

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 4/20/2020

Question DG-C-6:

What contingencies were studied and what probabilities for each were used in the Planning Study and what durations (and why) (Planning Study – pg 4 of Planning Study)? Are the probabilities for existing lines based upon historical performance? Are the probabilities for new lines based on industry averages (in-line with historical performance)? Does SCE use a 4-hour duration to calculate line outages? What is used to calculate flex outages?

Response to Question DG-C-6:

In order to support the evaluation of project alternatives and quantify their performance benefits (for the cost-benefit analysis), several contingencies were considered in this study. These include N-1 contingencies, N-2 (including N-1-1) contingencies and other high-impact, low probability events.¹ Refer to SCE's response to 2020-0406 Data Request No. 3, Question DG-C-9 for a list of the studied contingencies. Additional details including associated probabilities are described below:

The Expected Energy Not Served (EENS) N-1 metric quantifies outages due to N-1 contingencies, which are single system component (e.g., subtransmission line) outages. The probabilities were derived from historical performance data available over the life of the system component. Probabilities for new lines in the system have been associated with probabilities of existing lines with comparable length. This metric was monetized assuming a four-hour outage duration. This duration represents the average outage period based on historical performance data from recorded, sustained subtransmission line outages in the Valley South system.

The Flex-1 metric quantifies outages due to contingencies involving two lines out-of-service (N-1-1 and N-2), which represents a sequence of events consisting of an initial outage of a single system component (e.g., subtransmission line), followed by a second outage of a single system component (for purposes of power flow analysis and the evaluation of the Flex-1 metric, N-1-1 and N-2 are

¹ Alternatives of the cost-benefit analysis were scoped to address N-1 contingencies consistent with SCE's planning criteria. Alternatives development did not include scope to address N-1-1 (or N-2), or other high-impact, low-probability contingencies as these events are more extreme than those considered in SCE's planning criteria. However, these types of contingencies were assessed to evaluate the performance of alternatives (beyond what is required in SCE's planning criteria) and to further differentiate alternatives relative to others.

equivalent). The probabilities associated with the double outages are derived as the product of individual circuit outage probabilities (using the same individual circuit outage probabilities as the EENS N-1 metric). This metric was monetized assuming a five-hour outage duration. It was observed from SCE's planning studies that the system is most at risk of significant performance issues (due to two-line outages) while operating at loading levels greater than threshold 900 MVA. This threshold was determined by analyzing the average number of hours at risk on the annual peak day of each year of the 30-year load forecast used in the cost-benefit analysis. Hence, the five-hour duration is derived from analysis of the average number of hours the system is operating above this threshold limit.

The study also considered high-impact, low-probability contingencies, which are quantified using the Flex-2-1 and Flex-2-2 metrics. The Flex-2-1 metric quantifies the outage of the entire Valley Substation which includes an outage to all transformers (load-serving and spare) serving both the Valley North and South Systems. A very low probability is associated with this expected 1-in-100 year event and has been used to reflect the occurrence frequency of this outage. This metric was monetized assuming a two-week outage duration, which is reflective of the expected minimum restoration duration for an event of this magnitude. However, it is noted that for an extreme event such as this, it is reasonable to expect the duration could be much longer. The Flex-2-2 metric quantifies the simultaneous outage of two transformers from Valley Substation and assumes that of the three remaining in-service transformers (including the spare), only one is serving the Valley South System. This contingency event represents an outage of both Valley South System transformers with only the spare transformer being able to be aligned with the Valley South System. A low probability of 1-in-60 year event has been used to quantify the frequency of this outage. This is consistent with the event occurring once over the life of the asset. The duration of this outage is dependent on the duration in which system loading is above the rating of the single transformer remaining in-service. The total EENS over each year is then multiplied by the probability of the event occurrence.

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DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 5/3/2021

Question DG-C-6 Revised:

What contingencies were studied and what probabilities for each were used in the Planning Study and what durations (and why) (Planning Study – pg 4 of Planning Study)? Are the probabilities for existing lines based upon historical performance? Are the probabilities for new lines based on industry averages (in-line with historical performance)? Does SCE use a 4-hour duration to calculate line outages? What is used to calculate flex outages?

Response to Question DG-C-6 Revised:

Revision 1 of this data request is being submitted to reflect changes documented in Southern California Edison's February 1, 2021 Amended Motion to Supplement the Record.

The Planning Study analyzes N-1 subtransmission line contingencies (N-1 metric), N-2 subtransmission line contingencies (Flex-1 metric), and transformer/substation contingencies (Flex-2-1 and Flex-2-2). Details on the specific contingencies can be found in Section 6.3 of SCE's amended Motion to Supplement the Record.

Outage frequencies for the N-1 and Flex-1 metrics are based on SCE historical outage data in the Valley South and Valley North Systems. Outage frequencies for the Flex-2-1 and Flex-2-2 metrics are based on industry data. For details on outage frequencies used for the Flex-2-1 and Flex-2-2 metrics, see SCE's response to A.09-09-022 TURN-SCE-Alberhill-006 Question 03d (attached hereto). For details on the outage frequencies used for the N-1 and Flex-1 metrics, see SCE's response to A.09-09-022 TURN-SCE-Alberhill-006 Question 03e (attached hereto).

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

DATA REQUEST SET TURN-SCE-Alberhill-006

To: TURN
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 8/12/2020

Response Date: 2/24/2021

Question 03e:

SCE, in its Compliance Filing, selected four main benefit categories for monetization using Value of Service: EENS under N-0 conditions, EENS under N-1 conditions, Flex-1, and Flex-2. SCE summarized its results in Table 8-4, pp. C1-58 and C1-59.9

e. SCE stated that “Line outage probabilities were calculated from historical data for each subtransmission and distribution circuit within the Valley South System. ... Duration for line outages were four hours for EENS N-1 contingencies, and 5 hours for N-1-1 (N-2) contingencies for the Flex-1 metric.” 13

Please provide the historical data SCE used. Please provide all calculations and work papers SCE used in deriving the 4 hours and 5 hours duration assumptions.

Response to Question 03e:

SCE has revised its Compliance Filing since submission of this data request question. See the summary of revisions provided in Appendix C for further information. The frequencies and durations described in the question have been revised. The revised Compliance Filing now uses 2.8 hours for N-1 outages and 3 hours for N-2 outages. A discussion of the line outage frequencies and durations is provided below.

Line outage frequencies for the N-1 and Flex-1 metric are based on historic data of the Valley North and Valley South Systems. SCE used its outage database to study line outage data, including start and end dates, duration, and cause of outages for these systems from 2005 through 2018. A significant number of these outages are brief, and the study excludes momentary outages which are less than 1 minute in duration. The data is provided in the attached file titled “A.09-09-022 TURN-Alberhill-SCE-006 Question 3e.xlsx”.

Each sustained outage was categorized as either:

- N-1 (for the N-1 metric), where a single line is out-of-service; or
- N-2 (for the Flex-1 metric), where two lines that share a common pole are simultaneously out of service due to a common-mode failure event.

N-2 contingencies were determined by sorting the outages by date. If two line outages occurred on the same date and time, and share a common double-circuit pole, there is high likelihood that the same event caused the N-2 outage. This assumption was confirmed in select cases by review of detailed outage logs. Lines as part of N-2 outages typically did not have the same outage duration since restoration times vary. For purposes of this study, the shorter outage duration of the two lines was taken as the duration of the N-2 outage. The remaining outage duration time for the second out-of-service line was ignored and not counted towards N-1 outage duration. N-1-1 outages (overlapping outages of two lines that don't share a common pole) were treated as separate N-1 outages as opposed to N-2 since the normalization of mile-years for N-2 outages was based on double-circuit mile-years. Additionally, the number of N-1-1 outages was minimal, and the limited duration would not significantly change the results for N-1 or N-2.

Since the system planning analysis studied 13 different system configurations (ASP and the alternatives) with differing single-circuit and double-circuit mileage, the outage frequency is normalized by mile-years of line operation. Along with the outage frequency for each Valley South and Valley North lines described above, the total mile-years (for single-circuit and double-circuit lines) were calculated for each line, while taking into account configuration changes throughout the evolution of each of the electrical systems over time. Historical line configuration data was studied for both the Valley South and Valley North Systems, including the in-service month and year and out-of-service month and year. This information was used to determine the years of service for each line within the outage database query timeframe (2005-2018). For example, lines that were placed into service prior to 2005 and also removed from service prior to 2005 would have a service life of 0 years for this study, since no line outages for that particular line would have been captured in the outage query which started in 2005. Similarly, a line placed into service prior to 2005, and that is still in service today, would have a service life of 14 years for the purposes of this study, since the outage database query only captured outages from 2005 to 2018. Mile-years are calculated for the total route length, i.e., mileage from substation to substation following the route for both single-circuit and double-circuit structures, since the likelihood of an outage is dependent on its exposure to N-1 or N-2 failure modes. N-2 mile-years are based on the route length and not the circuit length of each line, since this would double count the length of double-circuit exposure.

The number and duration of N-1 and N-2 outages, as well as mile-years of operation are provided below for each individual line, the Valley South System, the Valley North System, and the combined Valley System. Frequency of outages per 100 mile-years and the mean duration were calculated as follows:

- Frequency = total sustained outages / mile-years *100
- Mean Duration = total duration / total outages

N-1 results for Valley South and Valley North lines are provided in Table 1. Table 2 provides N-1 and N-2 results for the Valley South System, Valley North System and for the total Valley System. N-2 outages are limited and are therefore not explicitly expressed. Since outage history is not available for lines created by ASP or the alternatives, the Valley System-wide results are used (3.4 outages per 100 mile-years and 2.8 hours for N-1 outages, and 0.8 outages per 100 mile-years and 3 hours for N-2 outages).

Table 1 –Valley North and Valley South N-1 Line Outage Results

	Mile- Years (MY)	Total Number of Sustained Outages (NO)	Total Time, Hours (TT)	Frequency, outages per 100 mile- years (FM)	Mean Duration, hours (MD)
Lakeview-Moval	35	0	0.00	0.0	0.00
Mayberry-Nelson	91	0	0.00	0.0	0.00
Moreno-Moval-Vista	154	5	10.45	3.2	2.09
Nelson-Stetson	54	3	14.17	5.5	4.72
Valley-Alessandro-Bunker	221	13	64.98	5.9	5.00
Valley-Alessandro-Cajalco	286	7	6.87	2.4	0.98
Valley-Bunker-Cajalco	256	9	16.48	3.5	1.83
Valley-Lakeview	24	1	7.47	4.2	7.47
Valley-Mayberry-Moreno-Vista	708	29	89.45	4.1	3.08
Valley-Moreno-Vista	81	2	0.07	2.5	0.03
Valley-Moval	176	7	95.30	4.0	13.61
Valley-MWD-Stetson	159	17	22.45	10.7	1.32
Valley-Nelson	165	3	0.53	1.8	0.18
Auld-Moraga No. 1	89	0	0.00	0.0	0.00
Auld-Moraga No. 2	103	0	0.00	0.0	0.00
Auld-Sun City	102	2	0.32	2.0	0.16

Table 1 –Valley North and Valley South N-1 Line Outage Results

	Mile- Years (MY)	Total Number of Sustained Outages (NO)	Total Time, Hours (TT)	Frequency, outages per 100 mile- years (FM)	Mean Duration, hours (MD)
Elsinore-Skylark	672	1	11.73	0.1	11.73
Fogarty-Ivyglen	67	3	13.57	4.5	4.52
Moraga-Pechanga	72	5	40.37	6.9	8.07
Moraga-Stadler	12	0	0.00	0.0	0.00
Moraga-Stadler-Stent	83	5	5.92	6.0	1.18
Pauba-Pechanga	108	4	20.03	3.7	5.01
Pauba-Triton	46	1	0.05	2.2	0.05
Skylark-Stadler	55	0	0.00	0.0	0.00
Skylark-Tenaja	37	0	0.00	0.0	0.00
Stadler-Tenaja	43	2	24.07	4.7	12.03
Valley-Auld	152	1	0.03	0.7	0.03
Valley-Auld No. 1	16	0	0.00	0.0	0.00
Valley-Auld No. 2	18	1	3.52	5.6	3.52
Valley-Auld-Pauba	152	3	2.72	2.0	0.91
Valley-Auld-Triton	89	0	0.00	0.0	0.00
Valley-Elsinore-Fogarty	123	9	5.25	7.3	0.58

Table 1 –Valley North and Valley South N-1 Line Outage Results

	Mile- Years (MY)	Total Number of Sustained Outages (NO)	Total Time, Hours (TT)	Frequency, outages per 100 mile- years (FM)	Mean Duration, hours (MD)
Valley-Elsinore-Ivyglen	186	18	11.83	9.7	0.66
Valley-Newcomb	88	5	17.62	5.7	3.52
Valley-Newcomb-Skylark	280	15	8.14	5.4	0.54
Valley-Pauba	37	2	0.15	5.5	0.07
Valley-Sun City	47	2	0.37	4.2	0.18

Table 2 –Valley North, Valley South, and Valley System N-1 and N-2 Line Outage Results

	Mile- Years (MY)	Total Number of Sustained Outages (NO)	Total Time, Hours (TT)	Frequency, outages per 100 mile- years (FM)	Mean Duration, hours (MD)
Valley System (N-1)	5088	175	494	3.4	2.8
Valley North (N-1)	2410	96	328	4.0	3.4
Valley South (N-1)	2678	79	166	3.0	2.1
Valley System (N-2)	723	6	18	0.8	3.0

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

DATA REQUEST SET TURN - SCE - Alberhill-006

To: TURN

Prepared by: Paul McCabe

Job Title: Senior Advisor

Received Date: 8/12/2020

Response Date: 2/24/2021

Question 03d:

SCE, in its Compliance Filing, selected four main benefit categories for monetization using Value of Service: EENS under N-0 conditions, EENS under N-1 conditions, Flex-1, and Flex-2. SCE summarized its results in Table 8-4, pp. C1-58 and C1-59.9

d. SCE stated that “Transformer outage probabilities were based on industry data (1-in-100 year event for Flex-2-1 and 1-in-60 year event for Flex-2-2.”¹¹ Similarly, SCE stated the annual outage rates for Flex-2-1 and Flex-2-2 as 0.01 and 0.0169, respectively.¹²

Please provide the industry data SCE used. Please provide all calculations and work papers SCE used in deriving the 1-in-100 and 1-in-60 years assumptions. Please provide all calculations and work papers SCE used to arrive at the Flex-2-1 and Flex-2-2 annual outage rates and the Flex-2-1 and Flex-2-2 outage probabilities.

Response to Question 03d:

SCE has revised its Compliance Filing since submission of this data request question. See the summary of revisions provided in Appendix C for further information. The frequencies described in the question have been revised as explained below.

The Flex-2-1 metric assumes a 1-in-100 year event frequency to represent the scenario in which the Valley South Substation is damaged to the point in which it cannot serve any load. There are many events that could result in the scenario considered for the Flex-2-1 metric (e.g., wildfire, earthquake, sabotage, or electromagnetic pulse), and there is limited industry data that can serve as a basis for the frequency of such events. Despite this, similar events have occurred recently in the industry, such as the PG&E Metcalf Substation attack, and fires at SCE’s Vincent, Mira Loma and El Dorado Substations. Although the impact of each of these events is different, they demonstrate that high-impact, low-probability events do occur and can cause major and extended outages of electric service. A 1-in-100 year frequency was chosen because it is a reasonable bounding frequency for this analysis.

The Flex-2-2 metric uses a 0.0015 outage frequency per year to represent the scenario in which two of the normally load-serving Valley South transformers are unavailable due to a fire or explosion of one of the transformers that causes collateral damage to the other. This outage frequency is based on the Conseil International des Grands Réseaux Electriques (CIGRE) “Transformer Reliability Survey” published by Working Group A2.37 in December 2015. The report can be downloaded at this link: <https://e-cigre.org/publication/642-transformer-reliability-survey>. The survey collected details of 964 major transformer failures which occurred during the period 1996 to 2010, for a total population of 167,459 transformer years. The survey defines major failures as those that required the transformer to be removed from service for a period longer than 7 days for investigation, remedial work or replacement. Of the 964 major failures, 126 of them resulted in a fire or explosion. These outages are representative of the Flex-2-2 metric scenario and occur at a rate of 0.000752 per transformer-year (126 outages divided by 167,459 transformer years). The Valley Substation has two normally load-serving transformers, and experiences two transformer-year annually, so the total outage frequency is 0.0015 per year.

