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San Jose′ City Data Center
(19-SPPE-04)

Data Response Set 2
(Responses to Data Requests 32 to 52)

Submitted to
California Energy Commission

Prepared by
Microsoft Corporation

with technical assistance from

JACOBS®

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Contents

Attachments

Tables

Introduction

Attached are Microsoft Corporation (Microsoft or the Applicant) responses to the California Energy Commission (CEC) Data Request, Set 2 regarding the San Jose′ City Data Center (SJC02) (19-SPPE-04) Small Power Plant Exemption (SPPE).

The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as the CEC presented them and are keyed to the Data Request numbers.

New or revised graphics or tables are numbered in reference to the Data Request number. For example, the first table used in response to Data Request 28 would be numbered Table DR28-1. The first figure used in response to Data Request 28 would be Figure DR28-1, and so on. Figures or tables from the SJC02 SPPE that have been revised have “R1” following the original number, indicating revision 1.

Additional tables, figures, or documents submitted in response to a data request (for example, supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of each discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

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Air Quality and Greenhouse Gas Emissions (32-50)

Background: Correspondence with BAAQMD

The proposed project would require a permit from the Bay Area Air Quality Management District (District or BAAQMD). For purposes of consistency, staff needs copies of all correspondence between the applicant and the District in a timely manner in order to stay up to date on any issues that arise prior to completion of the initial study.

Data Requests

32) *Please provide copies of all substantive correspondence between the applicant and the District regarding the project, including application and e-mails, within one week of submittal or receipt. This request is in effect until staff publishes the initial study.*

Response: The Applicant will provide copies of all substantive correspondence with the Bay Area Air Quality Management District (BAAQMD) within 1 week of submittal or receipt.

Background: Emission Calculations

The SPPE application includes Appendix 3.3, which documents potential project emissions calculations. To validate the applicant's work, staff requests the spreadsheet files of the applicant's Appendix 3.3 emissions calculations for staff's independent review.

Data Requests

33) *Please provide spreadsheet versions of the emissions calculations worksheets supporting the SPPE application in Appendix 3.3 with the embedded calculations live and intact*

Response: Electronic versions of Appendix 3.3 spreadsheets with live and intact embedded calculations have been provided under separate cover as Attachment DR-33.

Background: Project Features and Analytical Assumptions

The SPPE application shows the assumptions for air quality impact analyses of the typical readiness and maintenance testing emissions (p.3.3-22). Assumptions in Air Quality and Greenhouse Gas sections include having only a single generator engine in use at a time, during any given hour of testing, and no more than 42 hours per year per engine for testing (p.3.3-22 and p.3.8-8). The air quality analyses also limit routine readiness testing to occur within certain hours of the day (p.3.3-21). Additionally, for impacts to be consistent with those predicted by the modeling files, the stacks should not have horizontal releases or rain-caps. Staff would like to verify that these project features and/or analytical assumptions can be made enforceable.

Data Requests

34) *Please confirm that the applicant would request the District to require an enforceable limit on concurrent operation of standby engines during allreadiness and maintenance testing scenarios so that only a single generator operates for maintenance and testing at any given time?*

Response: The Applicant will request in the BAAQMD Permit Application the following enforceable limits to be incorporated into the project: to only conduct maintenance and testing of one standby generator engine at a time, that maintenance and testing will only occur for 42 hours per engine per 12 month period, that maintenance and testing will only occur from 7 a.m. to 7 p.m. daily, and that the standby generators will not have horizontal releases or rain caps.

35) *Please confirm that the applicant would request the District to require an enforceable limit that would allow no more than 42 hours per year per engine for readiness and maintenance testing.*

Response: See the response to Data Request #34.

36) *Please confirm that the applicant would request the District to require an enforceable limit that would allow testing of standby engines only between the hours of 7 AM to 7 PM daily.*

Response: See the response to Data Request #34.

37) *Please confirm that all standby engine exhaust stacks would not have horizontal releases or rain-caps.*

Response: See the response to Data Request #34.

Background: Air Modeling Details

The SPPE application (p.3.3-21) and the applicant's modeling files indicate that the refined analysis used to evaluate the project's compliance with California's ambient air quality standard for 1-hour nitrogen dioxide (NO2) used ARM2 and the default federal processing procedure for 1-hour NO2 concentrations, which is automatically enabled in AEROMOD through the setting "POLLUTID NO2." Staff is concerned that this setting that is for federal NO2 processing may have underestimated the highest 1- hour NO2 concentrations in the evaluation of exceedances against California's 1-hour NO2 ambient air quality standard (CAAQS). Additionally, staff would like to efficiently locate modeling details within the electronic files for ambient air quality impacts tabulated in the application (pp.3.3-32 to 3.3-36).

