Southern California Edison
A.09-09-022 – Alberhill PTC & CPCN

DATA REQUEST SET E D - A l b e r h i l l - S C E - J W S - 2

To: CPUC
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Response Date: 4/5/2019

Question 01d: Provide additional analysis as required by Decision D. 18-08-026, Ordering Paragraph 4, items 4b, 4d, 4e, and 4h, replicated below:

d) An analysis of several years of electric reliability performance for the Valley systems to demonstrate existing customer service level

Response to Question 01d:

To demonstrate several years of electric reliability performance for the Valley systems, Tables 1 and 2 and Figure 1 provide the SAIDI[1] and SAIFI[2] reliability data, respectively, for all outages in the Valley North and Valley South subtransmission systems (together comprising the Valley System). Also provided for comparison are SAIDI and SAIFI averages for all subtransmission systems,[3] including the split systems, that are served from the 43 A-bank substations[4] throughout SCE's service territory.

SAIDI and SAIFI data are the principal metrics used to report on historical system reliability; however, they are primarily influenced by events at the distribution system level and thus are less informative for planning at the subtransmission system level. This is because when an electric power system has sufficient substation transformer capacity[5] and/or system tie-lines, and is properly maintained and operated, reliability performance is driven largely by random, distribution level

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[1] Per IEEE Standard 1366, "*IEEE Guide for Electric Power Distribution Reliability Indices*", SAIDI is defined as the total duration of interruption for the average customer during a predefined period of time (measured in minutes per customer).

[2] Per IEEE Standard 1366, "*IEEE Guide for Electric Power Distribution Reliability Indices*", SAIFI is defined as the number of times the average customer experiences a sustained interruption over a predefined period of time (measured in interruptions per customer).

[3] SCE serves a total of 56 distinct subtransmission systems from 43 A-bank substations. There are 31 A-bank substations that serve a single subtransmission system, 11 A-bank substations that serve two subtransmission systems, and one A-bank substations that serves three subtransmission systems. The A-bank substations that serve more than a single subtransmission system are called "split systems" Valley Substation is one of the 12 A-bank substations that are split and Valley South is an example of one of the subtransmission systems from these split systems.

[4] SCE defines its "A-bank" substations as load-serving transmission substations that transform voltage from the transmission level (220 kV or 500 kV) to the subtransmission level (115 kV or 66 kV) and then deliver power to multiple distribution substations.

[5] "*Capacity*" is the availability of electric power to serve load and is comprised of *transformer capacity* (the ability to deliver power through the transmission system through substation transformers) and *subtransmission system line capacity* (the ability to deliver power to substations which directly serve customer load). This definition is derived from SCE's "*Subtransmission Planning Criteria and Guidelines*."

events. These events are typically associated with equipment failures or damage introduced by animal intrusion, weather or third parties, and by a utility's ability to respond to these events in a timely manner. Thus, although incremental improvement of SAIDI and SAIFI metrics could be expected to occur as a result of the increased operational flexibility obtained from a project such as the Alberhill System Project (ASP), the past reliability performance of the Valley Systems is not a driver for the proposed project.

As discussed throughout the ASP Certificate of Public Convenience and Necessity (CPCN) Proceeding, the reliability issues of the Valley South System are driven by the need for both Valley South substation transformer capacity and system tie-lines to maintain service to customers under both routine and abnormal system conditions. As available substation transformer capacity margin is reduced, the ability to serve load during peak conditions is threatened. Flexibility of system operators to mitigate this threat is limited by lack of system tie-lines. This leaves the utility operator with few options other than dropping load to avoid damaging equipment and the additional consequence of prolonged service outages to customers. The SAIDI and SAIFI data provided here show that, to date, the capacity of the Valley System has been sufficient to serve all system customers under commonly planned for normal and extreme weather conditions. However, degradation in reliability performance is expected to occur once the substation transformer capacity margin has been eliminated. Simply put, the existing system has met past needs, but will soon be inadequate to handle future needs, therein creating reliability problems.

In summary, in its current status, Valley South operates at or very close to its maximum operating limits, has no connections (tie-lines) to other systems, and represents the largest concentration of customers on a single substation in SCE's entire system making it uniquely vulnerable to capacity and reliability issues. In the case of a major heat storm, SCE's ability to maintain service to its customers in the Valley South System is currently at risk. As electrical demands grow, these existing reliability risks will only increase. The peak demand served by the Valley South System is expected to exceed capacity by 2022 based on the SCE 2018-2027 ten-year load forecast, impacting SCE's ability to provide continuous safe and reliable electrical service to the approximately 500,000 people it serves in the Valley South System.

