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PG&E RESPONSES TO STAFF DATA REQUESTS CONCERNING INTERCONNECTION OF GREAT OAKS SOUTH BACKUP GENERATING FACILITY SUBMITTED ON AUGUST 17, 2020.

Note: CEC has received responses from PG&E to staff's questions for PG&E, presented below. Staff has modified these responses by underlining PG&E's responses to staff's questions for ease of reading.

Great Oaks South Backup Generating Facility (20-SPPE-01)

Questions for PG&E

A. Santa Teresa Substation design related to the Great Oaks South Data Center and the redundancy of the PG&E 115 kV system in San Jose Division.

It appears there are three data centers, Equinix, China Mobile and Ri Cloud (China Telecom) that all propose to interconnect to the Santa Teresa substation (from PG&E Advice letter 6501-E and 5601-E-A). The Equinix Data Center is actually on the same site as the proposed Great Oaks South Data Center (GOS data center) in the application filed by SV1, LLC, a wholly owned subsidiary of Equinix, LLC (SV1) before the California Energy Commission and we think they are essentially the same project. Equinix was a 63 megawatt (MW) data center. The GOS data center before the Energy Commission is a staged data center that, if approved or exempted, could ultimately be a 99 MW data center load.

1. Information provided by the GOS data center to the Energy Commission indicated that there would be five 21 kilovolt (kV) underground cable connections between the Santa Teresa Substation and the GOS data center.
    a. Without a "load application for the GOS project," can you confirm the above statement? Yes, each 21 kV circuit can serve approximately 20 MW of load. 99 MW would require five 21 kV circuits, each rated 20MW. MW circuits

The Email from Jennifer Goncalves to Laiping Ng from Friday July 3, 2020 included two sets of one-line diagrams, one labeled "Santa Teresa – planned" and Santa Teresa – Ultimate."

The "planned" Santa Teresa substation has two 115 kV lines connecting to a 115 kV bus and a single transformer from the 115 kV bus to the 21 kV bus (assume it is 21 kV). There are four circuits leaving the 21 kV bus. The "ultimate" Santa Teresa substation has three 115 kV lines connected to the 115 kV bus and three transformers between

the 115 kV and 21 kV bus (assume it is 21 kV). There are twelve circuits leaving the 21 kV bus.

2. Does the "planned" Santa Teresa substation allow for the interconnection of the GOS (Equinix) data center? No, the planned substation does not have sufficient capacity to serve the GOS, but the ultimate substation does. New banks and feeders will be added to Santa Teresa substation when load forecasts predict that the existing bank and/or feeders will be above normal capacity. Load forecasts include the impact of growth from both new applications for service and the added load of existing customers.

3. What project/projects trigger the need for the "ultimate" Santa Teresa substation? Load forecasts include the impact of new load from applications for service. The Great Oaks South data center would submit an application for service for one or more phases of their project and PG&E would study the impact to the system from the new load. If the load forecast shows the facilities at Santa Teresa Substation above normal capacity, a project to address the capacity need would be initiated. This project may be a reconfiguration of existing circuits, the installation of new banks and feeders, or a Request for Offer from a third-party DER provider.

4. Does a new, third, 115 kV line need to be sited and developed in the area to allow growth from the "planned" to the "ultimate" Santa Teresa substation? This is unknown at the present time and requires a complete transmission study. The ultimate design includes this third 115 kV line as a possible connection, and it should be understood that the third line could be a new 115 kV line to a future customer site in order to serve new load.

5. What are the ratings for the three 115 kV lines that connect to the Santa Teresa substation and what substations do they connect to?
    a. If one of the lines is out of service, can the loads connected to the Santa Teresa substation be supplied through the remaining line or lines? This is unknown at this time and would require a complete transmission study. The exisiting Metcalf- Edenvale #1 and #2 115 kV lines are bundled 715.5-37 Aluminum conductors on Lattice Steel towers. The scope of the section looping into the new Santa Theresa 115 kV substation is unknown at this point, but would most likely match the existing conductors and towers to main structural integrity and Right of Way requirements.