SYSTEM	Start Date	End Date	Line Name	Primary Cause Desc	Duration-Min
Valley South	24-Feb-05	24-Feb-05	AULD-MORAGA - 115KV	Patrolled no cause found (storm)	0.50
Valley South	17-Feb-06	17-Feb-06	AULD-MORAGA - 115KV	Metallic party balloon	0.50
Valley South	03-Jun-09	03-Jun-09	AULD-MORAGA #1 - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	AULD-MORAGA #1 - 115KV	N/a	0.50
Valley South	12-Aug-11	12-Aug-11	AULD-MORAGA #1 - 115KV	Unknown	0.50
Valley South	18-Dec-11	18-Dec-11	AULD-MORAGA #1 - 115KV	Open for repairs	146.00
Valley South	30-Dec-07	30-Dec-07	AULD-MORAGA #2 - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	AULD-MORAGA #2 - 115KV	N/a	0.50
Valley South	18-Dec-11	18-Dec-11	AULD-MORAGA #2 - 115KV	Open for repairs	147.00
Valley South	06-Sep-06	06-Sep-06	AULD-SUN CITY - 115KV	Lightning	0.50
Valley South	17-Nov-06	17-Nov-06	AULD-SUN CITY - 115KV	Bird shorted line equipment	0.50
Valley South	16-Mar-08	16-Mar-08	AULD-SUN CITY - 115KV	Animal	1.00
Valley South	08-Jun-09	08-Jun-09	AULD-SUN CITY - 115KV	N/a	0.50
Valley South	21-Nov-09	21-Nov-09	AULD-SUN CITY - 115KV	N/a	0.50
Valley South	11-Apr-10	11-Apr-10	AULD-SUN CITY - 115KV	N/a	0.50
Valley South	15-Jul-10	15-Jul-10	AULD-SUN CITY - 115KV	N/a	0.50
Valley South	01-Sep-10	01-Sep-10	AULD-SUN CITY - 115KV	N/a	4.00
Valley South	01-Sep-10	01-Sep-10	AULD-SUN CITY - 115KV	Animal	0.50
Valley South	19-Feb-12	19-Feb-12	AULD-SUN CITY - 115KV	Foreign material	1.00
Valley South	30-Aug-12	30-Aug-12	AULD-SUN CITY - 115KV	N/a	15.00
Valley South	26-Dec-15	26-Dec-15	AULD-SUN CITY - 115KV	N/a	0.50
Valley South	26-Dec-15	26-Dec-15	AULD-SUN CITY - 115KV	N/a	0.50
Valley South	08-Mar-16	08-Mar-16	AULD-SUN CITY - 115KV	Animal	1.00
Valley South	14-May-17	14-May-17	AULD-SUN CITY - 115KV	Open for repairs	127.00
Valley South	20-Sep-05	20-Sep-05	ELSINORE-SKYLARK - 115KV	Lightning	0.50
Valley South	10-Aug-06	10-Aug-06	ELSINORE-SKYLARK - 115KV	Patrolled no cause found	1.00
Valley South	31-Aug-07	31-Aug-07	ELSINORE-SKYLARK - 115KV	N/a	0.50
Valley South	25-Jun-10	25-Jun-10	ELSINORE-SKYLARK - 115KV	Overload	0.50
Valley South	18-Jul-10	18-Jul-10	ELSINORE-SKYLARK - 115KV	Vehicle hit	704.00
Valley South	05-Feb-14	05-Feb-14	FOGARTY-IVYGLEN - 115KV	Lost	3.00
Valley South	07-Mar-16	07-Mar-16	FOGARTY-IVYGLEN - 115KV	Lost	4.00
Valley South	31-Mar-16	31-Mar-16	FOGARTY-IVYGLEN - 115KV	Vehicle hit	231.00
Valley South	09-May-16	09-May-16	FOGARTY-IVYGLEN - 115KV	N/a	4.00

Valley South	01-Aug-17	01-Aug-17	FOGARTY-IVYGLEN - 115KV	N/a	0.50
Valley South	02-Dec-17	02-Dec-17	FOGARTY-IVYGLEN - 115KV	Vehicle hit	579.00
Valley South	20-Sep-05	20-Sep-05	MORAGA-PECHANGA - 115KV	Lightning	1.00
Valley South	28-Sep-07	28-Sep-07	MORAGA-PECHANGA - 115KV	Vehicle hit	118.00
Valley South	07-Jun-08	07-Jun-08	MORAGA-PECHANGA - 115KV	Vehicle hit	323.00
Valley South	17-Mar-09	17-Mar-09	MORAGA-PECHANGA - 115KV	Balloon	0.50
Valley South	03-Jun-09	03-Jun-09	MORAGA-PECHANGA - 115KV	N/a	0.50
Valley South	21-Jan-10	21-Jan-10	MORAGA-PECHANGA - 115KV	N/a	0.50
Valley South	03-Mar-10	03-Mar-10	MORAGA-PECHANGA - 115KV	N/a	0.50
Valley South	19-Oct-10	19-Oct-10	MORAGA-PECHANGA - 115KV	N/a	0.50
Valley South	18-Dec-11	18-Dec-11	MORAGA-PECHANGA - 115KV	Open for repairs	146.00
Valley South	30-Jan-13	30-Jan-13	MORAGA-PECHANGA - 115KV	Open for repairs	933.00
Valley South	27-Nov-13	27-Nov-13	MORAGA-PECHANGA - 115KV	Vehicle hit	50.00
Valley South	02-Sep-14	02-Sep-14	MORAGA-PECHANGA - 115KV	Other-see notes	0.50
Valley South	15-Jul-15	15-Jul-15	MORAGA-PECHANGA - 115KV	N/a	0.50
Valley South	16-Mar-17	17-Mar-17	MORAGA-PECHANGA - 115KV	Open for repairs	998.00
Valley South	30-Apr-17	30-Apr-17	MORAGA-PECHANGA - 115KV	Open for repairs	0.50
Valley South	02-Nov-05	02-Nov-05	MORAGA-STADLER - 115KV	Raptor faulted line	0.50
Valley South	18-May-08	18-May-08	MORAGA-STADLER-STENT - 115KV	Vehicle hit	70.00
Valley South	18-May-08	18-May-08	MORAGA-STADLER-STENT - 115KV	Vehicle hit	70.00
Valley South	13-Jul-08	13-Jul-08	MORAGA-STADLER-STENT - 115KV	Other-see notes	1.00
Valley South	13-Jul-08	13-Jul-08	MORAGA-STADLER-STENT - 115KV	Other-see notes	1.00
Valley South	03-Jun-09	03-Jun-09	MORAGA-STADLER-STENT - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	MORAGA-STADLER-STENT - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	MORAGA-STADLER-STENT - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	MORAGA-STADLER-STENT - 115KV	N/a	0.50
Valley South	30-Sep-10	30-Sep-10	MORAGA-STADLER-STENT - 115KV	N/a	0.50
Valley South	30-Sep-10	30-Sep-10	MORAGA-STADLER-STENT - 115KV	N/a	0.50
Valley South	22-Dec-10	22-Dec-10	MORAGA-STADLER-STENT - 115KV	Vehicle hit	10.00
Valley South	22-Dec-10	22-Dec-10	MORAGA-STADLER-STENT - 115KV	Vehicle hit	10.00
Valley South	12-Feb-11	12-Feb-11	MORAGA-STADLER-STENT - 115KV	Other-see notes	16.00
Valley South	12-Feb-11	12-Feb-11	MORAGA-STADLER-STENT - 115KV	Other-see notes	16.00
Valley South	27-Jan-12	27-Jan-12	MORAGA-STADLER-STENT - 115KV	Other-see notes	151.00
Valley South	27-Jan-12	27-Jan-12	MORAGA-STADLER-STENT - 115KV	Other-see notes	151.00

Valley South	31-Jul-12	31-Jul-12	MORAGA-STADLER-STENT - 115KV	Vehicle hit	108.00
Valley South	31-Jul-12	31-Jul-12	MORAGA-STADLER-STENT - 115KV	Vehicle hit	108.00
Valley South	18-Jul-15	18-Jul-15	MORAGA-STADLER-STENT - 115KV	N/a	1.00
Valley South	18-Jul-15	18-Jul-15	MORAGA-STADLER-STENT - 115KV	N/a	1.00
Valley South	28-Feb-05	28-Feb-05	PAUBA-PECHANGA - 115KV	Opened - transmission orders	18.00
Valley South	02-Jul-06	02-Jul-06	PAUBA-PECHANGA - 115KV	Vehicle hit guy or guy pole	0.50
Valley South	25-Aug-10	25-Aug-10	PAUBA-PECHANGA - 115KV	N/a	2.00
Valley South	11-Aug-12	11-Aug-12	PAUBA-PECHANGA - 115KV	N/a	0.50
Valley South	20-Nov-13	20-Nov-13	PAUBA-PECHANGA - 115KV	N/a	0.50
Valley South	11-May-16	11-May-16	PAUBA-PECHANGA - 115KV	N/a	2.00
Valley South	17-Apr-17	17-Apr-17	PAUBA-PECHANGA - 115KV	Balloon	1.00
Valley South	13-Aug-17	13-Aug-17	PAUBA-PECHANGA - 115KV	Open for repairs	1180.00
Valley South	18-Jul-15	18-Jul-15	PAUBA-TRITON - 115KV	Lightning	4.00
Valley South	01-Aug-17	01-Aug-17	PAUBA-TRITON - 115KV	N/a	3.00
Valley South	21-Apr-06	21-Apr-06	SKYLARK-STADLER - 115KV	Patrolled no cause found	0.50
Valley South	24-May-08	24-May-08	SKYLARK-STADLER - 115KV	Animal	0.50
Valley South	08-Oct-08	08-Oct-08	SKYLARK-STADLER - 115KV	Vehicle hit	0.50
Valley South	16-Sep-14	16-Sep-14	STADLER-TENAJA - 115KV	N/a	0.50
Valley South	10-Apr-16	10-Apr-16	STADLER-TENAJA - 115KV	Vehicle hit	827.00
Valley South	31-Aug-17	01-Sep-17	STADLER-TENAJA - 115KV	Overload	617.00
Valley South	23-Apr-09	23-Apr-09	VALLEY-AULD - 115KV	Lost	9.00
Valley South	23-Apr-09	23-Apr-09	VALLEY-AULD - 115KV	Lost	9.00
Valley South	03-Jun-09	03-Jun-09	VALLEY-AULD - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	VALLEY-AULD - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	VALLEY-AULD - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	VALLEY-AULD - 115KV	N/a	0.50
Valley South	26-Jun-14	26-Jun-14	VALLEY-AULD - 115KV	N/a	2.00
Valley South	26-Jun-14	26-Jun-14	VALLEY-AULD - 115KV	N/a	2.00
Valley South	20-Sep-05	20-Sep-05	VALLEY-AULD-NO.1 - 115KV	Lightning	1.00
Valley South	21-Mar-05	21-Mar-05	VALLEY-AULD-NO.2 - 115KV	Patrolled no cause found	1.00
Valley South	20-Sep-05	20-Sep-05	VALLEY-AULD-NO.2 - 115KV	Lightning	1.00
Valley South	11-Nov-05	11-Nov-05	VALLEY-AULD-NO.2 - 115KV	Conducting material thrown into line	1.00
Valley South	11-Nov-05	11-Nov-05	VALLEY-AULD-NO.2 - 115KV	Conducting material thrown into line	211.00
Valley South	11-Feb-06	11-Feb-06	VALLEY-AULD-NO.2 - 115KV	Animal or bird dropped material into equ	1.00

Valley South	18-Mar-06	18-Mar-06	VALLEY-AULD-NO.2 - 115KV	Patrolled no cause found	0.50
Valley South	03-Sep-06	03-Sep-06	VALLEY-AULD-PAUBA - 115KV	Lightning	0.50
Valley South	09-Dec-06	09-Dec-06	VALLEY-AULD-PAUBA - 115KV	Patrolled no cause found	1.00
Valley South	10-Dec-06	10-Dec-06	VALLEY-AULD-PAUBA - 115KV	Bird soil caused insulator flashover	0.50
Valley South	23-Dec-07	23-Dec-07	VALLEY-AULD-PAUBA - 115KV	Other-see notes	14.00
Valley South	23-Apr-09	23-Apr-09	VALLEY-AULD-PAUBA - 115KV	Lost	9.00
Valley South	03-Jun-09	03-Jun-09	VALLEY-AULD-PAUBA - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	VALLEY-AULD-PAUBA - 115KV	N/a	1.00
Valley South	23-Sep-09	23-Sep-09	VALLEY-AULD-PAUBA - 115KV	Vehicle hit	143.00
Valley South	25-Aug-10	25-Aug-10	VALLEY-AULD-PAUBA - 115KV	Lightning	1.00
Valley South	05-Apr-12	05-Apr-12	VALLEY-AULD-PAUBA - 115KV	N/a	6.00
Valley South	18-Jul-15	18-Jul-15	VALLEY-AULD-TRITON - 115KV	Lightning	3.00
Valley South	08-Sep-15	08-Sep-15	VALLEY-AULD-TRITON - 115KV	N/a	0.50
Valley South	04-Feb-16	04-Feb-16	VALLEY-AULD-TRITON - 115KV	N/a	0.50
Valley South	20-Mar-13	20-Mar-13	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	3.00
Valley South	08-Oct-13	08-Oct-13	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	2.00
Valley South	05-Feb-14	05-Feb-14	VALLEY-ELSINORE-FOGARTY - 115KV	Other-see notes	3.00
Valley South	22-Oct-14	22-Oct-14	VALLEY-ELSINORE-FOGARTY - 115KV	Unknown	169.00
Valley South	28-Feb-15	28-Feb-15	VALLEY-ELSINORE-FOGARTY - 115KV	Line equipment trouble (trans only)	106.00
Valley South	05-Nov-15	05-Nov-15	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	14.00
Valley South	07-Mar-16	07-Mar-16	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	4.00
Valley South	22-Oct-16	22-Oct-16	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	2.00
Valley South	07-Apr-17	07-Apr-17	VALLEY-ELSINORE-FOGARTY - 115KV	Animal	1.00
Valley South	15-Jul-18	15-Jul-18	VALLEY-ELSINORE-FOGARTY - 115KV	Lightning	12.00
Valley South	09-Aug-18	09-Aug-18	VALLEY-ELSINORE-FOGARTY - 115KV	Lost	0.50
Valley South	16-Aug-18	16-Aug-18	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	0.50
Valley South	01-Dec-18	01-Dec-18	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	1.00
Valley South	16-Mar-05	16-Mar-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Patrolled no cause found	5.00
Valley South	01-May-05	01-May-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Vehicle hit guy or guy pole	104.00
Valley South	17-May-05	17-May-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Vehicle hit guy or guy pole	119.00
Valley South	28-Jul-05	28-Jul-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Vehicle broke pole	126.00
Valley South	06-Aug-05	06-Aug-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Wind storm - no cause found	1.00
Valley South	20-Sep-05	20-Sep-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Lightning	77.00
Valley South	20-Sep-05	20-Sep-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Lightning	2.00

Valley South	27-Mar-06	27-Mar-06	VALLEY-ELSINORE-IVYGLEN - 115KV	Patrolled no cause found	9.00
Valley South	17-Apr-06	17-Apr-06	VALLEY-ELSINORE-IVYGLEN - 115KV	Patrolled no cause found	1.00
Valley South	12-Jun-06	12-Jun-06	VALLEY-ELSINORE-IVYGLEN - 115KV	Patrolled no cause found	2.00
Valley South	22-Jul-06	22-Jul-06	VALLEY-ELSINORE-IVYGLEN - 115KV	Lightning	0.50
Valley South	07-Sep-06	07-Sep-06	VALLEY-ELSINORE-IVYGLEN - 115KV	Scce truck boom contact	2.00
Valley South	31-Aug-07	31-Aug-07	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	0.50
Valley South	21-Sep-07	21-Sep-07	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	1.00
Valley South	10-Oct-07	10-Oct-07	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	1.00
Valley South	30-Nov-07	30-Nov-07	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	11.00
Valley South	29-Feb-08	29-Feb-08	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	3.00
Valley South	24-Mar-08	24-Mar-08	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	0.50
Valley South	25-Jun-08	25-Jun-08	VALLEY-ELSINORE-IVYGLEN - 115KV	Other-see notes	0.50
Valley South	23-Apr-09	23-Apr-09	VALLEY-ELSINORE-IVYGLEN - 115KV	Lost	9.00
Valley South	19-Jan-10	19-Jan-10	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	2.00
Valley South	29-Jun-10	29-Jun-10	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	5.00
Valley South	06-Jul-10	06-Jul-10	VALLEY-ELSINORE-IVYGLEN - 115KV	Vehicle hit	83.00
Valley South	20-Aug-10	20-Aug-10	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	6.00
Valley South	25-Aug-10	25-Aug-10	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	0.50
Valley South	23-Sep-10	23-Sep-10	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	3.00
Valley South	17-Oct-10	17-Oct-10	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	1.00
Valley South	08-Jan-11	08-Jan-11	VALLEY-ELSINORE-IVYGLEN - 115KV	Vehicle hit	149.00
Valley South	08-Apr-11	08-Apr-11	VALLEY-ELSINORE-IVYGLEN - 115KV	Other-see notes	2.00
Valley South	15-Jul-11	15-Jul-11	VALLEY-ELSINORE-IVYGLEN - 115KV	Overload	1.00
Valley South	28-Aug-11	28-Aug-11	VALLEY-ELSINORE-IVYGLEN - 115KV	Other-see notes	1.00
Valley South	20-Mar-13	20-Mar-13	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	3.00
Valley South	17-Apr-06	17-Apr-06	VALLEY-NEWCOMB - 115KV	Patrolled no cause found	1.00
Valley South	23-Apr-09	23-Apr-09	VALLEY-NEWCOMB - 115KV	Lost	9.00
Valley South	11-Oct-10	11-Oct-10	VALLEY-NEWCOMB - 115KV	N/a	2.00
Valley South	14-Jun-13	14-Jun-13	VALLEY-NEWCOMB - 115KV	N/a	2.00
Valley South	04-Feb-16	05-Feb-16	VALLEY-NEWCOMB - 115KV	Vehicle hit	919.00
Valley South	03-Nov-16	03-Nov-16	VALLEY-NEWCOMB - 115KV	3rd party caused	132.00
Valley South	09-Feb-18	09-Feb-18	VALLEY-NEWCOMB - 115KV	No cause found	2.00
Valley South	27-Feb-18	27-Feb-18	VALLEY-NEWCOMB - 115KV	Lightning	0.97
Valley South	07-Feb-05	07-Feb-05	VALLEY-NEWCOMB-SKYLARK - 115KV	Bird shorted line equipment	1.00