Table 1 - Service Level SAIDI Performance by Year

System	2014	2015	2016	2017	2018	5 Year Total	5 Year Average
Valley (North)	5.104	3.450	5.043	4.324	6.216	24.138	4.828
Valley (South)	4.021	2.094	3.132	3.310	2.040	14.596	2.919
(11[1]) Split System Average	1.628	1.761	2.281	1.994	2.525	-	2.038
(55[1]) Systems Average	1.975	2.028	2.398	2.450	2.206	-	2.212

Note 1: SCE A-bank substations serve a total of 56 electrical systems, one of which serves the City of Riverside Public Utilities municipality. SAIDI data is not available for this system.

Table 2 – Service Level SAIFI Performance by Year

SAIFI System	2014	2015	2016	2017	2018	5 Year Total	5 Year Average
Valley (North)	0.040	0.032	0.042	0.032	0.028	0.174	0.035
Valley (South)	0.029	0.022	0.033	0.029	0.024	0.136	0.027
(11[1]) Split System Average	0.015	0.014	0.019	0.016	0.013	-	0.016
(55[1]) Systems Average	0.017	0.016	0.020	0.021	0.015	-	0.018

Note 1: SCE A-bank substations serve a total of 56 electrical systems, one of which serves the City of Riverside Public Utilities municipality. SAIFI data is not available for this system.

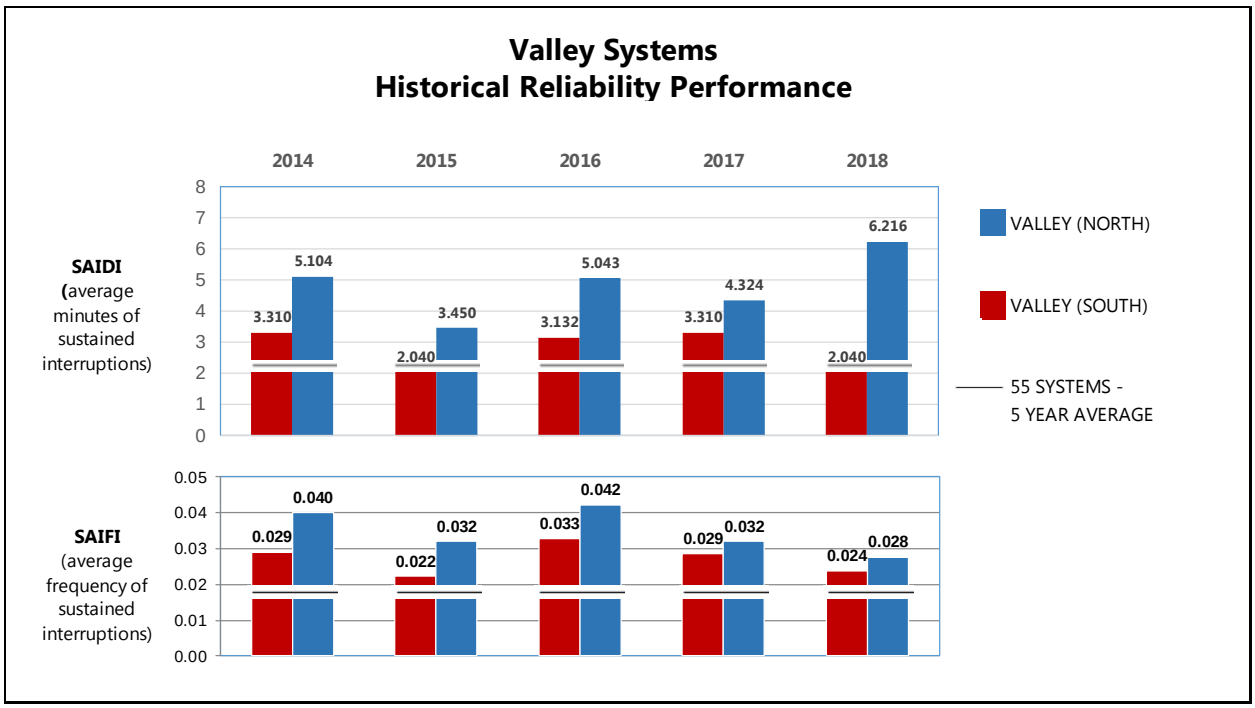

Figure 1 – Valley Systems Historical Reliability Performance