Data Requests

38) *Please confirm that use of the setting "POLLUTID NO2", as in the applicant's refined 1-hour NO2 CAAQS analysis, provides a conservative result that matches or exceeds the result that would otherwise be obtained by setting "POLLUTID NO2 H1H". If not, please reevaluate 1-hour NO2 impacts using "POLLUTID NO2 H1H."*

Response: The use of "POLLUTID NO2" allows AERMOD to internally calculate an average 1st high over all years of modeled meteorological data for each receptor, then report the average highest 1st-high concentration from the model. The use of "POLLUTID NO2 H1H" reports the maximum result from the model run. As the Applicant modeled each meteorological data year individually for comparison to the California Ambient Air Quality Standard (CAAQS), rather than using a combined 5-year meteorological data file, this provides a conservative result since the maximum result from each modeled year would yield the same result as if the Applicant had used a combined 5-year meteorological data file and "POLLUTID NO2 H1H".

39) *Please list the modeled source or source-groups, and the modeled years, that correspond with the modeled concentrations presented in each of the results in Tables 3.3-18, 3.3-19, and 3.3-20.*

Response: Tables DR39-1, DR39-2, and DR39-3 provide additional information related to the modeled concentrations presented in SPPE application Tables 3.3-18, 3.3-19, and 3.3-20, respectively. This information includes the source group of the modeled impact, the meteorological year of the modeled impact, and the meteorological years used to conduct the modeling.

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Table DR39-1. Basis of the Comparison of Modeled Results with Background to the National Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)[a]	Total Predicted Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Source Group of Modeled Impact	Met Year(s) of Modeled Impact	Met Years Used for Analysis
100% Load Scenario								
PM_{10}	24-hour[b]	1.16	115	116	150	100P	2017	2013-2017
$PM_{2.5}$	Annual[c]	0.01	10.5	10.5	12	100P	2013-2017	2013-2017
CO	1-hour[d]	208	2,863	3,071	40,000	100P	2014	2013-2017
	8-hour[d]	80.5	2,405	2,485	10,000	100P	2015	2013-2017
SO_2	1-hour[e]	1.72	6.98	8.70	196	100P	2013-2017	2013-2017
	3-hour[f]	1.75	18.1	19.8	1,300	100P	2013	2013-2017
	24-hour[f]	0.25	2.88	3.13	365	100P	2015	2013-2017
	Annual[f]	0.00	0.55	0.55	80	100P	2013	2013-2017
NO_2	Annual[f]	1.93	23.0	25.0	100	100P	2013	2013-2017
	1-hour[g]	162	N/A	162	188	G15	2013-2017	2013-2017
75% Load Scenario								
PM_{10}	24-hour[b]	0.99	115	116	150	75P	2017	2013-2017
$PM_{2.5}$	Annual[c]	0.01	10.5	10.5	12	75P	2013-2017	2013-2017
CO	1-hour[d]	177	2,863	3,040	40,000	75P	2013	2013-2017
	8-hour[d]	68.6	2,405	2,474	10,000	75P	2015	2013-2017
SO_2	1-hour[e]	1.51	6.98	8.49	196	75P	2013-2017	2013-2017
	3-hour[f]	1.52	18.1	19.6	1,300	75P	2013	2013-2017
	24-hour[f]	0.23	2.88	3.10	365	75P	2015	2013-2017
	Annual[f]	0.00	0.55	0.55	80	75P	2013	2013-2017
NO_2	Annual[f]	1.68	23.0	24.7	100	75P	2013	2013-2017
	1-hour[g]	153	N/A	153	188	G15_75	2013-2017	2013-2017

Table DR39-1. Basis of the Comparison of Modeled Results with Background to the National Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)[a]	Total Predicted Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Source Group of Modeled Impact	Met Year(s) of Modeled Impact	Met Years Used for Analysis
50% Load Scenario								
PM_{10}	24-hour[b]	0.75	115	116	150	50P	2017	2013-2017
$PM_{2.5}$	Annual[c]	0.01	10.5	10.5	12	50P	2013-2017	2013-2017
CO	1-hour[d]	138	2,863	3,001	40,000	50P	2013	2013-2017
	8-hour[d]	52.4	2,405	2,457	10,000	50P	2015	2013-2017
SO_2	1-hour[e]	1.22	6.98	8.20	196	50P	2013-2017	2013-2017
	3-hour[f]	1.21	18.1	19.3	1,300	50P	2013	2013-2017
	24-hour[f]	0.18	2.88	3.06	365	50P	2015	2013-2017
	Annual[f]	0.00	0.55	0.55	80	50P	2013	2013-2017
NO_2	Annual[f]	1.31	23.0	24.3	100	50P	2013	2013-2017
	1-hour[g]	153	N/A	153	188	G15_50	2013-2017	2013-2017

[a] Background concentration from SPPE application Table 3.3-1c were used to estimate the total predicted concentrations.

[b] The total predicted concentration for the 24-hour PM_{10} standard is the 6th-highest value over the five modeled years (2013-2017) combined with the maximum background concentration.

[c] The total predicted concentration for the annual $PM_{2.5}$ standard is the maximum 5-year average modeled concentration combined with the maximum background concentration.

[d] The total predicted concentrations for the 1-hour and 8-hour CO standards are the high-2nd-high modeled concentrations of the 5 individual years modeled (2013-2017) combined with the maximum background concentrations.