6. What are the ratings for the transformers in the Santa Teresa substation? Each transformer will be 45 MVA.

a. Is it correct that for the "planned" substation the loads connected to the 21 kV bus would be dropped or shut-off when maintenance was required on the 115/21 kV transformer? No, that is not correct. Planned maintenance is done at a time of low loading and loads are moved to adjacent substations. If all loads cannot be moved to adjacent substations then temporary mobile generation is usually employed to serve the loads that cannot be moved.

b. For the "ultimate" Santa Teresa substation would two of the 115/21 kV transformers be capable of supplying the full loads of the 21kV bus when the third transformer is undergoing maintenance or out of service? Yes, the plan would be that two of the three transformers could serve all loads in either an emergency or a planned clearance.

7. What MW size GOS or Equinix data center does the "Ultimate" design one-line diagram accommodate? The ultimate design could serve 45 X 3 or 135 MVA of load. / Among the 12 feeders shown in the one-line diagram, are five feeders designed for GOS? No. None of the feeders except the first four are designed for any particular customer or with any particular customer in mind.

8. How many of the feeders serving GOS could undergo maintenance simultaneously, for example to service an underground vault containing multiple feeders, without disrupting service to GOS? This is unknown at this time because the feeders have not been designed, but is is typical to run only two feeders per trench and only two feeders into any one vault.

9. According to a California Energy Commission (CEC) map of the local area, electricity for Santa Teresa substation would come from a double circuit 115 kV line coming from the Metcalf substation located to the southeast of Santa Teresa substation and extending to the Edenvale substation. But this is the only line supplying electricity to Edenvale and it appears that Edenvale is a radial extension from Metcalf. If there is loss of power from the Metcalf substation, how would electricity be supplied to Santa Teresa substation? Are there additional lines serving Edenvale that are not on the CEC map? Can Edenvale supply the full capacity needs of Santa Teresa without Metcalf? It should first be understood that there are two 115 kV lines that presently run between Metcalf and Edenvale. This system is not a radial system, it is part of the transmission network. One 115 kV line is planned to loop through the new Santa Teresa Substation once that substation is placed in service. Because of the network design, the transmission line to Santa Teresa will be in service as long as either 115 kV from Metcalf to Edenvale has power. Does this Ultimate design one-line

diagram for the Santa Teresa substation include interconnection for the 99 MW GOS data center (Equinix) and the other two data centers (China Mobile and Ri Cloud) mentioned in Advice Letter 5601-A? The ultimate design will be able to serve the known loads from Equinix SV11, China Mobile, and RiCloud. At this time, and with no other customer applications in the area, it would be able to serve the proposed loads from the GOS data center.

B. Trigger need for reconductor/line re-rate

We understand from Ms. Goncalves' email that a load study would be needed to determine whether reconductoring or a line re-rate is required for the 115 kv lines to carry the full load of the data center (99 MW), independently. We have the following related questions:

10. How long does a load study take to complete?
    The Large Load Study timeline to complete the Preliminary Engineering Study (PES) is 90 bussiness days. Once the PES is signed by the customer, the project will be handed-off to the Project Manager for implementation. If there are any network upgrades like reconductoring the transmission lines, the typical duration for reconductoring can vary between 12-24 months depending on the scope of projects(reconductoring, tower replacement, additional ROW). Environmental review of the circuit may require Notice of Construction (NOC) from CPUC which could be another 6-8 months.

11. Who requests a load study be conducted? The customer/applicant, along with payment of an Engineering Advance.
    Are there other ways of determining whether a reconductoring or line re-rate is necessary other than conducting a load study?
    A Full Load Study must be performed to see the impacts of the proposed project to be interconnected. If a project is a phased project and if the project proponent provides an application for service for each phase of the project, then PG&E will study each phase separately and make system modifications in order to accommodate each phase.