Valley South	04-Dec-05	04-Dec-05	VALLEY-NEWCOMB-SKYLARK - 115KV	Unknown not patrolled	2.00
Valley South	10-Aug-06	10-Aug-06	VALLEY-NEWCOMB-SKYLARK - 115KV	Patrolled no cause found	14.00
Valley South	28-Dec-06	29-Dec-06	VALLEY-NEWCOMB-SKYLARK - 115KV	Vehicle hit guy or guy pole	113.00
Valley South	31-Aug-07	31-Aug-07	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	22-May-08	22-May-08	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	1.00
Valley South	26-May-08	26-May-08	VALLEY-NEWCOMB-SKYLARK - 115KV	Vehicle hit	1.00
Valley South	17-Jun-08	17-Jun-08	VALLEY-NEWCOMB-SKYLARK - 115KV	Vehicle hit	63.00
Valley South	23-Apr-09	23-Apr-09	VALLEY-NEWCOMB-SKYLARK - 115KV	Lost	9.00
Valley South	09-Mar-10	09-Mar-10	VALLEY-NEWCOMB-SKYLARK - 115KV	Unknown	1.00
Valley South	29-Jun-10	29-Jun-10	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	25-Aug-10	25-Aug-10	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	23-May-11	23-May-11	VALLEY-NEWCOMB-SKYLARK - 115KV	Overload	1.00
Valley South	27-Aug-11	27-Aug-11	VALLEY-NEWCOMB-SKYLARK - 115KV	Lightning	0.50
Valley South	04-Apr-12	04-Apr-12	VALLEY-NEWCOMB-SKYLARK - 115KV	Other-see notes	2.00
Valley South	06-Jun-12	06-Jun-12	VALLEY-NEWCOMB-SKYLARK - 115KV	Balloon	195.00
Valley South	25-Aug-12	25-Aug-12	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	16-Jan-13	16-Jan-13	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	4.00
Valley South	12-Aug-13	12-Aug-13	VALLEY-NEWCOMB-SKYLARK - 115KV	Lost	0.50
Valley South	21-Aug-13	21-Aug-13	VALLEY-NEWCOMB-SKYLARK - 115KV	Foreign material	4.00
Valley South	31-Oct-13	31-Oct-13	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	3.00
Valley South	23-Jun-14	23-Jun-14	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	11-Aug-14	11-Aug-14	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	16-Sep-14	16-Sep-14	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	2.00
Valley South	17-Aug-15	17-Aug-15	VALLEY-NEWCOMB-SKYLARK - 115KV	Other-see notes	74.00
Valley South	08-Sep-15	08-Sep-15	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	24-Sep-15	24-Sep-15	VALLEY-NEWCOMB-SKYLARK - 115KV	Vehicle hit	2.00
Valley South	27-Nov-15	27-Nov-15	VALLEY-NEWCOMB-SKYLARK - 115KV	Unknown	5.00
Valley South	16-Dec-15	16-Dec-15	VALLEY-NEWCOMB-SKYLARK - 115KV	Vehicle hit	0.50
Valley South	10-Mar-16	10-Mar-16	VALLEY-NEWCOMB-SKYLARK - 115KV	Animal	0.50
Valley South	17-Jun-16	17-Jun-16	VALLEY-NEWCOMB-SKYLARK - 115KV	Balloon	1.00
Valley South	14-May-17	14-May-17	VALLEY-NEWCOMB-SKYLARK - 115KV	Open for repairs	127.00
Valley South	23-May-17	23-May-17	VALLEY-NEWCOMB-SKYLARK - 115KV	Lost	3.00
Valley South	28-Sep-18	28-Sep-18	VALLEY-NEWCOMB-SKYLARK - 115KV	Balloon	2.50
Valley South	27-Mar-05	27-Mar-05	VALLEY-PAUBA - 115KV	Patrolled no cause found	1.00

Valley South	20-Sep-05	20-Sep-05	VALLEY-PAUBA - 115KV	Lightning	4.00
Valley South	11-Mar-06	11-Mar-06	VALLEY-PAUBA - 115KV	Loose bond wire	0.50
Valley South	02-Jul-06	02-Jul-06	VALLEY-PAUBA - 115KV	Vehicle hit guy or guy pole	5.00
Valley South	22-Jul-06	22-Jul-06	VALLEY-PAUBA - 115KV	Lightning	0.50
Valley South	09-Mar-07	09-Mar-07	VALLEY-SUN CITY - 115KV	High voltage	0.50
Valley South	14-Oct-07	14-Oct-07	VALLEY-SUN CITY - 115KV	Contamination flashover	1.00
Valley South	23-Apr-09	23-Apr-09	VALLEY-SUN CITY - 115KV	Lost	9.00
Valley South	17-Oct-11	17-Oct-11	VALLEY-SUN CITY - 115KV	Lost	13.00
Valley South	30-Aug-12	30-Aug-12	VALLEY-SUN CITY - 115KV	Lightning	9.00
Valley South	27-Nov-15	27-Nov-15	VALLEY-SUN CITY - 115KV	N/a	0.50
Valley North	15-Jun-05	15-Jun-05	VALLEY-MORENO-VISTA - 115KV	Patrolled no cause found	1.00
Valley North	12-Jul-05	12-Jul-05	VALLEY-MORENO-VISTA - 115KV	Bird soil caused flashover	1.00
Valley North	15-Aug-05	15-Aug-05	VALLEY-MORENO-VISTA - 115KV	Lightning	1.00
Valley North	09-Sep-05	09-Sep-05	VALLEY-MORENO-VISTA - 115KV	Raptor faulted line	1.00
Valley North	30-Jan-06	30-Jan-06	VALLEY-MORENO-VISTA - 115KV	Broken or damaged insulator flashover	2.00
Valley North	11-Mar-06	11-Mar-06	VALLEY-MORENO-VISTA - 115KV	Patrolled no cause found	2.00
Valley North	09-Jul-06	09-Jul-06	VALLEY-MORENO-VISTA - 115KV	Vehicle hit guy or guy pole	0.50
Valley North	07-Dec-06	07-Dec-06	VALLEY-MORENO-VISTA - 115KV	Patrolled no cause found	1.00
Valley North	02-Apr-07	02-Apr-07	VALLEY-MORENO-VISTA - 115KV	N/a	1.00
Valley North	06-Jun-07	06-Jun-07	VALLEY-MORENO-VISTA - 115KV	N/a	0.50
Valley North	10-Apr-17	10-Apr-17	LAKEVIEW-MOVAL - 115KV	N/a	0.50
Valley North	23-Jul-05	23-Jul-05	MAYBERRY-NELSON - 115KV	Lightning	1.00
Valley North	18-May-08	18-May-08	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	22-May-08	22-May-08	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	27-May-08	27-May-08	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	15-Feb-09	15-Feb-09	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	30-May-10	30-May-10	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	12-Jun-10	12-Jun-10	MORENO-MOVAL-VISTA - 115KV	Other-see notes	0.02
Valley North	27-Oct-10	27-Oct-10	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	19-Aug-11	19-Aug-11	MORENO-MOVAL-VISTA - 115KV	Fire	1.00
Valley North	15-Nov-11	15-Nov-11	MORENO-MOVAL-VISTA - 115KV	Lost	0.50
Valley North	26-Nov-11	26-Nov-11	MORENO-MOVAL-VISTA - 115KV	Other-see notes	0.50
Valley North	26-Jan-12	26-Jan-12	MORENO-MOVAL-VISTA - 115KV	Other-see notes	1.00
Valley North	08-Feb-12	08-Feb-12	MORENO-MOVAL-VISTA - 115KV	Foreign material	4.00

Valley North	27-Mar-12	27-Mar-12	MORENO-MOVAL-VISTA - 115KV	Contamination flashover	0.50
Valley North	25-Feb-15	25-Feb-15	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	23-Mar-15	23-Mar-15	MORENO-MOVAL-VISTA - 115KV	N/a	2.00
Valley North	27-Jul-15	27-Jul-15	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	15-Oct-15	15-Oct-15	MORENO-MOVAL-VISTA - 115KV	N/a	2.00
Valley North	02-Feb-16	02-Feb-16	MORENO-MOVAL-VISTA - 115KV	Open for repairs	538.00
Valley North	10-Feb-16	10-Feb-16	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	19-Apr-16	19-Apr-16	MORENO-MOVAL-VISTA - 115KV	Foreign material	0.50
Valley North	12-Jan-17	12-Jan-17	MORENO-MOVAL-VISTA - 115KV	Animal	1.00
Valley North	25-May-18	25-May-18	MORENO-MOVAL-VISTA - 115KV	Contamination flashover	81.00
Valley North	21-Oct-07	21-Oct-07	NELSON-STETSON - 115KV	Toppled/broken	41.00
Valley North	27-Dec-11	28-Dec-11	NELSON-STETSON - 115KV	Overload	803.00
Valley North	01-Aug-13	01-Aug-13	NELSON-STETSON - 115KV	Other-see notes	6.00
Valley North	30-Jun-15	30-Jun-15	NELSON-STETSON - 115KV	N/a	0.50
Valley North	03-Aug-15	03-Aug-15	NELSON-STETSON - 115KV	Vehicle hit	0.50
Valley North	23-Sep-17	23-Sep-17	NELSON-STETSON - 115KV	N/a	0.50
Valley North	27-Jun-05	27-Jun-05	VALLEY-ALESSANDRO-BUNKER - 115KV	Lightning	2.00
Valley North	06-Aug-05	08-Aug-05	VALLEY-ALESSANDRO-BUNKER - 115KV	Wind blew pole or tower over	2404.00
Valley North	25-Aug-05	25-Aug-05	VALLEY-ALESSANDRO-BUNKER - 115KV	Bird soil caused flashover	1.00
Valley North	10-May-06	10-May-06	VALLEY-ALESSANDRO-BUNKER - 115KV	Pole/tower fell over due to excavation	197.00
Valley North	18-Aug-06	18-Aug-06	VALLEY-ALESSANDRO-BUNKER - 115KV	Bird soil caused insulator flashover	3.00
Valley North	17-Sep-06	17-Sep-06	VALLEY-ALESSANDRO-BUNKER - 115KV	Patrolled no cause found	4.00
Valley North	09-Dec-06	09-Dec-06	VALLEY-ALESSANDRO-BUNKER - 115KV	Vehicle hit guy or guy pole	129.00
Valley North	02-May-08	02-May-08	VALLEY-ALESSANDRO-BUNKER - 115KV	Lost	9.00
Valley North	23-Apr-09	23-Apr-09	VALLEY-ALESSANDRO-BUNKER - 115KV	Lost	10.00
Valley North	11-Nov-11	11-Nov-11	VALLEY-ALESSANDRO-BUNKER - 115KV	Other-see notes	2.00
Valley North	30-Aug-12	30-Aug-12	VALLEY-ALESSANDRO-BUNKER - 115KV	N/a	2.00
Valley North	24-Oct-14	24-Oct-14	VALLEY-ALESSANDRO-BUNKER - 115KV	Foreign material	5.00
Valley North	12-Dec-14	12-Dec-14	VALLEY-ALESSANDRO-BUNKER - 115KV	Other-see notes	2.00
Valley North	03-Apr-15	03-Apr-15	VALLEY-ALESSANDRO-BUNKER - 115KV	Foreign material	177.00
Valley North	03-Dec-16	03-Dec-16	VALLEY-ALESSANDRO-BUNKER - 115KV	Vehicle hit	5.00
Valley North	25-Mar-17	25-Mar-17	VALLEY-ALESSANDRO-BUNKER - 115KV	Vehicle hit	967.00
Valley North	21-Jun-17	21-Jun-17	VALLEY-ALESSANDRO-BUNKER - 115KV	Overload	1.00
Valley North	21-Sep-07	21-Sep-07	VALLEY-ALESSANDRO-CAJALCO - 115KV	Other-see notes	3.00

Valley North	21-Sep-07	21-Sep-07	VALLEY-ALESSANDRO-CAJALCO - 115KV	Other-see notes	1.00
Valley North	10-Dec-07	10-Dec-07	VALLEY-ALESSANDRO-CAJALCO - 115KV	Vehicle hit	4.00
Valley North	02-May-08	02-May-08	VALLEY-ALESSANDRO-CAJALCO - 115KV	Lost	9.00
Valley North	29-Dec-08	29-Dec-08	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	3.00
Valley North	01-Feb-09	01-Feb-09	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	23-Apr-09	23-Apr-09	VALLEY-ALESSANDRO-CAJALCO - 115KV	Lost	10.00
Valley North	17-Aug-09	17-Aug-09	VALLEY-ALESSANDRO-CAJALCO - 115KV	Application	2.00
Valley North	17-Aug-09	17-Aug-09	VALLEY-ALESSANDRO-CAJALCO - 115KV	Application	1.00
Valley North	10-Apr-10	10-Apr-10	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	1.00
Valley North	06-Jul-11	06-Jul-11	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	04-Jun-12	04-Jun-12	VALLEY-ALESSANDRO-CAJALCO - 115KV	Other-see notes	384.00
Valley North	12-Aug-12	12-Aug-12	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	6.00
Valley North	30-Aug-12	30-Aug-12	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	30-Aug-13	30-Aug-13	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	30-Aug-13	30-Aug-13	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	18-Aug-14	18-Aug-14	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	14-Sep-14	14-Sep-14	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	01-Mar-15	01-Mar-15	VALLEY-ALESSANDRO-CAJALCO - 115KV	Foreign material	0.50
Valley North	02-Apr-15	02-Apr-15	VALLEY-ALESSANDRO-CAJALCO - 115KV	Contamination flashover	2.00
Valley North	15-Oct-15	15-Oct-15	VALLEY-ALESSANDRO-CAJALCO - 115KV	Lightning	3.00
Valley North	31-Aug-16	31-Aug-16	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	25-Sep-16	25-Sep-16	VALLEY-ALESSANDRO-CAJALCO - 115KV	Other-see notes	0.50
Valley North	15-Oct-16	15-Oct-16	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	3.00
Valley North	13-Mar-17	13-Mar-17	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	11.00
Valley North	23-Jul-17	23-Jul-17	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	1.00
Valley North	19-Sep-05	19-Sep-05	VALLEY-BUNKER-CAJALCO - 115KV	Lightning	1.00
Valley North	07-Dec-05	07-Dec-05	VALLEY-BUNKER-CAJALCO - 115KV	Patrolled no cause found	1.00
Valley North	09-Jan-06	09-Jan-06	VALLEY-BUNKER-CAJALCO - 115KV	Bird soil caused insulator flashover	48.00
Valley North	21-Sep-07	21-Sep-07	VALLEY-BUNKER-CAJALCO - 115KV	Other-see notes	132.00
Valley North	10-Dec-07	10-Dec-07	VALLEY-BUNKER-CAJALCO - 115KV	Vehicle hit	178.00
Valley North	11-May-08	11-May-08	VALLEY-BUNKER-CAJALCO - 115KV	Animal	123.00
Valley North	22-May-08	22-May-08	VALLEY-BUNKER-CAJALCO - 115KV	Lightning	0.50
Valley North	01-Feb-09	01-Feb-09	VALLEY-BUNKER-CAJALCO - 115KV	Other-see notes	208.00
Valley North	23-Apr-09	23-Apr-09	VALLEY-BUNKER-CAJALCO - 115KV	Lost	10.00

Valley North	17-Aug-09	17-Aug-09	VALLEY-BUNKER-CAJALCO - 115KV	Foreign material	62.00
Valley North	18-Sep-10	18-Sep-10	VALLEY-BUNKER-CAJALCO - 115KV	Foreign material	382.00
Valley North	30-Sep-10	30-Sep-10	VALLEY-BUNKER-CAJALCO - 115KV	N/a	0.50
Valley North	19-Oct-10	19-Oct-10	VALLEY-BUNKER-CAJALCO - 115KV	N/a	0.50
Valley North	06-Jul-11	06-Jul-11	VALLEY-BUNKER-CAJALCO - 115KV	Unknown	0.50
Valley North	27-Feb-12	27-Feb-12	VALLEY-BUNKER-CAJALCO - 115KV	N/a	1.00
Valley North	27-Aug-12	27-Aug-12	VALLEY-BUNKER-CAJALCO - 115KV	Vehicle hit	212.00
Valley North	30-Aug-12	30-Aug-12	VALLEY-BUNKER-CAJALCO - 115KV	N/a	1.00
Valley North	30-Aug-12	30-Aug-12	VALLEY-BUNKER-CAJALCO - 115KV	N/a	6.00
Valley North	02-Feb-14	02-Feb-14	VALLEY-BUNKER-CAJALCO - 115KV	Unknown	2.00
Valley North	26-Apr-14	26-Apr-14	VALLEY-BUNKER-CAJALCO - 115KV	Animal	3.00
Valley North	31-Jan-16	31-Jan-16	VALLEY-BUNKER-CAJALCO - 115KV	Other-see notes	0.50
Valley North	31-Jan-16	31-Jan-16	VALLEY-BUNKER-CAJALCO - 115KV	Other-see notes	0.50
Valley North	26-Mar-16	26-Mar-16	VALLEY-BUNKER-CAJALCO - 115KV	N/a	0.50
Valley North	20-Oct-17	20-Oct-17	VALLEY-BUNKER-CAJALCO - 115KV	N/a	1.00
Valley North	01-Jan-18	01-Jan-18	VALLEY-BUNKER-CAJALCO - 115KV	Lightning	1.00
Valley North	19-Jul-18	19-Jul-18	VALLEY-BUNKER-CAJALCO - 115KV	Lightning	1.00
Valley North	26-Sep-18	26-Sep-18	VALLEY-BUNKER-CAJALCO - 115KV	No cause found	5.00
Valley North	29-Mar-16	29-Mar-16	VALLEY-LAKEVIEW - 115KV	Animal	0.50
Valley North	19-Jan-17	19-Jan-17	VALLEY-LAKEVIEW - 115KV	Open for repairs	448.00
Valley North	11-Jun-05	12-Jun-05	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit pole	737.00
Valley North	17-Jun-05	17-Jun-05	VALLEY-MAYBERRY-MORENO-VISTA -	Patrolled no cause found	1.00
Valley North	06-Aug-05	06-Aug-05	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit guy or guy pole	1.00
Valley North	06-Aug-05	06-Aug-05	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	1.00
Valley North	20-Sep-05	20-Sep-05	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	1.00
Valley North	21-Sep-05	21-Sep-05	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning damaged pole / tower line hard	157.00
Valley North	22-Mar-06	22-Mar-06	VALLEY-MAYBERRY-MORENO-VISTA -	Patrolled no cause found	0.50
Valley North	16-May-06	16-May-06	VALLEY-MAYBERRY-MORENO-VISTA -	Unknown not patrolled	3.00
Valley North	16-Aug-06	16-Aug-06	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit pole	138.00
Valley North	03-Sep-06	03-Sep-06	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	1.00
Valley North	03-Sep-06	03-Sep-06	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	0.50
Valley North	03-Sep-06	03-Sep-06	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning damaged pole / tower line hard	0.50
Valley North	03-Sep-06	03-Sep-06	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning damaged pole / tower line hard	0.50
Valley North	03-Sep-06	03-Sep-06	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning damaged pole / tower line hard	0.50