[e] The total predicted concentration for the 1-hour SO_2 standard is the high-4th-high modeled concentration averaged over 5 years combined with the 3-year average background concentration.

[f] The total predicted concentrations for the annual SO_2, 3-hour SO_2, 24-hour SO_2, and annual NO_2 standards are the highest modeled concentrations of the 5 individual years modeled (2013-2017) combined with the maximum background concentrations.

[g] The 1-hour NO_2 maximum modeled concentration accounts for an SEASHR background and ARM2 chemistry of an ISR of 0.1 and an out-of-stack ratio of 0.9, which were included within the model. This concentration is also the worst-case single generator concentration because only a single generator will operate at a given time.

Note:

N/A = Not applicable because the background is included in the model

Table DR39-2. Basis of the Comparison of Modeled Results with Background to the California Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration (µg/m^3)[a]	Background Concentration (µg/m^3)[b]	Total Predicted Concentration (µg/m^3)	CAAQS (µg/m^3)	Source Group of Modeled Impact	Met Year(s) of Modeled Impact	Met Years Used for Analysis
100% Load Scenario								
CO	1-hour	209	2,863	3,072	23,000	100P	2014	2013-2017
	8-hour	81.2	2,405	2,486	10,000	100P	2015	2013-2017
SO_2	1-hour	1.79	18.1	19.9	655	100P	2015	2013-2017
	24-hour	0.25	2.88	3.13	105	100P	2015	2013-2017
NO_2[c]	Annual	1.93	23.0	25.0	57	100P	2013	2013-2017
	1-hour	263	N/A	263	339	G15	2014	2013-2017
75% Load Scenario								
CO	1-hour	189	2,863	3,052	23,000	75P	2013	2013-2017
	8-hour	69.6	2,405	2,474	10,000	75P	2015	2013-2017
SO_2	1-hour	1.66	18.1	19.7	655	75P	2013	2013-2017
	24-hour	0.23	2.88	3.10	105	75P	2015	2013-2017
NO_2[c]	Annual	1.68	23.0	24.7	57	75P	2013	2013-2017
	1-hour	262	N/A	262	339	G15_75	2017	2013-2017
50% Load Scenario								
CO	1-hour	151	2,863	3,014	23,000	50P	2013	2013-2017
	8-hour	53.5	2,405	2,458	10,000	50P	2015	2013-2017
SO_2	1-hour	1.40	18.1	19.5	655	50P	2013	2013-2017
	24-hour	0.18	2.88	3.06	105	50P	2015	2013-2017
NO_2[c]	Annual	1.31	23.0	24.3	57	50P	2013	2013-2017
	1-hour	323	N/A	323	339	G33_50	2017	2013-2017

[a] The maximum modeled concentration for each pollutant and averaging period are the high-1st-high concentrations for comparison to the CAAQS.

[b] Background concentrations from SPPE application Table 3.3-1c were used to estimate the total predicted concentrations.

Table DR39-2. Basis of the Comparison of Modeled Results with Background to the California Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration ($\mu g/m^3$)[a]	Background Concentration ($\mu g/m^3$)[b]	Total Predicted Concentration ($\mu g/m^3$)	CAAQS ($\mu g/m^3$)	Source Group of Modeled Impact	Met Year(s) of Modeled Impact	Met Years Used for Analysis

[c] The 1-hour NO_2 maximum modeled concentration accounts for an SEASHR background and ARM2 chemistry of an ISR of 0.1 and an out-of-stack ratio of 0.9, which were included within the model. This concentration is also the worst-case single generator concentration because only a single generator will operate at a given time for maintenance and testing purposes.

Note:

N/A = Not applicable because the background is included in the model

Table DR39-3. Basis of the Comparison of Modeled PM_{10} and $PM_{2.5}$ Results to the Significant Impact Levels

Pollutant	Averaging Time	Maximum Modeled Concentration (µg/m³)	SIL (µg/m³)	Source Group of Modeled Impact	Met Year(s) of Modeled Impact	Met Years Used for Analysis
100% Load Scenario						
$PM_{2.5}$[a]	24-hour	1.15	1.2	100P	2013-2017	2013-2017
	Annual	0.01	0.3	100P	2013-2017	2013-2017
PM_{10}[b]	24-hour	1.24	5	100P	2015	2013-2017
	Annual	0.01	1	100P	2013	2013-2017
75% Load Scenario						
$PM_{2.5}$[a]	24-hour	0.99	1.2	75P	2013-2017	2013-2017
	Annual	0.01	0.3	75P	2013-2017	2013-2017
PM_{10}[b]	24-hour	1.07	5	75P	2015	2013-2017
	Annual	0.01	1	75P	2013	2013-2017
50% Load Scenario						
$PM_{2.5}$[a]	24-hour	0.76	1.2	50P	2013-2017	2013-2017
	Annual	0.01	0.3	50P	2013-2017	2013-2017
PM_{10}[b]	24-hour	0.82	5	50P	2015	2013-2017
	Annual	0.01	1	50P	2013	2013-2017

[a] Modeled concentration is the maximum high-1st-high value averaged over the 5 modeled years (2013-2017).