12. If reconductoring were determined necessary, what level of detail will be known? Construction methods (like use of a helicopter), replacement of existing equipment other than the transmission line (like transmission towers).
    - PES provided during the study phase will identify a high-level scope, cost and duration for the reconductoring project. The scope may include conductor selection, tower replacement, ROW requirements, upgrades and limiting equipment at the substation. Once the project is handed-off to a Project Manager and the project is initiated, the detailed scope for the load interconnection will be determined. Use of helicopter is part of construction and not identified in the PES.

- What is the scope of the reconductoring, if it were necessary- e.g. length of line, conductor type and rating? A Full Load Study must be performed to see the impacts of the proposed project to be interconnected.

C. Reliability of the San Jose 115 kV system:

13. Will PG&E be able to manage future PSPS events to ensure that they would not affect the delivery of service to these substations (Santa Teresa, Metcalf, Edenvale)?

    If severe weather threatens a portion of the electric system, it may be necessary for PG&E to turn off electricity in the interest of public safety. No single factor drives a PSPS, as each situation is unique. PG&E carefully reviews a combination of many criteria when determining if power should be turned off for safety. These factors generally include, but are not limited to:

    1) A Red Flag Warning declared by the National Weather Service
    2) Low humidity levels, generally 20 percent and below
    3) Forecasted sustained winds generally above 25 mph and wind gusts in excess of approximately 45 mph, depending on location and site-specific conditions such as temperature, terrain and local climate
    4) Condition of dry material on the ground and live vegetation (moisture content)
    5) On-the-ground, real-time observations from PG&E's Wildfire Safety Operations Center and field crews

    It is important to note that while we monitor and take into consideration Red Flag Warnings issued from the National Weather Service, the issuance of a Red Flag Warning does not automatically trigger a PSPS if local conditions do not warrant activation.
    While it is impossible to predict with certainty when, where and how often severe weather could occur, depending on the location, areas could experience an average of 0 to 5 events per year.

    The most likely electric lines to be considered for a public safety power outage will be those that pass through areas that have been designated by the California Public Utilities Commission (CPUC) High Fire Threat District (HFTD) map as at elevated (Tier 2) or extreme risk (Tier 3) for wildfire. Customers outside of these areas could have their power shut off, though, if their community relies upon a line that passes through a high fire-threat area or an area experiencing severe weather. Short sections of both Metcalf-Edenvale #1 and #2 115kV circuits have been designated as residing in a Tier 2 area.

    PG&E knows that PSPS is very disruptive and customers need as much warning as possible. PG&E uses the contact information associated with the customers' PG&E account to reach them. So, as a first step customers are asked to please

ensure that PG&E has their correct email address, landline number and mobile number.

PG&E will attempt to contact customers through automated calls, texts and emails. PG&E will do its best to give customers as much notice as possible. This year, we are updating our customer alerts about PSPS events to provide more detail earlier – including estimated time of restoration – about what to expect during PSPS events. We will also use pge.com and social media channels, and we will keep local news and radio outlets informed and updated.

Timing of notifications: If we need to turn off customers' power for safety, we aim to provide advance notifications in three phases:

1) Advance notification (when possible)
   - Two days before electricity is turned off
   - One day before electricity is turned off
   - Just before electricity is turned off
2) During the public safety outage
3) Once power has been restored

NOTE: Due to the focus on safety, the shutoff notification will be sent at any time, day or night. PG&E aims to send all other notifications between 8 a.m. and 9 p.m. However, severe weather threats can change quickly, and there may be some instances when notifications may be sent outside of those hours.