Valley North	22-Sep-06	22-Sep-06	VALLEY-MAYBERRY-MORENO-VISTA -	Unknown not patrolled	0.50
Valley North	07-Apr-07	07-Apr-07	VALLEY-MAYBERRY-MORENO-VISTA -	Lost	2.00
Valley North	31-Aug-07	31-Aug-07	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	16-Oct-07	16-Oct-07	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit	118.00
Valley North	21-Oct-07	22-Oct-07	VALLEY-MAYBERRY-MORENO-VISTA -	Other-see notes	1538.00
Valley North	28-Jan-08	28-Jan-08	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit	0.50
Valley North	01-Feb-08	01-Feb-08	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	12-Mar-08	12-Mar-08	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	18-Apr-08	18-Apr-08	VALLEY-MAYBERRY-MORENO-VISTA -	3rd party caused	0.50
Valley North	02-May-08	02-May-08	VALLEY-MAYBERRY-MORENO-VISTA -	Lost	8.00
Valley North	22-May-08	22-May-08	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	2.00
Valley North	22-Jun-08	22-Jun-08	VALLEY-MAYBERRY-MORENO-VISTA -	Balloon	0.50
Valley North	21-Sep-08	21-Sep-08	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	14-Apr-09	14-Apr-09	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	23-Apr-09	23-Apr-09	VALLEY-MAYBERRY-MORENO-VISTA -	Lost	8.00
Valley North	09-May-09	09-May-09	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	03-Jun-09	03-Jun-09	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	0.50
Valley North	03-Jun-09	03-Jun-09	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	0.50
Valley North	03-Jun-09	03-Jun-09	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	2.00
Valley North	16-Jun-09	16-Jun-09	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	02-Sep-09	02-Sep-09	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	1.00
Valley North	17-Feb-10	17-Feb-10	VALLEY-MAYBERRY-MORENO-VISTA -	Other-see notes	3.00
Valley North	17-Feb-10	17-Feb-10	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	3.00
Valley North	25-Feb-10	25-Feb-10	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	2.00
Valley North	01-Oct-10	01-Oct-10	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	15-Mar-11	15-Mar-11	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	14-May-11	14-May-11	VALLEY-MAYBERRY-MORENO-VISTA -	Other-see notes	0.50
Valley North	15-May-11	15-May-11	VALLEY-MAYBERRY-MORENO-VISTA -	Other-see notes	1.00
Valley North	12-Jun-11	12-Jun-11	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	25-Jun-11	25-Jun-11	VALLEY-MAYBERRY-MORENO-VISTA -	Overload	1.00
Valley North	06-Nov-11	06-Nov-11	VALLEY-MAYBERRY-MORENO-VISTA -	Other-see notes	2.00
Valley North	01-Feb-12	01-Feb-12	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	03-Feb-12	03-Feb-12	VALLEY-MAYBERRY-MORENO-VISTA -	Foreign material	0.50
Valley North	15-Mar-12	15-Mar-12	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50

Valley North	23-Jun-12	23-Jun-12	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	10-Aug-12	10-Aug-12	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	30-Aug-12	30-Aug-12	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	30-Aug-12	30-Aug-12	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	2.00
Valley North	06-Nov-12	06-Nov-12	VALLEY-MAYBERRY-MORENO-VISTA -	Balloon	0.50
Valley North	17-Nov-12	17-Nov-12	VALLEY-MAYBERRY-MORENO-VISTA -	Unknown	602.00
Valley North	08-Feb-13	08-Feb-13	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	274.00
Valley North	02-Mar-13	02-Mar-13	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit	60.00
Valley North	26-Apr-13	27-Apr-13	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit	1084.00
Valley North	01-Jun-13	01-Jun-13	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	3.00
Valley North	30-Aug-13	30-Aug-13	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit	2.00
Valley North	11-Sep-13	11-Sep-13	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	12-Feb-14	12-Feb-14	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	9.00
Valley North	28-Feb-14	01-Mar-14	VALLEY-MAYBERRY-MORENO-VISTA -	Unknown	880.00
Valley North	16-Jul-14	16-Jul-14	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit	374.00
Valley North	20-Aug-14	20-Aug-14	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	2.00
Valley North	10-Nov-14	10-Nov-14	VALLEY-MAYBERRY-MORENO-VISTA -	Unknown	2.00
Valley North	26-Nov-14	26-Nov-14	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	2.00
Valley North	04-Dec-14	04-Dec-14	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	2.00
Valley North	01-Mar-15	01-Mar-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	21-Mar-15	21-Mar-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	22-Apr-15	22-Apr-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	02-Jun-15	02-Jun-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	20-Jun-15	20-Jun-15	VALLEY-MAYBERRY-MORENO-VISTA -	Other-see notes	0.50
Valley North	12-Jul-15	12-Jul-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	18-Jul-15	18-Jul-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	29-Jul-15	29-Jul-15	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	0.50
Valley North	08-Sep-15	08-Sep-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	11-Dec-15	11-Dec-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	3.00
Valley North	29-Apr-16	29-Apr-16	VALLEY-MAYBERRY-MORENO-VISTA -	Open for repairs	0.50
Valley North	29-Apr-16	29-Apr-16	VALLEY-MAYBERRY-MORENO-VISTA -	Open for repairs	412.00
Valley North	17-Jan-17	17-Jan-17	VALLEY-MAYBERRY-MORENO-VISTA -	Animal	1.00
Valley North	22-May-17	22-May-17	VALLEY-MAYBERRY-MORENO-VISTA -	Lost	172.00
Valley North	06-Nov-17	06-Nov-17	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00

Valley North	15-Jun-18	15-Jun-18	VALLEY-MAYBERRY-MORENO-VISTA -	Balloon	1.00
Valley North	19-Oct-18	19-Oct-18	VALLEY-MAYBERRY-MORENO-VISTA -	No cause found	316.00
Valley North	15-Jun-05	15-Jun-05	VALLEY-MORENO-VISTA - 115KV	Patrolled no cause found	1.00
Valley North	12-Jul-05	12-Jul-05	VALLEY-MORENO-VISTA - 115KV	Bird soil caused flashover	1.00
Valley North	15-Aug-05	15-Aug-05	VALLEY-MORENO-VISTA - 115KV	Lightning	1.00
Valley North	09-Sep-05	09-Sep-05	VALLEY-MORENO-VISTA - 115KV	Raptor faulted line	1.00
Valley North	30-Jan-06	30-Jan-06	VALLEY-MORENO-VISTA - 115KV	Broken or damaged insulator flashover	2.00
Valley North	11-Mar-06	11-Mar-06	VALLEY-MORENO-VISTA - 115KV	Patrolled no cause found	2.00
Valley North	09-Jul-06	09-Jul-06	VALLEY-MORENO-VISTA - 115KV	Vehicle hit guy or guy pole	0.50
Valley North	07-Dec-06	07-Dec-06	VALLEY-MORENO-VISTA - 115KV	Patrolled no cause found	1.00
Valley North	02-Apr-07	02-Apr-07	VALLEY-MORENO-VISTA - 115KV	N/a	1.00
Valley North	06-Jun-07	06-Jun-07	VALLEY-MORENO-VISTA - 115KV	N/a	0.50
Valley North	02-Sep-07	02-Sep-07	VALLEY-MOVAL - 115KV	Other-see notes	1.00
Valley North	02-Sep-07	03-Sep-07	VALLEY-MOVAL - 115KV	Other-see notes	615.00
Valley North	27-Oct-07	27-Oct-07	VALLEY-MOVAL - 115KV	Vehicle hit	725.00
Valley North	05-Dec-08	05-Dec-08	VALLEY-MOVAL - 115KV	Fire	0.50
Valley North	23-Apr-09	23-Apr-09	VALLEY-MOVAL - 115KV	Lost	10.00
Valley North	25-May-09	25-May-09	VALLEY-MOVAL - 115KV	Vehicle hit	1.00
Valley North	13-May-11	13-May-11	VALLEY-MOVAL - 115KV	Other-see notes	2.00
Valley North	12-Oct-11	12-Oct-11	VALLEY-MOVAL - 115KV	Other-see notes	0.02
Valley North	29-Oct-11	29-Oct-11	VALLEY-MOVAL - 115KV	Animal	1.00
Valley North	13-Nov-11	13-Nov-11	VALLEY-MOVAL - 115KV	Contamination flashover	0.50
Valley North	19-Jan-12	19-Jan-12	VALLEY-MOVAL - 115KV	Vehicle hit	535.00
Valley North	12-Aug-12	15-Aug-12	VALLEY-MOVAL - 115KV	Toppled/broken	3818.00
Valley North	29-May-13	29-May-13	VALLEY-MOVAL - 115KV	N/a	0.50
Valley North	28-Apr-15	28-Apr-15	VALLEY-MOVAL - 115KV	Open for repairs	0.50
Valley North	07-Jun-15	07-Jun-15	VALLEY-MOVAL - 115KV	Open for repairs	16.00
Valley North	24-Jun-15	24-Jun-15	VALLEY-MOVAL - 115KV	N/a	0.50
Valley North	30-Jun-15	30-Jun-15	VALLEY-MOVAL - 115KV	N/a	1.00
Valley North	30-Sep-15	30-Sep-15	VALLEY-MOVAL - 115KV	Balloon	7.00
Valley North	10-Jul-06	10-Jul-06	VALLEY-MWD-STETSON - 115KV	Bird shorted line equipment	1.00
Valley North	22-Jul-06	22-Jul-06	VALLEY-MWD-STETSON - 115KV	Lightning	0.50
Valley North	03-Sep-06	03-Sep-06	VALLEY-MWD-STETSON - 115KV	Wind blew pole or tower over	200.00
Valley North	26-Jan-07	26-Jan-07	VALLEY-MWD-STETSON - 115KV	Animal	1.00

Valley North	20-Mar-08	20-Mar-08	VALLEY-MWD-STETSON - 115KV	Animal	3.00
Valley North	02-May-08	02-May-08	VALLEY-MWD-STETSON - 115KV	Lost	8.00
Valley North	25-Nov-08	25-Nov-08	VALLEY-MWD-STETSON - 115KV	Animal	2.00
Valley North	23-Apr-09	23-Apr-09	VALLEY-MWD-STETSON - 115KV	Lost	8.00
Valley North	03-Jun-09	03-Jun-09	VALLEY-MWD-STETSON - 115KV	N/a	21.00
Valley North	18-Jul-09	18-Jul-09	VALLEY-MWD-STETSON - 115KV	Animal	4.00
Valley North	03-Jan-10	03-Jan-10	VALLEY-MWD-STETSON - 115KV	N/a	5.00
Valley North	27-Jul-10	27-Jul-10	VALLEY-MWD-STETSON - 115KV	Other-see notes	5.00
Valley North	09-Oct-10	09-Oct-10	VALLEY-MWD-STETSON - 115KV	Contamination flashover	8.00
Valley North	18-Jan-11	18-Jan-11	VALLEY-MWD-STETSON - 115KV	Lost	8.00
Valley North	31-Mar-12	31-Mar-12	VALLEY-MWD-STETSON - 115KV	Contamination flashover	2.00
Valley North	09-Jan-13	09-Jan-13	VALLEY-MWD-STETSON - 115KV	N/a	3.00
Valley North	04-Apr-13	04-Apr-13	VALLEY-MWD-STETSON - 115KV	Foreign material	4.00
Valley North	28-May-13	28-May-13	VALLEY-MWD-STETSON - 115KV	N/a	161.00
Valley North	18-Oct-14	18-Oct-14	VALLEY-MWD-STETSON - 115KV	Open for repairs	11.00
Valley North	18-Jul-15	18-Jul-15	VALLEY-MWD-STETSON - 115KV	Lightning	1.00
Valley North	18-Jul-15	18-Jul-15	VALLEY-MWD-STETSON - 115KV	Lightning	1.00
Valley North	14-Dec-15	14-Dec-15	VALLEY-MWD-STETSON - 115KV	N/a	2.00
Valley North	18-Mar-16	18-Mar-16	VALLEY-MWD-STETSON - 115KV	N/a	0.50
Valley North	27-Apr-16	27-Apr-16	VALLEY-MWD-STETSON - 115KV	Foreign material	0.50
Valley North	15-Mar-17	15-Mar-17	VALLEY-MWD-STETSON - 115KV	Contamination flashover	44.00
Valley North	20-Jan-18	21-Jan-18	VALLEY-MWD-STETSON - 115KV	Vehicle hit	864.00
Valley North	11-Nov-05	11-Nov-05	VALLEY-NELSON - 115KV	Patrolled no cause found	1.00
Valley North	20-May-06	20-May-06	VALLEY-NELSON - 115KV	Patrolled no cause found	2.00
Valley North	09-Jun-06	09-Jun-06	VALLEY-NELSON - 115KV	Bird soil caused flashover	0.50
Valley North	19-Jan-07	19-Jan-07	VALLEY-NELSON - 115KV	High voltage	1.00
Valley North	21-Oct-07	22-Oct-07	VALLEY-NELSON - 115KV	Other-see notes	924.00
Valley North	02-May-08	02-May-08	VALLEY-NELSON - 115KV	Lost	8.00
Valley North	23-Apr-09	23-Apr-09	VALLEY-NELSON - 115KV	Lost	8.00
Valley North	03-Jun-09	03-Jun-09	VALLEY-NELSON - 115KV	Lightning	0.50
Valley North	03-Jun-09	03-Jun-09	VALLEY-NELSON - 115KV	Lightning	1.00
Valley North	23-May-13	23-May-13	VALLEY-NELSON - 115KV	Open for repairs	12.00
Valley North	18-Jul-15	18-Jul-15	VALLEY-NELSON - 115KV	N/a	1.00
Valley North	13-Feb-18	13-Feb-18	VALLEY-NELSON - 115KV	De-energize for pub. agency	18.00

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 4/20/2020

Question DG-C-7:

What are the values (absolute) for the “No Project” for the 4 columns in table ES-1 (not) the percentage values?

Response to Question DG-C-7:

Table ES-1 provides the system performance improvements of each alternative over the "No Project" scenario. The "No Project" scenario is provided in this table as a baseline comparison. The absolute values for all alternatives and the "No Project" scenario are provided in Table 6-1 and Table 6-2 for the years 2028 and 2048, respectively.

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 4/17/2020

Question DG-C-8:

In the Planning Study, the definition of “Flexibility 1 (Flex-1) – accumulation of EENS for all possible combinations of N-1-1 (or N-2) contingencies related to line outages. System tie-lines are utilized when needed and available.” Does N-1-1 mean an outage for planning followed by a forced outage?

Response to Question DG-C-8:

An N-1-1 contingency is a sequence of events consisting of an initial outage of a single system component (e.g., subtransmission line), followed by another outage of a single system component. This includes the scenario where one line is out-of-service for either planned maintenance or a prior unplanned outage, and a second line subsequently experiences an unplanned outage. The Flex-1 metric analyzes all possible combinations in which two subtransmission lines are out-of-service.

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 5/3/2021

Question DG-C-8 Revised:

In the Planning Study, the definition of “Flexibility 1 (Flex-1) – accumulation of EENS for all possible combinations of N-1-1 (or N-2) contingencies related to line outages. System tie-lines are utilized when needed and available.” Does N-1-1 mean an outage for planning followed by a forced outage?

Response to Question DG-C-8 Revised:

Revision 1 of this data request is being submitted to reflect changes documented in Southern California Edison’s February 1, 2021 Amended Motion to Supplement the Record.

As defined in SCE’s original response to this Data Request, an N-1-1 outage is a sequence of events consisting of an initial outage of a single system component (e.g., subtransmission line), followed by another outage of a single system components. This includes the scenario where one line is out-of-service for either planned maintenance or a prior unplanned outage, and a second line subsequently experiences an unplanned outage.

The revised analysis included as part of SCE’s February 1, 2021 Amended Motion to Supplement the Record omits N-1-1 outages from the cost-benefit analysis. N-1-1 outages are relatively rare events in the SCE System, in part because system operators proactively use system tie-lines (SCE again notes the Valley South System has no system tie-lines) and other mitigation to minimize their potential for occurring. Including them in the analysis using historic SCE data would have no significant impact on the results. The Flex-1 metric now only includes N-2 events, where two subtransmission lines that share a common pole are simultaneously out of service due to a common-mode failure event.

Please see SCE’s response to A.09-09-022 TURN-SCE-Alberhill-006 Question 03e for additional details (attached hereto).