[b] Modeled concentration is the maximum high-1st-high value of the 5 individual modeled years (2013-2017).

Background: SCR Effectiveness

The proposed project would include generators with engines certified to achieve USEPA Tier 4 exhaust standards. Conservatively, the SPPE application applies Tier 2 emission factors in calculations for nitrogen oxides (NOx) emissions to reflect the "likelihood of each generator's SCR (selective catalytic reduction device) not achieving full functionality during the short-duration maintenance and testing events" (p.3.3-14). During a longer-duration run of the engines, the SCR would presumably achieve full functionality and reduce the NOx emissions rates below those presented for short-duration testing. Staff seeks to clarify how the SCR would become effective as the duration of operation increases. Staff needs to clarify how the District would determine Potential To Emit (PTE) for purposes of determining the applicability of the Prevention of Significant Deterioration (PSD) program.

Data Requests

40) Please specify the in-stack conditions that must occur before Tier 4 emissions rates could be achieved.

Response: The engine manufacturer indicates that the selective catalytic reduction system (SCR) will be active within 1 hour of the engine start, at loads greater than 75 percent, and with the exhaust temperature exiting the SCR above 572 degrees Fahrenheit.

41) Please describe the duration of operation (in minutes or hours) and/or loads required before the engines could reach the Tier 4 emissions standards.

Response: See the response to Data Request #40.

42) *Please identify the anticipated emissions rates, stack temperatures, and release velocities that should be considered during the times the engines comply with the Tier 4 emissions standards.*

Response: Table DR42-1 presents the emission rates, stack temperatures, and exhaust flow rates that should be considered to comply with the Tier 4 emissions standards.

Table DR42-1 Standby Generator Tier 4 Emission Parameters

3-MW Standby Generator				Emission Factors			
Load	Horsepower	Exhaust Flow	Exhaust Temperature	g/BHP-hr			
Percent	BHP	ACFM	°F	NOx	CO	NMHC	PM2.5/10
100	4,307	23,365	830	0.5	2.6	0.14	0.022
75	3,256	19,695	714	0.5	2.6	0.14	0.022
1.25-MW Standby Generator				**Emission Factors**			
Load	Horsepower	Exhaust Flow	Exhaust Temperature	g/BHP-hr			
Percent	BHP	ACFM	°F	NOx	CO	NMHC	PM2.5/10
100	1,818	10,417	850	0.5	2.6	0.14	0.022
75	1,382	9,249	810	0.5	2.6	0.14	0.022
0.500-MW Standby Generator				**Emission Factors**			
Load	Horsepower	Exhaust Flow	Exhaust Temperature	g/BHP-hr			
Percent	BHP	ACFM	°F	NOx	CO	NMHC	PM2.5/10
100	731	3,442	894	0.5	2.6	0.14	0.022
75	554	2,771	852	0.5	2.6	0.14	0.022

BHP – Brake Horse Power

°F – Degrees Fahrenheit

ACFM – Actual Cubic Feet per Minute

g/BHP-hr – Grams per Brake Horse Power-Hour

NOx – Oxides of Nitrogen

CO – Carbon Monoxide

NMHC – Nonmethane Hydrocarbons

PM2.5/10 – Particulate Matter with an aerodynamic diameter of 2.5 or 10 microns or less

43) *Please describe how Tier 2 and/or Tier 4 NOx emissions factors were used to determine emergency and routine operations emissions estimates for facility- wide total NOx emissions (99 tons per year, maximum Potential To Emit [PTE]), as presented in the comparison against the Title V permitting thresholds (in SPPE application Table 3.3-5, Table 3.3-16 and in Appendix 3.3-B, Table 1). This response should include tables that detail the emissions by events, durations, and emission control equipment operations.*

Response: Conservatively, only Tier 2 emission factors were used to estimate the facility-wide total nitrogen oxides (NOx) emissions presented in SPPE application Table 3.3-5, Table 3.3-16, and

Appendix 3.3-B – Table 1. Both of the administrative generators and 30 standby generators were assumed to operate 142 hours. The remaining 10 standby generators were assumed to operate only 42 hours. The NOx emissions presented in SPPE application Tables 3.3-5 and 3.3-16 were calculated using the following data from SPPE application Appendix 3.3-B – Tables 1, 3, 4, and 5 and is shown in Table DR 43-1.

