be appropriate to consider ambient air quality impacts of multiple data centers—not just multiple generators—because the CEC is currently considering several projects in the same area.*" CARB stated in its analysis of the CEC's IS/MND, *"****The impacts from the operation of the backup generators at these other constructed and/or proposed data centers located in the general project area should be included***

[18] TN 236919 Revised Initial Study and Proposed Mitigated Negative Declaration Page 5.3-32,33
[19] Exhibit 314 ,315
[20] Exhibit 314 TN 235803 BAAQMD Comment Letter on the Great Oaks South Data Center Page 2
[21] Exhibit 315 TN 236946 BAAQMD comment letter for San Jose Data Center NOP Page 2
[22] Exhibit 319 TN 235271 California Air Resources Board Comments - CARB Comments on Air Quality Analysis

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."[23] CEC Staff ignoring CARB's direction failed to model cumulative data center operations for violations of ambient air quality standards. There are 25 existing data centers in census tract 6085505202 listed and located in Exhibit 313 with access to 386 MW of power. The energy commission has already approved the McLaren Data Center with 47 diesel-fired backup generators, each with a peak output capacity of 2.75 megawatt (MW) in Census Tract 6085505202.[24] The Walsh Data Center (WDC) already approved by the Commission would consist of thirty-two (32) 3-MW diesel fired generators.[25] The CEC Staff is reviewing the Lafayette Backup Generation Facility (LBGF), which would have a generation capacity of up to 99.8 MW with 44 diesel-fired backup generators.[26] And of course, the Sequoia Data Center is being considered with 54 diesel-fired generators 96 MW of IT.[27] This already overburdened census tract is now facing an additional 177 diesel backup generators totaling 478.75 MW more than doubling the existing 386 MW of power already sited in Census tract 6085505202. Two other CEC data centers Laurelwood[28] and Mission College Data Center[29] are located on the border of Census tract 6085505202. Locations of the existing Santa Clara Data Centers are depicted below.

[23] Exhibit 315 Page 7,8 of 120
[24] Exhibit 320 Figure 3 Census Tract 6085505202 Location of the McLaren Data Center
[25] Exhibit 320 Figure 2 Census Tract 6085505202 Location of the 650 Walsh Avenue
[26] Exhibit 320 Figure 4 Census Tract 6085505202 Location of the Lafayette Data Center
[27] Exhibit 320 Figure 1 Census Tract 6085505202 Location of the Sequoia Data Center
[28] Exhibit 320 Figure 5 Location of the Laurelwood Data Center Adjacent to Census Tract 6085505202
[29] Exhibit 320 Figure 6 Location of the Mission College Data Canter Adjacent to Census Tract 6085505202

Santa Clara Data Center Locations



Census Tract 6085505202 where the Sequoia Project is located is in the upper 95th percentile for diesel particulate pollution for census tracts in the State of California. This census tract is already overburdened with hazardous material sites and hazardous material transportation. On March 23, 2020 over a year ago my reply testimony provided the CEC staff with the locations of several newly approved data centers.[30]

The City of Santa Clara has approved several other data centers in the middle of the data center cluster. In April of 2019 The City of Santa Clara approved the 1150 Walsh Avenue Data Center located a few blocks from the 651 Walsh Avenue Data Center now under CEQA review at the Energy Commission.[31] Construction of the project is scheduled to begin in March 2019 and be completed in 2021, a total of 25 months.[32] The 1150 Walsh Avenue Data Center has ten 3.25 MW diesel generators.[33] The projects generators are expected to generate 9 tons per year of NOx and .3 tons per year of diesel particulate.[34] Annual GHG emissions from the project are estimated to be 39,156 Metric tons of

[30] Exhibit 303 Pages 13,14
[31] https://www.santaclaraca.gov/Home/Components/BusinessDirectory/BusinessDirectory/295/3650
[32] MND SV1 1150 Walsh Avenue Data Center Page 59 of 240
https://www.santaclaraca.gov/home/showdocument?id=64292
[33] https://www.santaclaraca.gov/home/showdocument?id=64292 Page 38 of 240
[34] MND SV1 1150 Walsh Avenue Data Center Page 59 0f 240

CO2e.[35] Annual GHG emissions from the emergency generators is estimated to be 589 Metric tons of CO2e.[36]