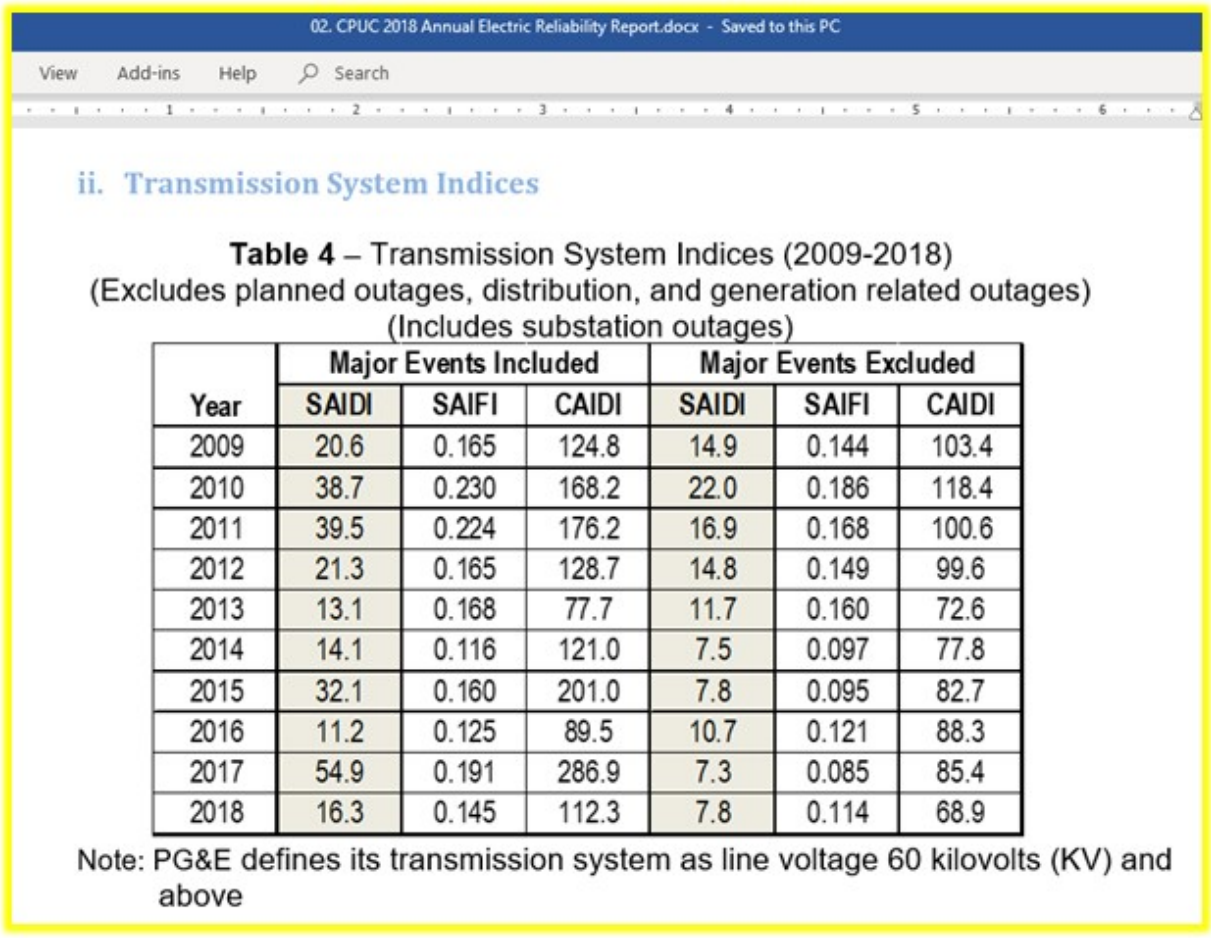
14. Please use the database mentioned in *PG&E's 2018 Annual Electricity Reliability Report* to the CPUC in response to D16-01-008 to develop a table similar to Table 4 in that report.

    We would like the response to this request to be tailored to the capacity of the lines that would support the Santa Teresa substation. We seek to understand the reliability of the transmission line system in the division within which the Santa Teresa substation would be located (we think that is the San Jose Division). Please provide the same parameters shown in Table 4.