Table DR43-1 Compiled NOx Emissions

Unit	Number of Units	Annual Hours	Load Rate	Horsepower	NOx Emission Factor	NOx Emissions	
			Percent	BHP	g/BHP-hr	lb/hr	lb/year
Standby 3-MW	30	142	100	4,307	4.38	41.6	177,168
Standby 3-MW	10	42	100	4,307	4.38	41.6	17,467
Admin 1.25-MW	1	142	100	1,818	4.03	16.2	2,294
Admin 0.5-MW	1	142	100	731	4.59	7.4	1,050
Total							**197,979**
						Tons/Year	**99.0**

44) *Please consult with the District and respond with what is the appropriate number of standby engines that should be assumed to operate for 142 hours per year to compute PTE for purposes of determining PSD applicability, as in Tables 3.3-5 and 3.3-16.*

Response: The BAAQMD defines Potential to Emit (PTE) in Regulation 2-1-217 as "The maximum capacity of a source or facility to emit a pollutant based on its physical and operational design. Any physical or operational limitation on the capacity of the source or facility to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as a part of its design only if the limitation, or the effect it would have on emissions, is enforceable by the District…" The facility has a physical limitation of a maximum electrical demand of 92 MW. This not-to-exceed electrical output can be achieved through numerous combinations of generators operating at varying loads. Although the BAAQMD has indicated that they typically begin by assuming all standby engines would operate up to 150 hours per year to compute PTE, they clarified that the Applicant can propose enforceable permit conditions to limit PTE. Therefore, consistent with the Regulation 2-1-217 definition, the Applicant will request in the BAAQMD Permit Application an enforceable limit be incorporated into the project that the concurrent operation of any standby generators and administrative generators during a power outage will not result in an electrical output greater than 92 MW.

45) *Please describe the appropriate "in-stack ratio" of NO2/NOx that should be used in modeling impacts after each generator's SCR achieves full functionality and meets Tier 4 emissions standards. This response should address whether or not the Tier 4 equipment to be used in the facility would be certified by CARB under Cal. Code Regs. tit. 13, §§ 2702 (f) or 2706 (a) which would certify that the equipment would meet the "in-stack" NO to NO2 conversion ratio (ISR) specified in these certification requirements. If not, please describe the effect of the Tier 4 equipment on the ISR and any similar performance guarantee that would affect the ISR.*

Response: The Tier 4 emission factors were not used in the air dispersion modeling included with the SPPE application as the use of the higher, more conservative Tier 2 emission factors was sufficient to demonstrate that the project is not expected to cause or contribute to the violation of a state or federal ambient air quality standard and is not expected to result in significant air quality impacts.

For the dispersion modeling utilizing Tier 2 emissions standards, an in-stack NO2 to NOx ratio (ISR) was assumed to be 10-percent. Based on correspondence with the manufacturer (Cummins),

the QSK95 engine's NO2 ISR would never exceed 10-percent either before or after the Selective Catalytic Reduction (SCR) control device across all operating loads (see Attachment DR45).

The manufacturer did not provide an opinion on whether they would request certification under California Code of Regulations Title 13, Chapter 14, Sections 2702(f) or 2706(a).

Background: Electrical System Outages

The SPPE application indicates that PG&E has "an outage frequency for the period of 2014 to 2018 of 99.8 and 99.9 percent on the two, 230-kV supply lines into the substation" (p.2-4, underline added) – which staff takes to mean that the historic outage rate is 0.1 to 0.2% of the time. To explore the potential nature of emergency operations of the diesel-powered engines, staff needs to confirm and refine our understanding of electrical system outages. The SPPE application does not specify whether the historic outage rate should be viewed as representative of the types of outages that could cause a loss of PG&E electric service to the data center.

Data Requests

46) *Please provide information that reviews the frequency and durations of historic outages of the 230 kV facilities that would be likely to trigger a total loss of service to the proposed onsite substation and lead to emergency operations of the diesel-powered generators. This response should identify the reliability of service historically provided by PG&E to other similar data centers in its service territory.*

Response: Tables DR46-1 and DR46-2 presents the outage historic, frequency, and duration for the Los Estero-Metcalf and Los Esteros-Newark 230 kilovolt (kV) transmission lines supplying the 230-kV bus at the Los Esteros Substation. The Applicant will request PG&E provide information regarding the reliability of service historically provided by PG&E to other similar datacenters in its service territory and will docket this information when received.

47) *Please provide information on the historic outages of the 230-kV portion of the Los Esteros Substation.*

Response: See the response to Data Request #46.

48) *Please describe whether a loss of the 230-kV portion of the Los Esteros Substation could cause a loss of service to the proposed data center.*

Response: The SJC02 electrical interconnection to the Los Esteros Substation is through two interconnection points to two different 230-kV bus locations (PG&E proposes to add a second new bay with two breakers installed to support SJC02 interconnection). This interconnection design provides highly reliable service as SJC02 will be connected to the substation with 230-kV lines connected at different bays. Losing a 230-kV bus or a breaker at the Los Esteros Substation will not interrupt service.

49) *Please describe whether the existing Newark-Los Esteros or Metcalf-Los Esteros 230 kV circuits could be looped into the data center's onsite substation and if feasible, whether doing so would increase or decrease electric service reliability to the data center.*

Response: PG&E proposed two 230-kV interconnecting within the Los Esteros Substation at two separate buses to provide reliable electric. The Applicant will consult PG&E to determine if looping in the existing Newark-Los Esteros or Metcalf-Los Esteros 230 kV circuits into the SJC02 substation is feasible. The Applicant will docket PG&E's response when received.