In August of 2019 the City of Santa Clara approved the 2175 Martin Avenue Data Center Project.[37] The project has six 2.75 MW emergency diesel generators. The emergency generators would have a total generation capacity of up to 13.75 MW."[38] The projects diesel generators are expected to generate 8 tons of NOx annually.[39] Based on the building energy and water consumption rates provided by the project applicant, the project would consume 105,003 megawatt-hours per year at buildout.[40] The projects GHG emissions from the emergency generators is 635 MT per year of CO2e[41] The projects annual indirect GHG emissions from electricity use is 12,178 MT per year of CO2e annually.[42]

In May of 2018 the City of Santa Clara approved the Coresite 8 Data Center located at 3045 Stender Way.[43] The project will employ ten 3 MW genrators for a generating capcity of 30 MW. [44] The project is estimated to emit 32,569 metric tons of CO2e per year. The emergency generators are estimated to emit 823 metric tons per year from generator testing.[45] Testing of the projects generators is estimated to produce 12.9 tons per year of NOx and .3 tons of diesel particulate matter.[46] The data centers are located on the map below."

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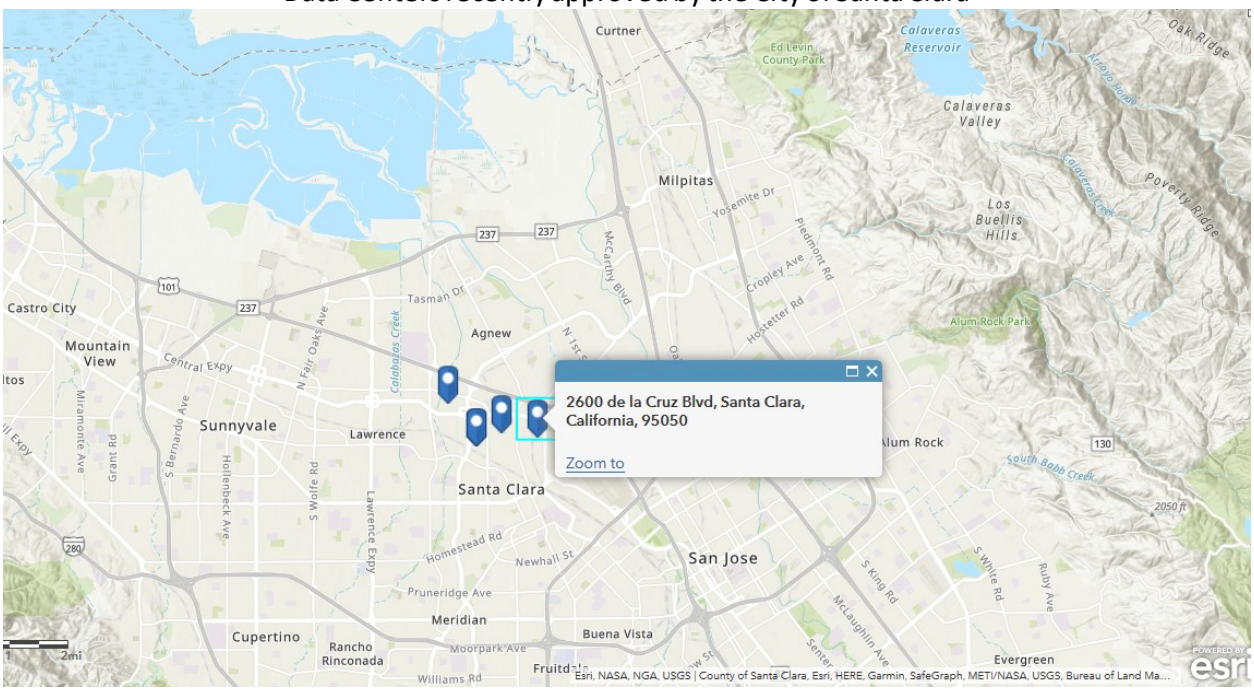
[35] https://www.santaclaraca.gov/home/showdocument?id=64292 Page 82 of 240
[36] [36] https://www.santaclaraca.gov/home/showdocument?id=64292 Page 82 of 240
[37] https://www.santaclaraca.gov/Home/Components/BusinessDirectory/BusinessDirectory/339/3650
[38] https://www.santaclaraca.gov/home/showdocument?id=65174 Page 5 of 289
[39] https://www.santaclaraca.gov/home/showdocument?id=65174 PAGE 73 OF 289
[40] https://www.santaclaraca.gov/home/showdocument?id=65174 Page 106 of 289
[41] https://www.santaclaraca.gov/home/showdocument?id=65174 Page 109 of 289
[42] https://www.santaclaraca.gov/home/showdocument?id=65174 Page 110 of 289
[43] https://www.santaclaraca.gov/Home/Components/BusinessDirectory/BusinessDirectory/231/3650?npage=4
[44] https://www.santaclaraca.gov/home/showdocument?id=57321 Page 15 of 118
[45] https://www.santaclaraca.gov/home/showdocument?id=57321 Page 40 of 118
[46] https://www.santaclaraca.gov/home/showdocument?id=57321 Page of 118