SYSTEM	Start Date	End Date	Line Name	Primary Cause Desc	Duration-Min
Valley South	24-Feb-05	24-Feb-05	AULD-MORAGA - 115KV	Patrolled no cause found (storm)	0.50
Valley South	17-Feb-06	17-Feb-06	AULD-MORAGA - 115KV	Metallic party balloon	0.50
Valley South	03-Jun-09	03-Jun-09	AULD-MORAGA #1 - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	AULD-MORAGA #1 - 115KV	N/a	0.50
Valley South	12-Aug-11	12-Aug-11	AULD-MORAGA #1 - 115KV	Unknown	0.50
Valley South	18-Dec-11	18-Dec-11	AULD-MORAGA #1 - 115KV	Open for repairs	146.00
Valley South	30-Dec-07	30-Dec-07	AULD-MORAGA #2 - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	AULD-MORAGA #2 - 115KV	N/a	0.50
Valley South	18-Dec-11	18-Dec-11	AULD-MORAGA #2 - 115KV	Open for repairs	147.00
Valley South	06-Sep-06	06-Sep-06	AULD-SUN CITY - 115KV	Lightning	0.50
Valley South	17-Nov-06	17-Nov-06	AULD-SUN CITY - 115KV	Bird shorted line equipment	0.50
Valley South	16-Mar-08	16-Mar-08	AULD-SUN CITY - 115KV	Animal	1.00
Valley South	08-Jun-09	08-Jun-09	AULD-SUN CITY - 115KV	N/a	0.50
Valley South	21-Nov-09	21-Nov-09	AULD-SUN CITY - 115KV	N/a	0.50
Valley South	11-Apr-10	11-Apr-10	AULD-SUN CITY - 115KV	N/a	0.50
Valley South	15-Jul-10	15-Jul-10	AULD-SUN CITY - 115KV	N/a	0.50
Valley South	01-Sep-10	01-Sep-10	AULD-SUN CITY - 115KV	N/a	4.00
Valley South	01-Sep-10	01-Sep-10	AULD-SUN CITY - 115KV	Animal	0.50
Valley South	19-Feb-12	19-Feb-12	AULD-SUN CITY - 115KV	Foreign material	1.00
Valley South	30-Aug-12	30-Aug-12	AULD-SUN CITY - 115KV	N/a	15.00
Valley South	26-Dec-15	26-Dec-15	AULD-SUN CITY - 115KV	N/a	0.50
Valley South	26-Dec-15	26-Dec-15	AULD-SUN CITY - 115KV	N/a	0.50
Valley South	08-Mar-16	08-Mar-16	AULD-SUN CITY - 115KV	Animal	1.00
Valley South	14-May-17	14-May-17	AULD-SUN CITY - 115KV	Open for repairs	127.00
Valley South	20-Sep-05	20-Sep-05	ELSINORE-SKYLARK - 115KV	Lightning	0.50
Valley South	10-Aug-06	10-Aug-06	ELSINORE-SKYLARK - 115KV	Patrolled no cause found	1.00
Valley South	31-Aug-07	31-Aug-07	ELSINORE-SKYLARK - 115KV	N/a	0.50
Valley South	25-Jun-10	25-Jun-10	ELSINORE-SKYLARK - 115KV	Overload	0.50
Valley South	18-Jul-10	18-Jul-10	ELSINORE-SKYLARK - 115KV	Vehicle hit	704.00
Valley South	05-Feb-14	05-Feb-14	FOGARTY-IVYGLEN - 115KV	Lost	3.00
Valley South	07-Mar-16	07-Mar-16	FOGARTY-IVYGLEN - 115KV	Lost	4.00
Valley South	31-Mar-16	31-Mar-16	FOGARTY-IVYGLEN - 115KV	Vehicle hit	231.00
Valley South	09-May-16	09-May-16	FOGARTY-IVYGLEN - 115KV	N/a	4.00

Valley South	01-Aug-17	01-Aug-17	FOGARTY-IVYGLEN - 115KV	N/a	0.50
Valley South	02-Dec-17	02-Dec-17	FOGARTY-IVYGLEN - 115KV	Vehicle hit	579.00
Valley South	20-Sep-05	20-Sep-05	MORAGA-PECHANGA - 115KV	Lightning	1.00
Valley South	28-Sep-07	28-Sep-07	MORAGA-PECHANGA - 115KV	Vehicle hit	118.00
Valley South	07-Jun-08	07-Jun-08	MORAGA-PECHANGA - 115KV	Vehicle hit	323.00
Valley South	17-Mar-09	17-Mar-09	MORAGA-PECHANGA - 115KV	Balloon	0.50
Valley South	03-Jun-09	03-Jun-09	MORAGA-PECHANGA - 115KV	N/a	0.50
Valley South	21-Jan-10	21-Jan-10	MORAGA-PECHANGA - 115KV	N/a	0.50
Valley South	03-Mar-10	03-Mar-10	MORAGA-PECHANGA - 115KV	N/a	0.50
Valley South	19-Oct-10	19-Oct-10	MORAGA-PECHANGA - 115KV	N/a	0.50
Valley South	18-Dec-11	18-Dec-11	MORAGA-PECHANGA - 115KV	Open for repairs	146.00
Valley South	30-Jan-13	30-Jan-13	MORAGA-PECHANGA - 115KV	Open for repairs	933.00
Valley South	27-Nov-13	27-Nov-13	MORAGA-PECHANGA - 115KV	Vehicle hit	50.00
Valley South	02-Sep-14	02-Sep-14	MORAGA-PECHANGA - 115KV	Other-see notes	0.50
Valley South	15-Jul-15	15-Jul-15	MORAGA-PECHANGA - 115KV	N/a	0.50
Valley South	16-Mar-17	17-Mar-17	MORAGA-PECHANGA - 115KV	Open for repairs	998.00
Valley South	30-Apr-17	30-Apr-17	MORAGA-PECHANGA - 115KV	Open for repairs	0.50
Valley South	02-Nov-05	02-Nov-05	MORAGA-STADLER - 115KV	Raptor faulted line	0.50
Valley South	18-May-08	18-May-08	MORAGA-STADLER-STENT - 115KV	Vehicle hit	70.00
Valley South	18-May-08	18-May-08	MORAGA-STADLER-STENT - 115KV	Vehicle hit	70.00
Valley South	13-Jul-08	13-Jul-08	MORAGA-STADLER-STENT - 115KV	Other-see notes	1.00
Valley South	13-Jul-08	13-Jul-08	MORAGA-STADLER-STENT - 115KV	Other-see notes	1.00
Valley South	03-Jun-09	03-Jun-09	MORAGA-STADLER-STENT - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	MORAGA-STADLER-STENT - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	MORAGA-STADLER-STENT - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	MORAGA-STADLER-STENT - 115KV	N/a	0.50
Valley South	30-Sep-10	30-Sep-10	MORAGA-STADLER-STENT - 115KV	N/a	0.50
Valley South	30-Sep-10	30-Sep-10	MORAGA-STADLER-STENT - 115KV	N/a	0.50
Valley South	22-Dec-10	22-Dec-10	MORAGA-STADLER-STENT - 115KV	Vehicle hit	10.00
Valley South	22-Dec-10	22-Dec-10	MORAGA-STADLER-STENT - 115KV	Vehicle hit	10.00
Valley South	12-Feb-11	12-Feb-11	MORAGA-STADLER-STENT - 115KV	Other-see notes	16.00
Valley South	12-Feb-11	12-Feb-11	MORAGA-STADLER-STENT - 115KV	Other-see notes	16.00
Valley South	27-Jan-12	27-Jan-12	MORAGA-STADLER-STENT - 115KV	Other-see notes	151.00
Valley South	27-Jan-12	27-Jan-12	MORAGA-STADLER-STENT - 115KV	Other-see notes	151.00

Valley South	31-Jul-12	31-Jul-12	MORAGA-STADLER-STENT - 115KV	Vehicle hit	108.00
Valley South	31-Jul-12	31-Jul-12	MORAGA-STADLER-STENT - 115KV	Vehicle hit	108.00
Valley South	18-Jul-15	18-Jul-15	MORAGA-STADLER-STENT - 115KV	N/a	1.00
Valley South	18-Jul-15	18-Jul-15	MORAGA-STADLER-STENT - 115KV	N/a	1.00
Valley South	28-Feb-05	28-Feb-05	PAUBA-PECHANGA - 115KV	Opened - transmission orders	18.00
Valley South	02-Jul-06	02-Jul-06	PAUBA-PECHANGA - 115KV	Vehicle hit guy or guy pole	0.50
Valley South	25-Aug-10	25-Aug-10	PAUBA-PECHANGA - 115KV	N/a	2.00
Valley South	11-Aug-12	11-Aug-12	PAUBA-PECHANGA - 115KV	N/a	0.50
Valley South	20-Nov-13	20-Nov-13	PAUBA-PECHANGA - 115KV	N/a	0.50
Valley South	11-May-16	11-May-16	PAUBA-PECHANGA - 115KV	N/a	2.00
Valley South	17-Apr-17	17-Apr-17	PAUBA-PECHANGA - 115KV	Balloon	1.00
Valley South	13-Aug-17	13-Aug-17	PAUBA-PECHANGA - 115KV	Open for repairs	1180.00
Valley South	18-Jul-15	18-Jul-15	PAUBA-TRITON - 115KV	Lightning	4.00
Valley South	01-Aug-17	01-Aug-17	PAUBA-TRITON - 115KV	N/a	3.00
Valley South	21-Apr-06	21-Apr-06	SKYLARK-STADLER - 115KV	Patrolled no cause found	0.50
Valley South	24-May-08	24-May-08	SKYLARK-STADLER - 115KV	Animal	0.50
Valley South	08-Oct-08	08-Oct-08	SKYLARK-STADLER - 115KV	Vehicle hit	0.50
Valley South	16-Sep-14	16-Sep-14	STADLER-TENAJA - 115KV	N/a	0.50
Valley South	10-Apr-16	10-Apr-16	STADLER-TENAJA - 115KV	Vehicle hit	827.00
Valley South	31-Aug-17	01-Sep-17	STADLER-TENAJA - 115KV	Overload	617.00
Valley South	23-Apr-09	23-Apr-09	VALLEY-AULD - 115KV	Lost	9.00
Valley South	23-Apr-09	23-Apr-09	VALLEY-AULD - 115KV	Lost	9.00
Valley South	03-Jun-09	03-Jun-09	VALLEY-AULD - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	VALLEY-AULD - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	VALLEY-AULD - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	VALLEY-AULD - 115KV	N/a	0.50
Valley South	26-Jun-14	26-Jun-14	VALLEY-AULD - 115KV	N/a	2.00
Valley South	26-Jun-14	26-Jun-14	VALLEY-AULD - 115KV	N/a	2.00
Valley South	20-Sep-05	20-Sep-05	VALLEY-AULD-NO.1 - 115KV	Lightning	1.00
Valley South	21-Mar-05	21-Mar-05	VALLEY-AULD-NO.2 - 115KV	Patrolled no cause found	1.00
Valley South	20-Sep-05	20-Sep-05	VALLEY-AULD-NO.2 - 115KV	Lightning	1.00
Valley South	11-Nov-05	11-Nov-05	VALLEY-AULD-NO.2 - 115KV	Conducting material thrown into line	1.00
Valley South	11-Nov-05	11-Nov-05	VALLEY-AULD-NO.2 - 115KV	Conducting material thrown into line	211.00
Valley South	11-Feb-06	11-Feb-06	VALLEY-AULD-NO.2 - 115KV	Animal or bird dropped material into equ	1.00

Valley South	18-Mar-06	18-Mar-06	VALLEY-AULD-NO.2 - 115KV	Patrolled no cause found	0.50
Valley South	03-Sep-06	03-Sep-06	VALLEY-AULD-PAUBA - 115KV	Lightning	0.50
Valley South	09-Dec-06	09-Dec-06	VALLEY-AULD-PAUBA - 115KV	Patrolled no cause found	1.00
Valley South	10-Dec-06	10-Dec-06	VALLEY-AULD-PAUBA - 115KV	Bird soil caused insulator flashover	0.50
Valley South	23-Dec-07	23-Dec-07	VALLEY-AULD-PAUBA - 115KV	Other-see notes	14.00
Valley South	23-Apr-09	23-Apr-09	VALLEY-AULD-PAUBA - 115KV	Lost	9.00
Valley South	03-Jun-09	03-Jun-09	VALLEY-AULD-PAUBA - 115KV	N/a	0.50
Valley South	03-Jun-09	03-Jun-09	VALLEY-AULD-PAUBA - 115KV	N/a	1.00
Valley South	23-Sep-09	23-Sep-09	VALLEY-AULD-PAUBA - 115KV	Vehicle hit	143.00
Valley South	25-Aug-10	25-Aug-10	VALLEY-AULD-PAUBA - 115KV	Lightning	1.00
Valley South	05-Apr-12	05-Apr-12	VALLEY-AULD-PAUBA - 115KV	N/a	6.00
Valley South	18-Jul-15	18-Jul-15	VALLEY-AULD-TRITON - 115KV	Lightning	3.00
Valley South	08-Sep-15	08-Sep-15	VALLEY-AULD-TRITON - 115KV	N/a	0.50
Valley South	04-Feb-16	04-Feb-16	VALLEY-AULD-TRITON - 115KV	N/a	0.50
Valley South	20-Mar-13	20-Mar-13	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	3.00
Valley South	08-Oct-13	08-Oct-13	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	2.00
Valley South	05-Feb-14	05-Feb-14	VALLEY-ELSINORE-FOGARTY - 115KV	Other-see notes	3.00
Valley South	22-Oct-14	22-Oct-14	VALLEY-ELSINORE-FOGARTY - 115KV	Unknown	169.00
Valley South	28-Feb-15	28-Feb-15	VALLEY-ELSINORE-FOGARTY - 115KV	Line equipment trouble (trans only)	106.00
Valley South	05-Nov-15	05-Nov-15	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	14.00
Valley South	07-Mar-16	07-Mar-16	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	4.00
Valley South	22-Oct-16	22-Oct-16	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	2.00
Valley South	07-Apr-17	07-Apr-17	VALLEY-ELSINORE-FOGARTY - 115KV	Animal	1.00
Valley South	15-Jul-18	15-Jul-18	VALLEY-ELSINORE-FOGARTY - 115KV	Lightning	12.00
Valley South	09-Aug-18	09-Aug-18	VALLEY-ELSINORE-FOGARTY - 115KV	Lost	0.50
Valley South	16-Aug-18	16-Aug-18	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	0.50
Valley South	01-Dec-18	01-Dec-18	VALLEY-ELSINORE-FOGARTY - 115KV	N/a	1.00
Valley South	16-Mar-05	16-Mar-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Patrolled no cause found	5.00
Valley South	01-May-05	01-May-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Vehicle hit guy or guy pole	104.00
Valley South	17-May-05	17-May-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Vehicle hit guy or guy pole	119.00
Valley South	28-Jul-05	28-Jul-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Vehicle broke pole	126.00
Valley South	06-Aug-05	06-Aug-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Wind storm - no cause found	1.00
Valley South	20-Sep-05	20-Sep-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Lightning	77.00
Valley South	20-Sep-05	20-Sep-05	VALLEY-ELSINORE-IVYGLEN - 115KV	Lightning	2.00

Valley South	27-Mar-06	27-Mar-06	VALLEY-ELSINORE-IVYGLEN - 115KV	Patrolled no cause found	9.00
Valley South	17-Apr-06	17-Apr-06	VALLEY-ELSINORE-IVYGLEN - 115KV	Patrolled no cause found	1.00
Valley South	12-Jun-06	12-Jun-06	VALLEY-ELSINORE-IVYGLEN - 115KV	Patrolled no cause found	2.00
Valley South	22-Jul-06	22-Jul-06	VALLEY-ELSINORE-IVYGLEN - 115KV	Lightning	0.50
Valley South	07-Sep-06	07-Sep-06	VALLEY-ELSINORE-IVYGLEN - 115KV	Scce truck boom contact	2.00
Valley South	31-Aug-07	31-Aug-07	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	0.50
Valley South	21-Sep-07	21-Sep-07	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	1.00
Valley South	10-Oct-07	10-Oct-07	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	1.00
Valley South	30-Nov-07	30-Nov-07	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	11.00
Valley South	29-Feb-08	29-Feb-08	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	3.00
Valley South	24-Mar-08	24-Mar-08	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	0.50
Valley South	25-Jun-08	25-Jun-08	VALLEY-ELSINORE-IVYGLEN - 115KV	Other-see notes	0.50
Valley South	23-Apr-09	23-Apr-09	VALLEY-ELSINORE-IVYGLEN - 115KV	Lost	9.00
Valley South	19-Jan-10	19-Jan-10	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	2.00
Valley South	29-Jun-10	29-Jun-10	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	5.00
Valley South	06-Jul-10	06-Jul-10	VALLEY-ELSINORE-IVYGLEN - 115KV	Vehicle hit	83.00
Valley South	20-Aug-10	20-Aug-10	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	6.00
Valley South	25-Aug-10	25-Aug-10	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	0.50
Valley South	23-Sep-10	23-Sep-10	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	3.00
Valley South	17-Oct-10	17-Oct-10	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	1.00
Valley South	08-Jan-11	08-Jan-11	VALLEY-ELSINORE-IVYGLEN - 115KV	Vehicle hit	149.00
Valley South	08-Apr-11	08-Apr-11	VALLEY-ELSINORE-IVYGLEN - 115KV	Other-see notes	2.00
Valley South	15-Jul-11	15-Jul-11	VALLEY-ELSINORE-IVYGLEN - 115KV	Overload	1.00
Valley South	28-Aug-11	28-Aug-11	VALLEY-ELSINORE-IVYGLEN - 115KV	Other-see notes	1.00
Valley South	20-Mar-13	20-Mar-13	VALLEY-ELSINORE-IVYGLEN - 115KV	N/a	3.00
Valley South	17-Apr-06	17-Apr-06	VALLEY-NEWCOMB - 115KV	Patrolled no cause found	1.00
Valley South	23-Apr-09	23-Apr-09	VALLEY-NEWCOMB - 115KV	Lost	9.00
Valley South	11-Oct-10	11-Oct-10	VALLEY-NEWCOMB - 115KV	N/a	2.00
Valley South	14-Jun-13	14-Jun-13	VALLEY-NEWCOMB - 115KV	N/a	2.00
Valley South	04-Feb-16	05-Feb-16	VALLEY-NEWCOMB - 115KV	Vehicle hit	919.00
Valley South	03-Nov-16	03-Nov-16	VALLEY-NEWCOMB - 115KV	3rd party caused	132.00
Valley South	09-Feb-18	09-Feb-18	VALLEY-NEWCOMB - 115KV	No cause found	2.00
Valley South	27-Feb-18	27-Feb-18	VALLEY-NEWCOMB - 115KV	Lightning	0.97
Valley South	07-Feb-05	07-Feb-05	VALLEY-NEWCOMB-SKYLARK - 115KV	Bird shorted line equipment	1.00