50) *Please describe some possible examples of groupings of generators that could be in use during emergency operations and the corresponding engine loadings. For example, one scenario could be 30 generators (such as G1-G12, G21-32, G37-G42) at full loads and a different scenario could include a greater number of generators operating at partial loads. If all engines, or engines in dedicated set(s), randomly respond to an emergency, please describe how those random responses cumulatively affect or are planned for in maintenance activities and run-time accounting.*

Response: The SPPE application Figures 2-2a and 2-2b show the internal floor plan of each building, with the administrative and server areas labeled. The server areas are labeled COLOs 1 to 5. Each COLO is operated as a separate unit with its own space conditioning system and four emergency standby generators. During an emergency, all 4 generators will fire to support the load within a COLO. The design can accommodate a single generator failure within each COLO without compromising the reliability of the COLO operations.

Table DR46-1 Los Esteros-Metcalf and Los Esteros-Newark 230 Kilovolt Line Outage History

kV	Transmission Line	Date/ Time Out	Durn (mins)	Cause Category	Cause Detail	Secondary Cause	Comments	Cust Affected
230	LOS ESTEROS-METCALF	03/21/07 03:49	91	Unknown	Patrol found nothing	NONE	Relayed, properly didn't test (has underground section so no auto test); no customers out; weather clear; patrol found no evidence for why line relayed; eventID=4600	0
230	LOS ESTEROS-METCALF	05/27/08 19:50	16	Unknown	Patrol found nothing	NONE	Relayed, did not test (Newark_LosEsteros-230kV); open ending this line at Metcalf & Newark 230kV static var compensator tripped offline; no customers out; weather clear	0
230	LOS ESTEROS-METCALF	06/05/08 18:38	222	External contact	Foreign object	COND	Relayed, didn't test; at same time, Metcalf_MossLanding #2-230kV open ended at ML; no customers out; weather clear, breezy; patrol found marsh grass on conductor at twr 1/10	0
230	LOS ESTEROS-METCALF	09/05/08 20:30	8,793	Equipment failure	Arrestor	ARRS	Relayed, properly did not test; no customer interruptions; on trouble, Newark_LosEsteros open ended at Newark by out of section tripping, reclosed OK (eventID=5986); weather clear; line later cleared to repair failed lightning arrestor on twr L4/10B on 'A' phase; eventID=5999	0
230	LOS ESTEROS-METCALF	04/25/09 11:39	426	External contact	Foreign object	COND	Relayed, did not test as designed due to UG cable on lineTLine; approx 1/2-mile out from LosEsteros sub on A Phase at TSP L6/25 found flashed hot end yoke plate, cause for this flashing though could not be confirmed; this is 3rd time in a year that we've had this type of event--1st 2 events were found to be balloons between middle & top phases; ET to work with Engg to come up with a solution to gain more separation between conductor & lower arm; eventID=6539	0
230	LOS ESTEROS-METCALF	06/22/12 14:42	159	Disaster	Fire	NONE	Relayed, did not test by design; caused by a small grass fire by tower LO/06B; no equipment damage; no customer interruption; weather clear; 1721 line manually tested OK; TARGETS: SET "A' LINE DISTANCE & OC RLY # 221/267NA-4 = NO TARGETS SET "B" LINE DISTANCE & OC RLY #221/267NB-4 = COMM, ZONE 2, A PHASE GROUND, 43.82 MILES, GROUP 1 BREAKER BU RLY 250/262BF-4 = 50 A, N. OPERATIONS; patrol found no damage, unsure what caused fire	0
230	LOS ESTEROS-METCALF	09/17/13 02:29	541	Unknown	Patrol found nothing	NONE	Relayed - 09/17/13, 0229 LosEsteros-Metcalf 230kV relayed, did not test by design (partial UG circuit); no customer interruption; weather clear; 1130 line returned to service after patrol of UG found no trouble	0
230	LOS ESTEROS-METCALF	05/14/15 13:46	156	Weather	Lightning	UG	Relayed - 05/14/15, 1346 LosEsteros-Metcalf relayed, properly did not test due to UG section; no customer interruption; rain, lightning; B-G fault 23 mi from Metcalf near twr 22/99, +/- 4.0 mi; 1621 line manually tested OK after crew found no trouble; 1622 line returned normal; coincident lightning strike shown in GIS across structure 019/088, patrol found no damage	0
230	LOS ESTEROS-METCALF	08/06/15 21:32	104	Weather	Lightning	NONE	Relayed - 08/06/15, 2132 LosEsteros-Metcalf relayed, properly did not test; no customer interruption; lightning; A-G fault 6.48 MI FROM Metcalf near structure 006/031, +/- 3 mi; 2315 line manually tested OK; 2316 line returned to service; air patrol found no damage, no specific cause (probable lightning); eventID=11376	0
230	LOS ESTEROS-METCALF	05/03/16 23:27	98	Equipment failure	Insulator-line	INSL	Relayed - 05/03/16, 2327 LosEsteros-Metcalf relayed, did not test by design due to UG section; no customer interruption; light rain; 5/04/16, 0105 the line returned to normal; A-G fault 13.5 mi from Metcalf near twr 013/063, +/- 3.0 mi; found flashed insulator bells at TWR 13/61 MIDDLE PHASE, will schedule hot wash	0
230	LOS ESTEROS-METCALF	01/19/17 10:09	265	Unknown	Patrol found nothing	NONE	Relayed - 01/19/17, 1009 LE-Metcalf relayed, did not by design; no customers interrupted; rain, lightning; A-B-G fault 8.84 mi from Metcalf & 36.88 mi from LosEsteros (w/in OH section near structure 8/42 (accuracy might be compromised due to mixed OH and UG sections, as well as super bundle sections), +/- 4 mi; 1425 line patrol complete, no trouble found; 1432 line manually tested OK after no trouble found; 1434 line returned normal	0
230	LOS ESTEROS-METCALF	01/23/17 19:59	83	Equipment failure	Connector/ hardware	COND	Forced - 01/23/17, 1959 to 2122 LE-Metcalf 230kV forced out to remove fiber optic cable wrapped in conductor bet structures L7/27-28; no customers interrupted	0
230	LOS ESTEROS-METCALF	02/24/17 10:44	38	Equipment failure	Switch-station	DISC	Forced - 02/24/17, 1044 to 1122 LE-Metcalf 230kV open-ended after Metcalf CB-262 forced out due to arcing Metcalf SW-269; no customers interrupted;	0
230	LOS ESTEROS-METCALF	04/03/18 19:31	38,859	Equipment Failure	Equip Fail-bushing	UG	Forced - 04/03/18, 1931 LosEsteros-Metcalf forced out to repair cable oil leak at 'B' phase pothead; no customers interrupted; ETOR 05/08/18 to await manufacturer's arrival, diagnosis & any repair recommendations; 04/30/18, 1910 LE-Metcalf 230kV cable returned to service after repair of oil leak on "B" phase pothead at LosEsteros	0
230	NEWARK-LOS ESTEROS	02/20/07 22:32	4,320	Equipment failure	Other-line	UG	Relayed, did not test; SUS NewarkDist; 2356 NewarkDist restored; found blown pothead next day @ structure L4/10A; est 03/07/07; 03/22 cable returned to service after repair of cable sect B; eventID=4582	10,209