Data Centers recently approved by the City of Santa Clara



Besides the data cnters alereadyapproved the City of Santa Clara is considering approval of a several other data centers. One project is the data center loacted at 2905 Stender Way (SV9).[47] The project consits of Sixteen standby, backup diesel generators (backup generators) which would be added to the site to provide backup power to the SV9 data center in the event of a power failure. At full buildout, the SV9 data center would have 48-megawatt (MW) connection to SVP service.[48] The project is estimated to emit 27.2 tpy of NOx.[49]

Another data center project being reviewed by the city of Santa Clara is located at 1200 Memorex Way in Santa Clara.[50] The project consists of 24 three-MW diesel-fueled engine generators would be located on the south side of the building, with 16 primary generators providing 48 MW of backup power generation capacity and eight additional generators providing redundancy for the primary generators.[51]

[47] https://www.santaclaraca.gov/home/showpublisheddocument/69414/637316388378370000
[48] https://www.santaclaraca.gov/home/showpublisheddocument/69414/637316388378370000 Page 7 of 240
[49] https://www.santaclaraca.gov/home/showpublisheddocument/69414/637316388378370000 Page 25 of 240
[50] https://www.santaclaraca.gov/Home/Components/BusinessDirectory/BusinessDirectory/372/3649
[51] https://www.santaclaraca.gov/home/showpublisheddocument/69239/637304327742970000 Page 2,3

The City of Santa Clara is also reviewing another data center at 2305 Mission College Drive in Santa Clara.[52] The Data Center consists "of 120 625-kW diesel-fueled engine generators would be located within a generator yard west of the data center building."[53]

Without any modeling of cumulative air quality impacts, it cannot be demonstrated that the project does not violate any ambient air quality standards in conjunction with existing and proposed sources near the project. The burden of proof that the project will not cause a significant impact has not been met.

NOISE IMPACTS FROM SCR CONVERSION

CEC Staff's Revised Initial Study and Proposed Mitigated Negative Declaration does not contain a revised noise analysis. The original IS/MND contained section 5-13 which concluded that the project would not exceed the City of Santa Clara's 75dba sound limit. The revised initial study mitigated negative declaration does not analyze the change in noise impacts from the switch to SCR. Staff's original IS/MND noise model showed that the project exceeds the 75 dBA limit at the business center directly to the south of the project site when testing only one generator at a time. In the Great South Oaks Data Center the applicants analysis indicates that, *"the change to SCR will increase in sound power level of about 5 dBA and a substantial shift in sound energy from higher to lower frequencies. Additionally, Tier 4 treatment would increase the height of the exhaust stack, the location where most noise originates."*[54]

Staff's latest assessment does not consider any increase in the noise impacts of the project operating with SCR.[55] Neither Staff's original assessment or its latest revised IS/MND considers noise impacts from emergency operation with or without SCR. Staff's noise model showed that for both the normal operation and testing modes, the project noise would exceed the 75 dBA limit at the business center directly to the south of the project site. While noise from emergency operations may be exempt from the municipal code, they are not exempt from analysis under CEQA.

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[52] https://www.santaclaraca.gov/Home/Components/BusinessDirectory/BusinessDirectory/221/3649

[53] https://www.santaclaraca.gov/home/showpublisheddocument/56607/636555965194270000 Page 11 of 26

[54] Great Oaks South Backup Generating Facility Small Power Plant Exemption TN 237148 SV1 Revised Noise Analysis – GOSBGF Page 1

[55] TN 236919 Revised Initial Study and Proposed Mitigated Negative Declaration 5.13-4