Valley South	04-Dec-05	04-Dec-05	VALLEY-NEWCOMB-SKYLARK - 115KV	Unknown not patrolled	2.00
Valley South	10-Aug-06	10-Aug-06	VALLEY-NEWCOMB-SKYLARK - 115KV	Patrolled no cause found	14.00
Valley South	28-Dec-06	29-Dec-06	VALLEY-NEWCOMB-SKYLARK - 115KV	Vehicle hit guy or guy pole	113.00
Valley South	31-Aug-07	31-Aug-07	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	22-May-08	22-May-08	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	1.00
Valley South	26-May-08	26-May-08	VALLEY-NEWCOMB-SKYLARK - 115KV	Vehicle hit	1.00
Valley South	17-Jun-08	17-Jun-08	VALLEY-NEWCOMB-SKYLARK - 115KV	Vehicle hit	63.00
Valley South	23-Apr-09	23-Apr-09	VALLEY-NEWCOMB-SKYLARK - 115KV	Lost	9.00
Valley South	09-Mar-10	09-Mar-10	VALLEY-NEWCOMB-SKYLARK - 115KV	Unknown	1.00
Valley South	29-Jun-10	29-Jun-10	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	25-Aug-10	25-Aug-10	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	23-May-11	23-May-11	VALLEY-NEWCOMB-SKYLARK - 115KV	Overload	1.00
Valley South	27-Aug-11	27-Aug-11	VALLEY-NEWCOMB-SKYLARK - 115KV	Lightning	0.50
Valley South	04-Apr-12	04-Apr-12	VALLEY-NEWCOMB-SKYLARK - 115KV	Other-see notes	2.00
Valley South	06-Jun-12	06-Jun-12	VALLEY-NEWCOMB-SKYLARK - 115KV	Balloon	195.00
Valley South	25-Aug-12	25-Aug-12	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	16-Jan-13	16-Jan-13	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	4.00
Valley South	12-Aug-13	12-Aug-13	VALLEY-NEWCOMB-SKYLARK - 115KV	Lost	0.50
Valley South	21-Aug-13	21-Aug-13	VALLEY-NEWCOMB-SKYLARK - 115KV	Foreign material	4.00
Valley South	31-Oct-13	31-Oct-13	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	3.00
Valley South	23-Jun-14	23-Jun-14	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	11-Aug-14	11-Aug-14	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	16-Sep-14	16-Sep-14	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	2.00
Valley South	17-Aug-15	17-Aug-15	VALLEY-NEWCOMB-SKYLARK - 115KV	Other-see notes	74.00
Valley South	08-Sep-15	08-Sep-15	VALLEY-NEWCOMB-SKYLARK - 115KV	N/a	0.50
Valley South	24-Sep-15	24-Sep-15	VALLEY-NEWCOMB-SKYLARK - 115KV	Vehicle hit	2.00
Valley South	27-Nov-15	27-Nov-15	VALLEY-NEWCOMB-SKYLARK - 115KV	Unknown	5.00
Valley South	16-Dec-15	16-Dec-15	VALLEY-NEWCOMB-SKYLARK - 115KV	Vehicle hit	0.50
Valley South	10-Mar-16	10-Mar-16	VALLEY-NEWCOMB-SKYLARK - 115KV	Animal	0.50
Valley South	17-Jun-16	17-Jun-16	VALLEY-NEWCOMB-SKYLARK - 115KV	Balloon	1.00
Valley South	14-May-17	14-May-17	VALLEY-NEWCOMB-SKYLARK - 115KV	Open for repairs	127.00
Valley South	23-May-17	23-May-17	VALLEY-NEWCOMB-SKYLARK - 115KV	Lost	3.00
Valley South	28-Sep-18	28-Sep-18	VALLEY-NEWCOMB-SKYLARK - 115KV	Balloon	2.50
Valley South	27-Mar-05	27-Mar-05	VALLEY-PAUBA - 115KV	Patrolled no cause found	1.00

Valley South	20-Sep-05	20-Sep-05	VALLEY-PAUBA - 115KV	Lightning	4.00
Valley South	11-Mar-06	11-Mar-06	VALLEY-PAUBA - 115KV	Loose bond wire	0.50
Valley South	02-Jul-06	02-Jul-06	VALLEY-PAUBA - 115KV	Vehicle hit guy or guy pole	5.00
Valley South	22-Jul-06	22-Jul-06	VALLEY-PAUBA - 115KV	Lightning	0.50
Valley South	09-Mar-07	09-Mar-07	VALLEY-SUN CITY - 115KV	High voltage	0.50
Valley South	14-Oct-07	14-Oct-07	VALLEY-SUN CITY - 115KV	Contamination flashover	1.00
Valley South	23-Apr-09	23-Apr-09	VALLEY-SUN CITY - 115KV	Lost	9.00
Valley South	17-Oct-11	17-Oct-11	VALLEY-SUN CITY - 115KV	Lost	13.00
Valley South	30-Aug-12	30-Aug-12	VALLEY-SUN CITY - 115KV	Lightning	9.00
Valley South	27-Nov-15	27-Nov-15	VALLEY-SUN CITY - 115KV	N/a	0.50
Valley North	15-Jun-05	15-Jun-05	VALLEY-MORENO-VISTA - 115KV	Patrolled no cause found	1.00
Valley North	12-Jul-05	12-Jul-05	VALLEY-MORENO-VISTA - 115KV	Bird soil caused flashover	1.00
Valley North	15-Aug-05	15-Aug-05	VALLEY-MORENO-VISTA - 115KV	Lightning	1.00
Valley North	09-Sep-05	09-Sep-05	VALLEY-MORENO-VISTA - 115KV	Raptor faulted line	1.00
Valley North	30-Jan-06	30-Jan-06	VALLEY-MORENO-VISTA - 115KV	Broken or damaged insulator flashover	2.00
Valley North	11-Mar-06	11-Mar-06	VALLEY-MORENO-VISTA - 115KV	Patrolled no cause found	2.00
Valley North	09-Jul-06	09-Jul-06	VALLEY-MORENO-VISTA - 115KV	Vehicle hit guy or guy pole	0.50
Valley North	07-Dec-06	07-Dec-06	VALLEY-MORENO-VISTA - 115KV	Patrolled no cause found	1.00
Valley North	02-Apr-07	02-Apr-07	VALLEY-MORENO-VISTA - 115KV	N/a	1.00
Valley North	06-Jun-07	06-Jun-07	VALLEY-MORENO-VISTA - 115KV	N/a	0.50
Valley North	10-Apr-17	10-Apr-17	LAKEVIEW-MOVAL - 115KV	N/a	0.50
Valley North	23-Jul-05	23-Jul-05	MAYBERRY-NELSON - 115KV	Lightning	1.00
Valley North	18-May-08	18-May-08	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	22-May-08	22-May-08	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	27-May-08	27-May-08	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	15-Feb-09	15-Feb-09	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	30-May-10	30-May-10	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	12-Jun-10	12-Jun-10	MORENO-MOVAL-VISTA - 115KV	Other-see notes	0.02
Valley North	27-Oct-10	27-Oct-10	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	19-Aug-11	19-Aug-11	MORENO-MOVAL-VISTA - 115KV	Fire	1.00
Valley North	15-Nov-11	15-Nov-11	MORENO-MOVAL-VISTA - 115KV	Lost	0.50
Valley North	26-Nov-11	26-Nov-11	MORENO-MOVAL-VISTA - 115KV	Other-see notes	0.50
Valley North	26-Jan-12	26-Jan-12	MORENO-MOVAL-VISTA - 115KV	Other-see notes	1.00
Valley North	08-Feb-12	08-Feb-12	MORENO-MOVAL-VISTA - 115KV	Foreign material	4.00

Valley North	27-Mar-12	27-Mar-12	MORENO-MOVAL-VISTA - 115KV	Contamination flashover	0.50
Valley North	25-Feb-15	25-Feb-15	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	23-Mar-15	23-Mar-15	MORENO-MOVAL-VISTA - 115KV	N/a	2.00
Valley North	27-Jul-15	27-Jul-15	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	15-Oct-15	15-Oct-15	MORENO-MOVAL-VISTA - 115KV	N/a	2.00
Valley North	02-Feb-16	02-Feb-16	MORENO-MOVAL-VISTA - 115KV	Open for repairs	538.00
Valley North	10-Feb-16	10-Feb-16	MORENO-MOVAL-VISTA - 115KV	N/a	0.50
Valley North	19-Apr-16	19-Apr-16	MORENO-MOVAL-VISTA - 115KV	Foreign material	0.50
Valley North	12-Jan-17	12-Jan-17	MORENO-MOVAL-VISTA - 115KV	Animal	1.00
Valley North	25-May-18	25-May-18	MORENO-MOVAL-VISTA - 115KV	Contamination flashover	81.00
Valley North	21-Oct-07	21-Oct-07	NELSON-STETSON - 115KV	Toppled/broken	41.00
Valley North	27-Dec-11	28-Dec-11	NELSON-STETSON - 115KV	Overload	803.00
Valley North	01-Aug-13	01-Aug-13	NELSON-STETSON - 115KV	Other-see notes	6.00
Valley North	30-Jun-15	30-Jun-15	NELSON-STETSON - 115KV	N/a	0.50
Valley North	03-Aug-15	03-Aug-15	NELSON-STETSON - 115KV	Vehicle hit	0.50
Valley North	23-Sep-17	23-Sep-17	NELSON-STETSON - 115KV	N/a	0.50
Valley North	27-Jun-05	27-Jun-05	VALLEY-ALESSANDRO-BUNKER - 115KV	Lightning	2.00
Valley North	06-Aug-05	08-Aug-05	VALLEY-ALESSANDRO-BUNKER - 115KV	Wind blew pole or tower over	2404.00
Valley North	25-Aug-05	25-Aug-05	VALLEY-ALESSANDRO-BUNKER - 115KV	Bird soil caused flashover	1.00
Valley North	10-May-06	10-May-06	VALLEY-ALESSANDRO-BUNKER - 115KV	Pole/tower fell over due to excavation	197.00
Valley North	18-Aug-06	18-Aug-06	VALLEY-ALESSANDRO-BUNKER - 115KV	Bird soil caused insulator flashover	3.00
Valley North	17-Sep-06	17-Sep-06	VALLEY-ALESSANDRO-BUNKER - 115KV	Patrolled no cause found	4.00
Valley North	09-Dec-06	09-Dec-06	VALLEY-ALESSANDRO-BUNKER - 115KV	Vehicle hit guy or guy pole	129.00
Valley North	02-May-08	02-May-08	VALLEY-ALESSANDRO-BUNKER - 115KV	Lost	9.00
Valley North	23-Apr-09	23-Apr-09	VALLEY-ALESSANDRO-BUNKER - 115KV	Lost	10.00
Valley North	11-Nov-11	11-Nov-11	VALLEY-ALESSANDRO-BUNKER - 115KV	Other-see notes	2.00
Valley North	30-Aug-12	30-Aug-12	VALLEY-ALESSANDRO-BUNKER - 115KV	N/a	2.00
Valley North	24-Oct-14	24-Oct-14	VALLEY-ALESSANDRO-BUNKER - 115KV	Foreign material	5.00
Valley North	12-Dec-14	12-Dec-14	VALLEY-ALESSANDRO-BUNKER - 115KV	Other-see notes	2.00
Valley North	03-Apr-15	03-Apr-15	VALLEY-ALESSANDRO-BUNKER - 115KV	Foreign material	177.00
Valley North	03-Dec-16	03-Dec-16	VALLEY-ALESSANDRO-BUNKER - 115KV	Vehicle hit	5.00
Valley North	25-Mar-17	25-Mar-17	VALLEY-ALESSANDRO-BUNKER - 115KV	Vehicle hit	967.00
Valley North	21-Jun-17	21-Jun-17	VALLEY-ALESSANDRO-BUNKER - 115KV	Overload	1.00
Valley North	21-Sep-07	21-Sep-07	VALLEY-ALESSANDRO-CAJALCO - 115KV	Other-see notes	3.00

Valley North	21-Sep-07	21-Sep-07	VALLEY-ALESSANDRO-CAJALCO - 115KV	Other-see notes	1.00
Valley North	10-Dec-07	10-Dec-07	VALLEY-ALESSANDRO-CAJALCO - 115KV	Vehicle hit	4.00
Valley North	02-May-08	02-May-08	VALLEY-ALESSANDRO-CAJALCO - 115KV	Lost	9.00
Valley North	29-Dec-08	29-Dec-08	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	3.00
Valley North	01-Feb-09	01-Feb-09	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	23-Apr-09	23-Apr-09	VALLEY-ALESSANDRO-CAJALCO - 115KV	Lost	10.00
Valley North	17-Aug-09	17-Aug-09	VALLEY-ALESSANDRO-CAJALCO - 115KV	Application	2.00
Valley North	17-Aug-09	17-Aug-09	VALLEY-ALESSANDRO-CAJALCO - 115KV	Application	1.00
Valley North	10-Apr-10	10-Apr-10	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	1.00
Valley North	06-Jul-11	06-Jul-11	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	04-Jun-12	04-Jun-12	VALLEY-ALESSANDRO-CAJALCO - 115KV	Other-see notes	384.00
Valley North	12-Aug-12	12-Aug-12	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	6.00
Valley North	30-Aug-12	30-Aug-12	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	30-Aug-13	30-Aug-13	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	30-Aug-13	30-Aug-13	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	18-Aug-14	18-Aug-14	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	14-Sep-14	14-Sep-14	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	01-Mar-15	01-Mar-15	VALLEY-ALESSANDRO-CAJALCO - 115KV	Foreign material	0.50
Valley North	02-Apr-15	02-Apr-15	VALLEY-ALESSANDRO-CAJALCO - 115KV	Contamination flashover	2.00
Valley North	15-Oct-15	15-Oct-15	VALLEY-ALESSANDRO-CAJALCO - 115KV	Lightning	3.00
Valley North	31-Aug-16	31-Aug-16	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	0.50
Valley North	25-Sep-16	25-Sep-16	VALLEY-ALESSANDRO-CAJALCO - 115KV	Other-see notes	0.50
Valley North	15-Oct-16	15-Oct-16	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	3.00
Valley North	13-Mar-17	13-Mar-17	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	11.00
Valley North	23-Jul-17	23-Jul-17	VALLEY-ALESSANDRO-CAJALCO - 115KV	N/a	1.00
Valley North	19-Sep-05	19-Sep-05	VALLEY-BUNKER-CAJALCO - 115KV	Lightning	1.00
Valley North	07-Dec-05	07-Dec-05	VALLEY-BUNKER-CAJALCO - 115KV	Patrolled no cause found	1.00
Valley North	09-Jan-06	09-Jan-06	VALLEY-BUNKER-CAJALCO - 115KV	Bird soil caused insulator flashover	48.00
Valley North	21-Sep-07	21-Sep-07	VALLEY-BUNKER-CAJALCO - 115KV	Other-see notes	132.00
Valley North	10-Dec-07	10-Dec-07	VALLEY-BUNKER-CAJALCO - 115KV	Vehicle hit	178.00
Valley North	11-May-08	11-May-08	VALLEY-BUNKER-CAJALCO - 115KV	Animal	123.00
Valley North	22-May-08	22-May-08	VALLEY-BUNKER-CAJALCO - 115KV	Lightning	0.50
Valley North	01-Feb-09	01-Feb-09	VALLEY-BUNKER-CAJALCO - 115KV	Other-see notes	208.00
Valley North	23-Apr-09	23-Apr-09	VALLEY-BUNKER-CAJALCO - 115KV	Lost	10.00

Valley North	17-Aug-09	17-Aug-09	VALLEY-BUNKER-CAJALCO - 115KV	Foreign material	62.00
Valley North	18-Sep-10	18-Sep-10	VALLEY-BUNKER-CAJALCO - 115KV	Foreign material	382.00
Valley North	30-Sep-10	30-Sep-10	VALLEY-BUNKER-CAJALCO - 115KV	N/a	0.50
Valley North	19-Oct-10	19-Oct-10	VALLEY-BUNKER-CAJALCO - 115KV	N/a	0.50
Valley North	06-Jul-11	06-Jul-11	VALLEY-BUNKER-CAJALCO - 115KV	Unknown	0.50
Valley North	27-Feb-12	27-Feb-12	VALLEY-BUNKER-CAJALCO - 115KV	N/a	1.00
Valley North	27-Aug-12	27-Aug-12	VALLEY-BUNKER-CAJALCO - 115KV	Vehicle hit	212.00
Valley North	30-Aug-12	30-Aug-12	VALLEY-BUNKER-CAJALCO - 115KV	N/a	1.00
Valley North	30-Aug-12	30-Aug-12	VALLEY-BUNKER-CAJALCO - 115KV	N/a	6.00
Valley North	02-Feb-14	02-Feb-14	VALLEY-BUNKER-CAJALCO - 115KV	Unknown	2.00
Valley North	26-Apr-14	26-Apr-14	VALLEY-BUNKER-CAJALCO - 115KV	Animal	3.00
Valley North	31-Jan-16	31-Jan-16	VALLEY-BUNKER-CAJALCO - 115KV	Other-see notes	0.50
Valley North	31-Jan-16	31-Jan-16	VALLEY-BUNKER-CAJALCO - 115KV	Other-see notes	0.50
Valley North	26-Mar-16	26-Mar-16	VALLEY-BUNKER-CAJALCO - 115KV	N/a	0.50
Valley North	20-Oct-17	20-Oct-17	VALLEY-BUNKER-CAJALCO - 115KV	N/a	1.00
Valley North	01-Jan-18	01-Jan-18	VALLEY-BUNKER-CAJALCO - 115KV	Lightning	1.00
Valley North	19-Jul-18	19-Jul-18	VALLEY-BUNKER-CAJALCO - 115KV	Lightning	1.00
Valley North	26-Sep-18	26-Sep-18	VALLEY-BUNKER-CAJALCO - 115KV	No cause found	5.00
Valley North	29-Mar-16	29-Mar-16	VALLEY-LAKEVIEW - 115KV	Animal	0.50
Valley North	19-Jan-17	19-Jan-17	VALLEY-LAKEVIEW - 115KV	Open for repairs	448.00
Valley North	11-Jun-05	12-Jun-05	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit pole	737.00
Valley North	17-Jun-05	17-Jun-05	VALLEY-MAYBERRY-MORENO-VISTA -	Patrolled no cause found	1.00
Valley North	06-Aug-05	06-Aug-05	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit guy or guy pole	1.00
Valley North	06-Aug-05	06-Aug-05	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	1.00
Valley North	20-Sep-05	20-Sep-05	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	1.00
Valley North	21-Sep-05	21-Sep-05	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning damaged pole / tower line hard	157.00
Valley North	22-Mar-06	22-Mar-06	VALLEY-MAYBERRY-MORENO-VISTA -	Patrolled no cause found	0.50
Valley North	16-May-06	16-May-06	VALLEY-MAYBERRY-MORENO-VISTA -	Unknown not patrolled	3.00
Valley North	16-Aug-06	16-Aug-06	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit pole	138.00
Valley North	03-Sep-06	03-Sep-06	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	1.00
Valley North	03-Sep-06	03-Sep-06	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	0.50
Valley North	03-Sep-06	03-Sep-06	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning damaged pole / tower line hard	0.50
Valley North	03-Sep-06	03-Sep-06	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning damaged pole / tower line hard	0.50
Valley North	03-Sep-06	03-Sep-06	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning damaged pole / tower line hard	0.50