Table DR46-1 Los Esteros-Metcalf and Los Esteros-Newark 230 Kilovolt Line Outage History

kV	Transmission Line	Date/ Time Out	Durn (mins)	Cause Category	Cause Detail	Secondary Cause	Comments	Cust Affected
230	NEWARK-LOS ESTEROS	05/21/07 07:11	729	Other	Safety clearance	UG	Forced out to inspect 'B' side UG cable terminals	0
230	NEWARK-LOS ESTEROS	05/27/08 19:50	247	Unknown	Patrol found nothing	NONE	Relayed, did not test (UG); LosEsteros_Metcalf-230kV open ended at Metcalf & Newark 230kV static var compensator tripped offline; no customers out; weather clear	0
230	NEWARK-LOS ESTEROS	09/05/08 20:30	1	Equipment failure	Relay	RELY	Relayed (open ended at Newark, reclosed OK) by out of section tripping coincident with the relay, proper no test of LosEsteros_Metcalf-230kV (eventID=5999); no customer interruptions; weather clear; LosEsteros_Metcalf later cleared to replace failed lightning arrestor on twr L4/10B on 'A' phase; eventID=5986	0
230	NEWARK-LOS ESTEROS	10/12/08 06:27	228	External contact	Foreign object	COND	Relayed, properly didn't test due to UG portion; no interruptions; weather clear; 1015 no trouble found on patrol, line returned to service (target ~7 mi out of Newark, outside of UG portion); ET & Asset Strategy did air patrol; at structure L7/28 middle phase conductor yoke plate had arc marks, indicating arc occurred between hot end hardware & grounded steel arm; no definitive cause found, however dozens of large tumble weeds in LosEsteros sub owned by PG&E, just outside the SantaClaraValley Power sub, operated by CalPine; composite insulators were also identified as heavily contaminated; will wash insulators & re-configure structure to gain maximum clearance from the conductors to the structure; ET will also ensure tumble weed condition is cleared at the Station location; reinvestigation determined most likely cause was metallic balloons, which were found near the station w/ burn marks; eventID=6079	0
230	NEWARK-LOS ESTEROS	04/25/09 11:39	1	Equipment failure	Relay	RELY	Relayed (open ended) coincident w/ relay, no test of LosEsteros_Metcalf after Newark Distribution CBs 940 & 880 opened, reclosed OK via autos; appears 940/880 Set B line relay is over-reaching per System Protection; eventID=6526	0
230	NEWARK-LOS ESTEROS	01/14/17 13:14	1,412	Equipment failure	Arrestor	ARRS	Relayed - 01/14/17, 1314 Newark-LE relayed, properly did not test by design; no customers interrupted; weather clear; A-G fault 3.73 mi from Newark Dist sub near UG cable section @ crossing of Newark-Milpitas#2 bet twrs 002/035-036, +/- 2 mi; 2258 line manually tested NG; 01/15/17, 1246 line returned to service after removal of blown lightning arrestor at L4/10A bottom phase	0
230	NEWARK-LOS ESTEROS	01/19/17 10:18	58	Unknown	Patrol found nothing	NONE	Relayed - 01/19/17, 1018 Newark-LE relayed, did not test by design; no customers interrupted; rain, lightning; 1114 Newark-LE manually tested OK, no trouble found; 1116 line normal	0
230	NEWARK-LOS ESTEROS	01/23/17 20:11	82	Equipment failure	Connector/ hardware	COND	Forced - 01/23/17, 2011 to 2133 Newark-LE 230kV forced out to remove fiber optic cable wrapped in conductor bet structures L7/27-28 on LE-Metcalf; no customers interrupted	0
230	NEWARK-LOS ESTEROS	10/13/18 09:22	146	Equipment Failure	Equip Fail-switch-line	LS	Forced - 10/13/18, 0922 to 1148 Newark-Los Esteros forced out to repair SW-889; no customers interrupted	0