    A screen shot of Table 4 from PG&E's 2018 Annual Electric Reliability Report to the CPUC is shown below. The indices in this table – i.e., SAIDI (system average interruption duration index), SAIFI (system average interruption frequency index) and CAIDI (customer average interruption duration index) are industry standard reliability measures based on customers served at distribution voltage levels – i.e., 4kV, 12kV or 21kV within PG&E's service territory. When an unplanned outage occurs on PG&E's electric "Transmission System", customers served at a distribution voltage level are usually unaffected. Table 4 captures all those 2018 unplanned outages when a transmission or substation "failure" resulted in a sustained event that contributed to SAIDI, SAIFI and CAIDI indices.

The electric transmission sources to the proposed Santa Teresa substation are the existing Metcalf-Edenvale #1 and Metcalf-Edenvale #2-115kV lines. Currently, when one of these 115kV lines experiences an unplanned outage, no customers served at the distribution voltage level are affected. There is one customer (IBM) served at the transmission voltage level, but that one customer per IEEE standard 1466 is not included in SAIDI, SAIFI or CAIDI calculations.

The only time Edenvale customers would experience an outage would be if both 115kV feeds above simultaneously experienced an unplanned outage. The historical unplanned outage table below provides an outage history going back to 2007 and through July 2020 for the Metcalf-Edenvale #1 and #2 115kV circuits. This outage history table shows no such events where a simultaneous outage occurred. Hence, populating a table similar to Table 4 from the CPUC report and specific to these two circuits cannot be done. However, the historical outage table below for both these circuits clearly shows that both lines have been very reliable and available for service over the years since 2007. Assuming a similar substation bus design at Santa Teresa to that of Edenvale, the expectations for availability/ reliability would be no different moving forward.


02. CPUC 2018 Annual Electric Reliability Report.docx - Saved to this PC

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ii. Transmission System Indices

Table 4 – Transmission System Indices (2009-2018)
(Excludes planned outages, distribution, and generation related outages)
(Includes substation outages)

	Major Events Included			Major Events Excluded		
Year	SAIDI	SAIFI	CAIDI	SAIDI	SAIFI	CAIDI
2009	20.6	0.165	124.8	14.9	0.144	103.4
2010	38.7	0.230	168.2	22.0	0.186	118.4
2011	39.5	0.224	176.2	16.9	0.168	100.6
2012	21.3	0.165	128.7	14.8	0.149	99.6
2013	13.1	0.168	77.7	11.7	0.160	72.6
2014	14.1	0.116	121.0	7.5	0.097	77.8
2015	32.1	0.160	201.0	7.8	0.095	82.7
2016	11.2	0.125	89.5	10.7	0.121	88.3
2017	54.9	0.191	286.9	7.3	0.085	85.4
2018	16.3	0.145	112.3	7.8	0.114	68.9

Note: PG&E defines its transmission system as line voltage 60 kilovolts (KV) and above