Valley North	22-Sep-06	22-Sep-06	VALLEY-MAYBERRY-MORENO-VISTA -	Unknown not patrolled	0.50
Valley North	07-Apr-07	07-Apr-07	VALLEY-MAYBERRY-MORENO-VISTA -	Lost	2.00
Valley North	31-Aug-07	31-Aug-07	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	16-Oct-07	16-Oct-07	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit	118.00
Valley North	21-Oct-07	22-Oct-07	VALLEY-MAYBERRY-MORENO-VISTA -	Other-see notes	1538.00
Valley North	28-Jan-08	28-Jan-08	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit	0.50
Valley North	01-Feb-08	01-Feb-08	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	12-Mar-08	12-Mar-08	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	18-Apr-08	18-Apr-08	VALLEY-MAYBERRY-MORENO-VISTA -	3rd party caused	0.50
Valley North	02-May-08	02-May-08	VALLEY-MAYBERRY-MORENO-VISTA -	Lost	8.00
Valley North	22-May-08	22-May-08	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	2.00
Valley North	22-Jun-08	22-Jun-08	VALLEY-MAYBERRY-MORENO-VISTA -	Balloon	0.50
Valley North	21-Sep-08	21-Sep-08	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	14-Apr-09	14-Apr-09	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	23-Apr-09	23-Apr-09	VALLEY-MAYBERRY-MORENO-VISTA -	Lost	8.00
Valley North	09-May-09	09-May-09	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	03-Jun-09	03-Jun-09	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	0.50
Valley North	03-Jun-09	03-Jun-09	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	0.50
Valley North	03-Jun-09	03-Jun-09	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	2.00
Valley North	16-Jun-09	16-Jun-09	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	02-Sep-09	02-Sep-09	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	1.00
Valley North	17-Feb-10	17-Feb-10	VALLEY-MAYBERRY-MORENO-VISTA -	Other-see notes	3.00
Valley North	17-Feb-10	17-Feb-10	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	3.00
Valley North	25-Feb-10	25-Feb-10	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	2.00
Valley North	01-Oct-10	01-Oct-10	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	15-Mar-11	15-Mar-11	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	14-May-11	14-May-11	VALLEY-MAYBERRY-MORENO-VISTA -	Other-see notes	0.50
Valley North	15-May-11	15-May-11	VALLEY-MAYBERRY-MORENO-VISTA -	Other-see notes	1.00
Valley North	12-Jun-11	12-Jun-11	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	25-Jun-11	25-Jun-11	VALLEY-MAYBERRY-MORENO-VISTA -	Overload	1.00
Valley North	06-Nov-11	06-Nov-11	VALLEY-MAYBERRY-MORENO-VISTA -	Other-see notes	2.00
Valley North	01-Feb-12	01-Feb-12	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	03-Feb-12	03-Feb-12	VALLEY-MAYBERRY-MORENO-VISTA -	Foreign material	0.50
Valley North	15-Mar-12	15-Mar-12	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50

Valley North	23-Jun-12	23-Jun-12	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	10-Aug-12	10-Aug-12	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	30-Aug-12	30-Aug-12	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	30-Aug-12	30-Aug-12	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	2.00
Valley North	06-Nov-12	06-Nov-12	VALLEY-MAYBERRY-MORENO-VISTA -	Balloon	0.50
Valley North	17-Nov-12	17-Nov-12	VALLEY-MAYBERRY-MORENO-VISTA -	Unknown	602.00
Valley North	08-Feb-13	08-Feb-13	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	274.00
Valley North	02-Mar-13	02-Mar-13	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit	60.00
Valley North	26-Apr-13	27-Apr-13	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit	1084.00
Valley North	01-Jun-13	01-Jun-13	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	3.00
Valley North	30-Aug-13	30-Aug-13	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit	2.00
Valley North	11-Sep-13	11-Sep-13	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	12-Feb-14	12-Feb-14	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	9.00
Valley North	28-Feb-14	01-Mar-14	VALLEY-MAYBERRY-MORENO-VISTA -	Unknown	880.00
Valley North	16-Jul-14	16-Jul-14	VALLEY-MAYBERRY-MORENO-VISTA -	Vehicle hit	374.00
Valley North	20-Aug-14	20-Aug-14	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	2.00
Valley North	10-Nov-14	10-Nov-14	VALLEY-MAYBERRY-MORENO-VISTA -	Unknown	2.00
Valley North	26-Nov-14	26-Nov-14	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	2.00
Valley North	04-Dec-14	04-Dec-14	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	2.00
Valley North	01-Mar-15	01-Mar-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	21-Mar-15	21-Mar-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	22-Apr-15	22-Apr-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	02-Jun-15	02-Jun-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	20-Jun-15	20-Jun-15	VALLEY-MAYBERRY-MORENO-VISTA -	Other-see notes	0.50
Valley North	12-Jul-15	12-Jul-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	18-Jul-15	18-Jul-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00
Valley North	29-Jul-15	29-Jul-15	VALLEY-MAYBERRY-MORENO-VISTA -	Lightning	0.50
Valley North	08-Sep-15	08-Sep-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	0.50
Valley North	11-Dec-15	11-Dec-15	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	3.00
Valley North	29-Apr-16	29-Apr-16	VALLEY-MAYBERRY-MORENO-VISTA -	Open for repairs	0.50
Valley North	29-Apr-16	29-Apr-16	VALLEY-MAYBERRY-MORENO-VISTA -	Open for repairs	412.00
Valley North	17-Jan-17	17-Jan-17	VALLEY-MAYBERRY-MORENO-VISTA -	Animal	1.00
Valley North	22-May-17	22-May-17	VALLEY-MAYBERRY-MORENO-VISTA -	Lost	172.00
Valley North	06-Nov-17	06-Nov-17	VALLEY-MAYBERRY-MORENO-VISTA -	N/a	1.00

Valley North	15-Jun-18	15-Jun-18	VALLEY-MAYBERRY-MORENO-VISTA -	Balloon	1.00
Valley North	19-Oct-18	19-Oct-18	VALLEY-MAYBERRY-MORENO-VISTA -	No cause found	316.00
Valley North	15-Jun-05	15-Jun-05	VALLEY-MORENO-VISTA - 115KV	Patrolled no cause found	1.00
Valley North	12-Jul-05	12-Jul-05	VALLEY-MORENO-VISTA - 115KV	Bird soil caused flashover	1.00
Valley North	15-Aug-05	15-Aug-05	VALLEY-MORENO-VISTA - 115KV	Lightning	1.00
Valley North	09-Sep-05	09-Sep-05	VALLEY-MORENO-VISTA - 115KV	Raptor faulted line	1.00
Valley North	30-Jan-06	30-Jan-06	VALLEY-MORENO-VISTA - 115KV	Broken or damaged insulator flashover	2.00
Valley North	11-Mar-06	11-Mar-06	VALLEY-MORENO-VISTA - 115KV	Patrolled no cause found	2.00
Valley North	09-Jul-06	09-Jul-06	VALLEY-MORENO-VISTA - 115KV	Vehicle hit guy or guy pole	0.50
Valley North	07-Dec-06	07-Dec-06	VALLEY-MORENO-VISTA - 115KV	Patrolled no cause found	1.00
Valley North	02-Apr-07	02-Apr-07	VALLEY-MORENO-VISTA - 115KV	N/a	1.00
Valley North	06-Jun-07	06-Jun-07	VALLEY-MORENO-VISTA - 115KV	N/a	0.50
Valley North	02-Sep-07	02-Sep-07	VALLEY-MOVAL - 115KV	Other-see notes	1.00
Valley North	02-Sep-07	03-Sep-07	VALLEY-MOVAL - 115KV	Other-see notes	615.00
Valley North	27-Oct-07	27-Oct-07	VALLEY-MOVAL - 115KV	Vehicle hit	725.00
Valley North	05-Dec-08	05-Dec-08	VALLEY-MOVAL - 115KV	Fire	0.50
Valley North	23-Apr-09	23-Apr-09	VALLEY-MOVAL - 115KV	Lost	10.00
Valley North	25-May-09	25-May-09	VALLEY-MOVAL - 115KV	Vehicle hit	1.00
Valley North	13-May-11	13-May-11	VALLEY-MOVAL - 115KV	Other-see notes	2.00
Valley North	12-Oct-11	12-Oct-11	VALLEY-MOVAL - 115KV	Other-see notes	0.02
Valley North	29-Oct-11	29-Oct-11	VALLEY-MOVAL - 115KV	Animal	1.00
Valley North	13-Nov-11	13-Nov-11	VALLEY-MOVAL - 115KV	Contamination flashover	0.50
Valley North	19-Jan-12	19-Jan-12	VALLEY-MOVAL - 115KV	Vehicle hit	535.00
Valley North	12-Aug-12	15-Aug-12	VALLEY-MOVAL - 115KV	Toppled/broken	3818.00
Valley North	29-May-13	29-May-13	VALLEY-MOVAL - 115KV	N/a	0.50
Valley North	28-Apr-15	28-Apr-15	VALLEY-MOVAL - 115KV	Open for repairs	0.50
Valley North	07-Jun-15	07-Jun-15	VALLEY-MOVAL - 115KV	Open for repairs	16.00
Valley North	24-Jun-15	24-Jun-15	VALLEY-MOVAL - 115KV	N/a	0.50
Valley North	30-Jun-15	30-Jun-15	VALLEY-MOVAL - 115KV	N/a	1.00
Valley North	30-Sep-15	30-Sep-15	VALLEY-MOVAL - 115KV	Balloon	7.00
Valley North	10-Jul-06	10-Jul-06	VALLEY-MWD-STETSON - 115KV	Bird shorted line equipment	1.00
Valley North	22-Jul-06	22-Jul-06	VALLEY-MWD-STETSON - 115KV	Lightning	0.50
Valley North	03-Sep-06	03-Sep-06	VALLEY-MWD-STETSON - 115KV	Wind blew pole or tower over	200.00
Valley North	26-Jan-07	26-Jan-07	VALLEY-MWD-STETSON - 115KV	Animal	1.00

Valley North	20-Mar-08	20-Mar-08	VALLEY-MWD-STETSON - 115KV	Animal	3.00
Valley North	02-May-08	02-May-08	VALLEY-MWD-STETSON - 115KV	Lost	8.00
Valley North	25-Nov-08	25-Nov-08	VALLEY-MWD-STETSON - 115KV	Animal	2.00
Valley North	23-Apr-09	23-Apr-09	VALLEY-MWD-STETSON - 115KV	Lost	8.00
Valley North	03-Jun-09	03-Jun-09	VALLEY-MWD-STETSON - 115KV	N/a	21.00
Valley North	18-Jul-09	18-Jul-09	VALLEY-MWD-STETSON - 115KV	Animal	4.00
Valley North	03-Jan-10	03-Jan-10	VALLEY-MWD-STETSON - 115KV	N/a	5.00
Valley North	27-Jul-10	27-Jul-10	VALLEY-MWD-STETSON - 115KV	Other-see notes	5.00
Valley North	09-Oct-10	09-Oct-10	VALLEY-MWD-STETSON - 115KV	Contamination flashover	8.00
Valley North	18-Jan-11	18-Jan-11	VALLEY-MWD-STETSON - 115KV	Lost	8.00
Valley North	31-Mar-12	31-Mar-12	VALLEY-MWD-STETSON - 115KV	Contamination flashover	2.00
Valley North	09-Jan-13	09-Jan-13	VALLEY-MWD-STETSON - 115KV	N/a	3.00
Valley North	04-Apr-13	04-Apr-13	VALLEY-MWD-STETSON - 115KV	Foreign material	4.00
Valley North	28-May-13	28-May-13	VALLEY-MWD-STETSON - 115KV	N/a	161.00
Valley North	18-Oct-14	18-Oct-14	VALLEY-MWD-STETSON - 115KV	Open for repairs	11.00
Valley North	18-Jul-15	18-Jul-15	VALLEY-MWD-STETSON - 115KV	Lightning	1.00
Valley North	18-Jul-15	18-Jul-15	VALLEY-MWD-STETSON - 115KV	Lightning	1.00
Valley North	14-Dec-15	14-Dec-15	VALLEY-MWD-STETSON - 115KV	N/a	2.00
Valley North	18-Mar-16	18-Mar-16	VALLEY-MWD-STETSON - 115KV	N/a	0.50
Valley North	27-Apr-16	27-Apr-16	VALLEY-MWD-STETSON - 115KV	Foreign material	0.50
Valley North	15-Mar-17	15-Mar-17	VALLEY-MWD-STETSON - 115KV	Contamination flashover	44.00
Valley North	20-Jan-18	21-Jan-18	VALLEY-MWD-STETSON - 115KV	Vehicle hit	864.00
Valley North	11-Nov-05	11-Nov-05	VALLEY-NELSON - 115KV	Patrolled no cause found	1.00
Valley North	20-May-06	20-May-06	VALLEY-NELSON - 115KV	Patrolled no cause found	2.00
Valley North	09-Jun-06	09-Jun-06	VALLEY-NELSON - 115KV	Bird soil caused flashover	0.50
Valley North	19-Jan-07	19-Jan-07	VALLEY-NELSON - 115KV	High voltage	1.00
Valley North	21-Oct-07	22-Oct-07	VALLEY-NELSON - 115KV	Other-see notes	924.00
Valley North	02-May-08	02-May-08	VALLEY-NELSON - 115KV	Lost	8.00
Valley North	23-Apr-09	23-Apr-09	VALLEY-NELSON - 115KV	Lost	8.00
Valley North	03-Jun-09	03-Jun-09	VALLEY-NELSON - 115KV	Lightning	0.50
Valley North	03-Jun-09	03-Jun-09	VALLEY-NELSON - 115KV	Lightning	1.00
Valley North	23-May-13	23-May-13	VALLEY-NELSON - 115KV	Open for repairs	12.00
Valley North	18-Jul-15	18-Jul-15	VALLEY-NELSON - 115KV	N/a	1.00
Valley North	13-Feb-18	13-Feb-18	VALLEY-NELSON - 115KV	De-energize for pub. agency	18.00

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

DATA REQUEST SET TURN-SCE-Alberhill-006

To: TURN
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 8/12/2020

Response Date: 2/24/2021

Question 03e:

SCE, in its Compliance Filing, selected four main benefit categories for monetization using Value of Service: EENS under N-0 conditions, EENS under N-1 conditions, Flex-1, and Flex-2. SCE summarized its results in Table 8-4, pp. C1-58 and C1-59.9

e. SCE stated that “Line outage probabilities were calculated from historical data for each subtransmission and distribution circuit within the Valley South System. ... Duration for line outages were four hours for EENS N-1 contingencies, and 5 hours for N-1-1 (N-2) contingencies for the Flex-1 metric.” 13

Please provide the historical data SCE used. Please provide all calculations and work papers SCE used in deriving the 4 hours and 5 hours duration assumptions.

Response to Question 03e:

SCE has revised its Compliance Filing since submission of this data request question. See the summary of revisions provided in Appendix C for further information. The frequencies and durations described in the question have been revised. The revised Compliance Filing now uses 2.8 hours for N-1 outages and 3 hours for N-2 outages. A discussion of the line outage frequencies and durations is provided below.

Line outage frequencies for the N-1 and Flex-1 metric are based on historic data of the Valley North and Valley South Systems. SCE used its outage database to study line outage data, including start and end dates, duration, and cause of outages for these systems from 2005 through 2018. A significant number of these outages are brief, and the study excludes momentary outages which are less than 1 minute in duration. The data is provided in the attached file titled “A.09-09-022 TURN-Alberhill-SCE-006 Question 3e.xlsx”.

Each sustained outage was categorized as either:

- N-1 (for the N-1 metric), where a single line is out-of-service; or
- N-2 (for the Flex-1 metric), where two lines that share a common pole are simultaneously out of service due to a common-mode failure event.

N-2 contingencies were determined by sorting the outages by date. If two line outages occurred on the same date and time, and share a common double-circuit pole, there is high likelihood that the same event caused the N-2 outage. This assumption was confirmed in select cases by review of detailed outage logs. Lines as part of N-2 outages typically did not have the same outage duration since restoration times vary. For purposes of this study, the shorter outage duration of the two lines was taken as the duration of the N-2 outage. The remaining outage duration time for the second out-of-service line was ignored and not counted towards N-1 outage duration. N-1-1 outages (overlapping outages of two lines that don't share a common pole) were treated as separate N-1 outages as opposed to N-2 since the normalization of mile-years for N-2 outages was based on double-circuit mile-years. Additionally, the number of N-1-1 outages was minimal, and the limited duration would not significantly change the results for N-1 or N-2.

Since the system planning analysis studied 13 different system configurations (ASP and the alternatives) with differing single-circuit and double-circuit mileage, the outage frequency is normalized by mile-years of line operation. Along with the outage frequency for each Valley South and Valley North lines described above, the total mile-years (for single-circuit and double-circuit lines) were calculated for each line, while taking into account configuration changes throughout the evolution of each of the electrical systems over time. Historical line configuration data was studied for both the Valley South and Valley North Systems, including the in-service month and year and out-of-service month and year. This information was used to determine the years of service for each line within the outage database query timeframe (2005-2018). For example, lines that were placed into service prior to 2005 and also removed from service prior to 2005 would have a service life of 0 years for this study, since no line outages for that particular line would have been captured in the outage query which started in 2005. Similarly, a line placed into service prior to 2005, and that is still in service today, would have a service life of 14 years for the purposes of this study, since the outage database query only captured outages from 2005 to 2018. Mile-years are calculated for the total route length, i.e., mileage from substation to substation following the route for both single-circuit and double-circuit structures, since the likelihood of an outage is dependent on its exposure to N-1 or N-2 failure modes. N-2 mile-years are based on the route length and not the circuit length of each line, since this would double count the length of double-circuit exposure.