Table DR46-2 Los Esteros-Metcalf and Los Esteros-Newark 230 Kilovolt Line Outage Frequency and Duration

		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2003 thru 2018								2014 thru 2018							
kV	Line Name	Accum Freq F	Accum Durn (mins) D	F	D	F	D	F	D	F	D	F	D	F	D	F	D	F	D	F	D	F	D	F	D	F	D	F	D	F	D	F	D	1st Year of Avail	Accum Freq Since 1st Yr	Accum Durn Since 1st Yr	No of Yrs	MTBF (yrs)	MTBF (mos)	MTTR (mins)	Availability 2003-2018 **(A1)**	Accum Freq Since 2014	Accum Durn Since 2009	No of Yrs	MTBF (yrs)	MTBF (mos)	MTTR (mins)	Availability 2014-2018 **(A2)**	Availability: % Improvement/ Degradation (A2-A1)/A1
230	LOS ESTEROS-METCALF	1	32	1	4,320	1	138	1	4,320	2	4,411	4	5,196	1	426	0	0	0	0	1	159	1	541	0	0	2	260	1	98	3	386	1	4,320	**2003**	**20**	**24,607**	**16**	**0.80**	**9.6**	**1,230**	**99.7074%**	**7**	**5,064**	**5**	**0.71**	**8.6**	**723**	**99.8%**	**0.1002%**
230	NEWARK-LOS ESTEROS	2	620	0	0	0	0	0	0	2	5,049	3	476	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1,552	1	146	**2003**	**12**	**7,844**	**16**	**1.33**	**16.0**	**654**	**99.9067%**	**4**	**1,698**	**5**	**1.25**	**15.0**	**425**	**99.9%**	**0.0287%**

Utilities and Service Systems (51-52)

Background: Reclaimed Water Use

The Introduction section states that reclaimed water would be used for landscaping purposes (p. 1-6). The Project Description section states that reclaimed water would be used for landscaping and cooling purposes (p.2-22 and p.2-3). The expected total water demand, including recycled and potable waters, is approximately 29.1 acre-feet per year (p.2-22).

Data Requests

51) *Please clarify the use of reclaimed water. Of the expected 29.1 acre-feet per year water use, how much is expected to be potable water and how much will be reclaimed water?*

Response: Of the proposed 29.1 acre-feet per year of water use, approximately 9 acre-feet per year will be potable water with the balance being reclaimed water use.

52) *Please provide information from the supplier about the availability of reclaimed water service for the proposed project.*

Response: The City of San José prepared a Water Supply Assessment[1] previously, assuming a project recycled water demand of 1,673 acre-feet per year (AFY). The City concluded the following.

> "Although the recycled water demands of the project are significant, meeting these demands falls within SBWR's future projections for recycled water sales. The use of recycled water represents a reliable, sustainable, local and drought-proof supply of cooling water for the Project's operations."

Therefore, it's reasonable to conclude that the recycled water portion of SJC02's 29.1 AFY of water use is available by the supplier.

[1] https://www.sanjoseca.gov/home/showdocument?id=20881

Attachment DR-33
Emissions Calculations

Attachment DR-33

An electronic copy of the Appendix 3.3 Emission Calculations with embedded calculations live and intact has been provided under separate cover and is available upon request.

Attachment DR-45
Manufacturer Correspondence

Power Systems

Jerry Salamy
Jacobs – Project Manager
2485 Natomas Park Drive, Suite 600
Sacramento, CA 95833

January 23rd, 2020

Dear Jerry,

This is in regard to request for in-stack NO_2/NO_x ratio for our C3000-D6e product, with a QSK95 engine.

For the QSK95 in this generator application, where the generator is under load of 10% or more of rated power, NO_2 is up to 5% of NO_x constituents in the exhaust. As per our SCR manufacturer, NO_2 is then reduced to 0% of NO_x after the SCR.

At lower loads, less than 10% of rated power, NO_2 can rise to around 7% of NOx constituents in the exhaust. In these lower load conditions, as per our SCR manufacturer, NO_2 will be reduced to less than 5% of NO_x after the SCR.

Sincerely,

Andrew Panning
Application Engineer - Technical Specialist

Cummins Inc.
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