kV	FACILITY	Date Out	MED	ET Wire Down	Auto Reclose Disabled	Durn (mins)	Cause Category	Cause Detail	Secondary Cause	Comments	Customers Affected
115	METCALF-EDENVALE #2	7/6/2008 2:22:00 PM	No	No	No	0	Unknown	Patrol found nothing	NONE	Relayed, tested OK, as did IBM BaileyAve tap (plant closed for holiday); weather clear; eventID=5809	0
115	METCALF-EDENVALE #1	11/19/2009 1:44:00 PM	No	No	No	11	Other	Safety clearance	RELY	Forced out Edenvale CB-112 to test breaker back-up relay, open ending this line	0
115	METCALF-EDENVALE #2	8/31/2010 8:04:00 PM	No	No	No	315	Equipment Failure	ccvt	AUX	Forced out due to NG CCVT at Metcalf; no customer interruption	0
115	METCALF-EDENVALE #2	11/20/2011 1:52:00 AM	No	No	No	501	Equipment Failure	Relay	RELY	Relayed, tested NG (Aware Time=0433); caused by mis-operation of a faulty line current differential relay; SUS IBM Bailey (1); rain; 0936 line manually tested OK restoring IBM Bailey; 1013 line returned to service	1
115	METCALF-EDENVALE #2	11/23/2011 8:52:00 AM	No	No	No	297	Other	Safety clearance	RELY	Open-ended after Edenvale CB-122 forced out to install temporary relay; no customers interrupted	0
115	METCALF-EDENVALE #2	11/28/2011 3:13:00 PM	No	No	No	163	Other	Safety clearance	RELY	Open ended after Metcalf CB-482 forced out to install temp line relay; no customers interrupted	0
115	METCALF-EDENVALE #2	3/16/2012 10:36:00 PM	No	No	No	0	Equipment Failure	Relay	RELY	Relayed, tested OK; MOM IBM Bailey; rain; new current differential relays recently installed @ IBM & 1 was found with H20 after rain; eventID=8316	0
115	METCALF-EDENVALE #2	7/9/2012 8:05:00 PM	No	No	No	0	Unknown	Patrol found nothing	NONE	Relayed, tested OK; MOM IBM Bailey; weather clear; ground & air patrols found no cause, no damage	1
115	METCALF-EDENVALE #1	4/16/2013 1:47:00 AM	No	No	No	0	External Contact	Vandalism	CB	Open-ended after Metcalf CB-472 tripped, reclosed by automatics; line subsequently forced out at 1322 same day to effect repairs on damaged CB	0
115	METCALF-EDENVALE #1	4/16/2013 1:22:00 PM	No	No	No	5,968	External Contact	Vandalism	CB	De-energized to force out Metcalf CB-472 due to gunshot damage (had relayed, reclosed by autos earlier in day @ 0147); no customers interrupted	0
115	METCALF-EDENVALE #2	7/13/2013 8:03:00 AM	No	No	No	673	Equipment Failure	Relay	RELY	Open ended after Edenvale CB-122 forced out to install temp line relay due to NG backup relay; no customers interrupted	0
115	METCALF-EDENVALE #1	10/16/2013 2:08:00 PM	No	No	No	1,655	Equipment Failure	ccvt	AUX	Forced out from scheduled work due to NG CCVT; 10/17/13, 1743 line returned to service following repairs	0
115	METCALF-EDENVALE #1	4/24/2014 9:15:00 AM	No	No	No	0	Animal	Bird	NONE	Relayed, tested OK; momentary IBM; weather clear; reported bird contact at tower 4/26; clearance will be scheduled to remove hawk's nest	1
115	METCALF-EDENVALE #1	7/23/2014 6:10:00 PM	No	No	No	9,917	Equipment Failure	Relay	CB	Forced out from scheduled work after CB failed to close during switching; no customers interrupted; 07/30/14, 1527 Edenvale CB-112 closed, line normal after replacing failed 52Y relay & CB close latch	0
115	METCALF-EDENVALE #2	1/4/2017 11:27:00 AM	No	No	No	0	Unknown	Patrol found nothing	NONE	While personnel in stn Metcalf-Edenvale#2 momentarily open ended after Metcalf CB-482 tripped, reclosed by autos; no customers interrupted; rain	0
115	METCALF-EDENVALE #2	6/4/2018 2:49:00 AM	No	No	No	0	Unknown	Patrol found nothing	NONE	Relayed, tested OK; momentary IBM; weather clear; B-G fault 1.0 mi from Metcalf near 000/006, +/-0.5 mi	1
115	METCALF-EDENVALE #2	1/18/2019 9:25:00 AM	No	No	No	2,090	Equipment Failure	Relay	RELY	Open-ended after Metcalf CB-482 forced out to replace NG set B relay; no customers interrupted; 01/19/19, 2015 Metcalf CB-482 returned to service	0
115	METCALF-EDENVALE #1	2/12/2019 11:57:00 PM	YES	No	No	0	Weather	Rain	NONE	Relayed, tested OK; momentary IBM; rain, wind; B-G fault 1.2 mi from Metcalf near 001/008, +/-0.5 mi; declared Major Event Day	1

TABLE xx: UNPLANNED OUTAGE HISTORY METCALF-EDENVALE # 1 AND # 2 115kV