The number and duration of N-1 and N-2 outages, as well as mile-years of operation are provided below for each individual line, the Valley South System, the Valley North System, and the combined Valley System. Frequency of outages per 100 mile-years and the mean duration were calculated as follows:

- Frequency = total sustained outages / mile-years *100
- Mean Duration = total duration / total outages

N-1 results for Valley South and Valley North lines are provided in Table 1. Table 2 provides N-1 and N-2 results for the Valley South System, Valley North System and for the total Valley System. N-2 outages are limited and are therefore not explicitly expressed. Since outage history is not available for lines created by ASP or the alternatives, the Valley System-wide results are used (3.4 outages per 100 mile-years and 2.8 hours for N-1 outages, and 0.8 outages per 100 mile-years and 3 hours for N-2 outages).

Table 1 –Valley North and Valley South N-1 Line Outage Results

	Mile- Years (MY)	Total Number of Sustained Outages (NO)	Total Time, Hours (TT)	Frequency, outages per 100 mile- years (FM)	Mean Duration, hours (MD)
Lakeview-Moval	35	0	0.00	0.0	0.00
Mayberry-Nelson	91	0	0.00	0.0	0.00
Moreno-Moval-Vista	154	5	10.45	3.2	2.09
Nelson-Stetson	54	3	14.17	5.5	4.72
Valley-Alessandro-Bunker	221	13	64.98	5.9	5.00
Valley-Alessandro-Cajalco	286	7	6.87	2.4	0.98
Valley-Bunker-Cajalco	256	9	16.48	3.5	1.83
Valley-Lakeview	24	1	7.47	4.2	7.47
Valley-Mayberry-Moreno-Vista	708	29	89.45	4.1	3.08
Valley-Moreno-Vista	81	2	0.07	2.5	0.03
Valley-Moval	176	7	95.30	4.0	13.61
Valley-MWD-Stetson	159	17	22.45	10.7	1.32
Valley-Nelson	165	3	0.53	1.8	0.18
Auld-Moraga No. 1	89	0	0.00	0.0	0.00
Auld-Moraga No. 2	103	0	0.00	0.0	0.00
Auld-Sun City	102	2	0.32	2.0	0.16

Table 1 –Valley North and Valley South N-1 Line Outage Results

	Mile- Years (MY)	Total Number of Sustained Outages (NO)	Total Time, Hours (TT)	Frequency, outages per 100 mile- years (FM)	Mean Duration, hours (MD)
Elsinore-Skylark	672	1	11.73	0.1	11.73
Fogarty-Ivyglen	67	3	13.57	4.5	4.52
Moraga-Pechanga	72	5	40.37	6.9	8.07
Moraga-Stadler	12	0	0.00	0.0	0.00
Moraga-Stadler-Stent	83	5	5.92	6.0	1.18
Pauba-Pechanga	108	4	20.03	3.7	5.01
Pauba-Triton	46	1	0.05	2.2	0.05
Skylark-Stadler	55	0	0.00	0.0	0.00
Skylark-Tenaja	37	0	0.00	0.0	0.00
Stadler-Tenaja	43	2	24.07	4.7	12.03
Valley-Auld	152	1	0.03	0.7	0.03
Valley-Auld No. 1	16	0	0.00	0.0	0.00
Valley-Auld No. 2	18	1	3.52	5.6	3.52
Valley-Auld-Pauba	152	3	2.72	2.0	0.91
Valley-Auld-Triton	89	0	0.00	0.0	0.00
Valley-Elsinore-Fogarty	123	9	5.25	7.3	0.58

Table 1 –Valley North and Valley South N-1 Line Outage Results

	Mile- Years (MY)	Total Number of Sustained Outages (NO)	Total Time, Hours (TT)	Frequency, outages per 100 mile- years (FM)	Mean Duration, hours (MD)
Valley-Elsinore-Ivyglen	186	18	11.83	9.7	0.66
Valley-Newcomb	88	5	17.62	5.7	3.52
Valley-Newcomb-Skylark	280	15	8.14	5.4	0.54
Valley-Pauba	37	2	0.15	5.5	0.07
Valley-Sun City	47	2	0.37	4.2	0.18

Table 2 –Valley North, Valley South, and Valley System N-1 and N-2 Line Outage Results

	Mile- Years (MY)	Total Number of Sustained Outages (NO)	Total Time, Hours (TT)	Frequency, outages per 100 mile- years (FM)	Mean Duration, hours (MD)
Valley System (N-1)	5088	175	494	3.4	2.8
Valley North (N-1)	2410	96	328	4.0	3.4
Valley South (N-1)	2678	79	166	3.0	2.1
Valley System (N-2)	723	6	18	0.8	3.0

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 4/17/2020

Question DG-C-9:

List and describe what N-1-1, and what N-2 events were studied for the Planning Study?

Response to Question DG-C-9:

The following list provides all existing 115 kV lines and approved future 115 kV lines (i.e., Valley-Ivyglen and Valley-Triton, which are both currently in construction) of the Valley South System. A power flow analysis was performed for every possible combination of two-line outages (N-1-1 or N-2) for the “No Project” scenario. For example, a load flow was performed for the Auld-Moraga #1 and Auld-Moraga #2 lines out of service, the Auld-Moraga #1 and the Auld-Sun City lines out of service, and so on. For the “No Project” scenario, this results in a total of 190 two-line outages power flow analyses.

- Auld-Moraga #1
- Auld-Moraga #2
- Auld-Sun City
- Elsinore-Skylark
- Fogarty-Ivyglen
- Moraga-Pechanga
- Moraga-Rectifier
- Moraga-Stadler-Stent
- Pauba-Pechanga
- Pauba-Triton
- Skylark-Tenaja
- Stadler-Tenaja
- Valley-Auld #1
- Valley-Auld #2
- Valley-Elsinore-Fogarty
- Valley-Ivyglen
- Valley-Newcomb
- Valley-Newcomb-Skylark
- Valley-Sun City
- Valley-Triton

For the Alberhill System Project and all alternatives, a similar process was performed. A scripting tool was used to generate the list of lines for each alternative, taking into account any new lines, reconfigured lines, and existing lines in the Valley South System as part of the alternative. The output of the scripting tool was input into the GE PSLF software and again, power flow cases with all possible two-line outages were analyzed.

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 5/3/2021

Question DG-C-9 Revised:

List and describe what N-1-1, and what N-2 events were studied for the Planning Study?

Response to Question DG-C-9 Revised:

Revision 1 of this data request is being submitted to reflect changes documented in Southern California Edison's February 1, 2021 Amended Motion to Supplement the Record.

SCE's revised analysis omits N-1-1 events, and only includes N-2 events where two lines that share a common pole are simultaneously out-of-service due to a common-mode failure event. This significantly reduces the number of outage scenarios studied for the Flex-1 metric since now only circuit combinations in which both circuits share a common pole are included, as opposed to every possible circuit combination studied originally for N-1-1 outages under the Flex-1 metric.

The following list includes all the unique, double-circuit combinations in the Valley South System analyzed as N-2 outages for the "No Project" scenario. For example, a load flow was performed for the Auld-Moraga #2 and Moraga-Pechanga lines out of service, the Auld-Moraga #2 and the Pauba-Triton lines out of service, and so on.

- Auld-Moraga #2 & Moraga-Pechanga
- Auld-Moraga #2 & Pauba-Triton
- Auld-Moraga #2 & Valley-Triton
- Auld-Sun City & Valley-Newcomb-Skylark
- Fogarty-Ivyglen & Valley-Ivyglen
- Pauba-Triton & Valley-Triton
- Valley-Auld #1 & Valley-Auld #2
- Valley-Auld #2 & Valley-Triton
- Valley-Elsinore-Fogarty & Valley-Newcomb
- Valley-Newcomb-Skylark & Valley-Sun City

For the Alberhill System Project and all alternatives, a similar process was performed. Only lines that share double-circuit poles, (after accounting for any new lines, reconfigured lines, and existing lines in the Valley South System resulting from the scope of the Alberhill System Project or other alternative) were analyzed.

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 4/20/2020

Question DG-C-10:

Provide savings by year not on an NPV basis and by the four metrics.

Response to Question DG-C-10:

The attached document titled “A.09-09-022 ED-Alberhill-SCE-Supplemental Data Request 003 Question DG-C-10.docx” provides both annual and net present value (NPV) benefits for the EENS N-0, EENS N-1, Flex-1, Flex-2, and Losses metrics.

EENS N-0																											
Alternative	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
Alberhill System Project	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	15,734	19,716	23,916	31,065	38,217	48,749	61,654	77,071	95,159	104,887	119,094	134,345	150,951	168,269	187,859	210,522	228,850	244,510
SCE Orange County	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	15,734	19,716	23,916	31,065	38,217	48,749	61,654	77,071	95,159	104,780	117,684	131,066	146,093	160,785	177,706	197,914	217,643	231,021
SDG&E and Centralized BESS in Valley South	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	15,734	19,716	23,916	31,065	38,217	48,749	61,654	77,071	95,159	104,887	119,094	134,345	150,951	168,269	187,859	210,570	229,014	244,821
Mira Loma and Centralized BESS in Valley South	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	15,734	19,716	23,916	31,065	38,217	48,749	61,654	77,071	95,159	104,887	119,094	134,345	150,951	168,269	187,859	210,570	229,014	244,821
Centralized BESS in Valley South	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	15,734	19,716	23,916	31,065	38,217	48,749	61,654	77,071	95,159	104,887	119,094	134,345	150,951	168,269	187,859	210,570	229,014	244,821
Mira Loma	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	14,911	17,364	19,750	24,219	28,663	38,338	47,343	60,183	76,640	81,645	90,355	100,904	110,884	122,208	131,536	144,098	153,004	159,118
SDG&E	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	15,734	19,716	23,916	31,065	38,217	48,749	61,654	77,071	95,159	104,480	117,043	130,918	144,935	159,598	176,945	200,140	216,200	229,100
Menifee	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	15,734	19,716	23,916	31,065	38,217	48,749	61,654	77,071	95,159	104,887	119,094	134,345	150,493	166,502	184,404	205,446	221,658	235,392
Valley South to Valley North and Centralized BESS in Valley South and Valley North	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	15,734	19,716	23,916	31,065	38,217	48,749	61,654	77,071	95,159	104,887	119,094	134,345	150,951	168,269	187,859	210,570	229,014	244,821
Valley South to Valley North to Vista and Centralized BESS in Valley South	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	15,734	19,716	23,916	31,065	38,217	48,749	61,654	77,071	95,159	104,887	118,680	132,830	144,952	158,659	174,086	190,585	205,014	214,435
Valley South to Valley North and Distributed BESS in Valley South	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	15,734	19,716	23,916	31,065	38,217	48,749	60,893	74,084	86,821	94,623	102,349	112,047	119,539	128,182	132,718	137,321	138,153	133,154
Valley South to Valley North to Vista	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	15,734	19,716	23,916	31,065	38,217	48,749	61,654	77,071	95,159	104,887	118,680	132,908	145,300	159,389	175,157	192,066	206,656	216,267
Valley South to Valley North	1,064	2,680	3,933	5,281	6,652	6,610	9,111	12,119	14,097	15,734	19,716	23,916	31,065	38,217	48,749	60,893	74,084	86,821	94,623	102,349	112,047	119,296	126,761	128,886	131,672	130,476	122,610

EENS N-1																											
Alternative	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
Alberhill System Project	7	18	29	40	51	61	72	105	137	169	201	405	610	814	1,018	1,222	1,356	1,842	2,327	2,812	3,297	3,782	4,578	5,373	6,169	6,964	7,760
SCE Orange County	7	18	29	40	51	61	62	90	118	146	174	374	557	741	925	1,109	1,293	1,777	2,261	2,745	3,229	3,713	4,532	5,350	6,169	6,987	7,805
SDG&E and Centralized BESS in Valley South	7	18	29	40	51	61	72	105	137	169	201	405	610	814	1,018	1,222	1,426	1,962	2,497	3,032	3,568	4,103	5,009	5,915	6,821	7,727	8,633
Mira Loma and Centralized BESS in Valley South	7	18	29	40	51	61	40	67	93	119	146	297	475	669	863	1,057	1,187	1,665	2,143	2,621	3,099	3,577	4,483	5,388	6,294	7,199	8,104
Centralized BESS in Valley South	7	18	29	40	51	61	72	105	137	169	201	405	610	814	1,018	1,222	1,426	1,962	2,497	3,032	3,568	4,103	5,009	5,915	6,821	7,727	8,633
Mira Loma	7	18	29	40	51	61	34	44	53	63	73	255	294	333	373	412	451	515	578	642	705	768	849	929	1,009	1,090	1,170
SDG&E	7	18	29	40	51	61	72	105	137	169	201	405	610	814	1,018	1,222	1,426	1,962	2,497	3,032	3,568	4,103	5,009	5,915	6,821	7,727	8,633
Menifee	1	7	13	18	24	30	(12)	(14)	(16)	(17)	(19)	31	82	132	182	233	283	398	513	628	743	858	1,096	1,334	1,572	1,810	2,047
Valley South to Valley North and Centralized BESS in Valley South and Valley North	1	-	(1)	(2)	(3)	(4)	(5)	(2)	-	2	5	56	107	158	209	261	312	463	615	766	918	1,069	1,523	1,976	2,429	2,882	3,335
Valley South to Valley North to Vista and Centralized BESS in Valley South	1	-	(1)	(2)	(3)	(4)	(5)	(2)	-	2	5	56	107	158	209	261	312	463	615	766	918	1,069	1,523	1,976	2,429	2,882	3,335
Valley South to Valley North and Distributed BESS in Valley South	-	-	(1)	(1)	(2)	(3)	(3)	2	7	12	17	72	128	183	238	294	349	540	731	923	1,114	1,305	1,714	2,123	2,532	2,941	3,350
Valley South to Valley North to Vista	-	-	(1)	(1)	(2)	(3)	(3)	(12)	(21)	(30)	(39)	124	154	184	214	244	274	387	499	611	724	836	1,073	1,310	1,547	1,784	2,021
Valley South to Valley North	-	-	(1)	(1)	(2)	(3)	(3)	(12)	(21)	(30)	(39)	124	154	184	214	244	274	387	499	611	724	836	1,073	1,310	1,547	1,784	2,021

Alternative	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
Alberhill System Project	112,749	153,670	196,567	241,512	288,582	337,854	389,410	443,332	502,229	558,623	620,173	684,452	751,557	821,589	894,653	970,857	1,050,312	1,133,132	1,219,438	1,309,350	1,402,996	1,500,506	1,602,015	1,707,661	1,817,588	1,931,944	2,050,882
SCE Orange County	95,470	130,120	166,442	204,500	244,356	286,077	329,732	375,390	425,648	473,013	525,130	579,558	636,379	695,679	757,545	822,071	889,349	959,477	1,032,556	1,108,689	1,187,984	1,270,550	1,356,502	1,445,958	1,539,039	1,635,870	1,736,580
SDG&E and Centralized BESS in Valley South	81,220	112,703	145,709	180,294	216,518	254,440	294,124	335,632	381,554	424,392	471,783	521,279	572,954	626,887	683,159	741,853	803,055	866,853	880,501	894,289	908,217	922,283	936,484	950,818	965,284	979,879	994,601
Mira Loma and Centralized BESS in Valley South	67,613	92,153	117,877	144,829	173,056	202,604	233,520	265,856	302,186	340,116	380,790	423,284	467,665	514,000	562,360	612,817	665,445	720,321	777,525	837,140	899,249	963,940	1,031,304	1,101,434	1,174,425	1,250,378	1,370,164
Centralized BESS in Valley South	74,072	100,956	129,137	158,665	189,588	221,958	255,828	291,253	330,812	366,995	407,431	449,660	493,745	539,754	587,754	637,817	690,016	744,426	801,126	860,195	921,717	985,777	1,052,465	1,121,870	1,194,089	1,269,216	1,347,354
Mira Loma	67,613	92,153	117,877	144,829	173,056	202,604	233,520	265,856	299,663	334,994	371,904	410,451	450,692	492,689	536,504	582,201	629,849	679,515	731,270	785,189	841,346	899,821	960,693	1,024,047	1,089,968	1,158,545	1,229,869
SDG&E	77,961	92,621	107,966	124,020	140,809	158,360	176,701	195,860	218,389	236,751	258,544	281,280	304,990	329,710	355,476	382,324	410,292	439,419	469,747	501,316	534,170	568,353	603,912	640,893	679,347	719,322	760,871
Menifee	39,280	46,206	59,104	72,618	86,772	101,587	117,089	133,302	152,776	167,968	186,475	205,803	225,980	247,037	269,007	291,920	315,810	340,713	366,664	393,699	421,857	450,567	480,450	511,546	543,895	577,543	608,980
Valley South to Valley North and Centralized BESS in Valley South and Valley North	33,902	46,206	59,104	72,618	86,772	101,587	117,089	133,302	152,776	167,968	186,475	205,803	225,980	247,037	269,007	291,920	315,810	340,713	366,664	393,699	421,857	525,143	633,330	746,598	865,134	989,130	1,118,785
Valley South to Valley North to Vista and Centralized BESS in Valley South	33,902	46,206	59,104	72,618	86,772	101,587	117,089	133,302	152,776	167,968	186,475	205,803	225,980	247,037	269,007	291,920	315,810	340,713	366,664	393,699	421,857	525,143	633,330	746,598	865,134	989,130	1,118,785
Valley South to Valley North and Distributed BESS in Valley South	33,902	46,206	59,104	72,618	86,772	101,587	117,089	133,302	152,776	167,968	186,475	205,803	225,980	247,037	269,007	291,920	315,810	340,713	366,664	393,699	421,857	480,567	541,949	606,099	673,119	743,110	816,181
Valley South to Valley North to Vista	33,902	46,206	59,104	72,618	86,772	101,587	117,089	133,302	152,776	167,968	186,475	205,803	225,980	247,037	269,007	291,920	315,810	340,713	366,664	393,699	421,857	451,176	481,698	513,464	546,517	580,902	616,665
Valley South to Valley North	33,902	46,206	59,104	72,618	86,772	101,587	117,089	133,302	152,776	167,968	186,475	205,803	225,980	247,037	269,007	291,920	315,810	340,713	366,664	393,699	421,857	451,176	481,698	513,464	546,517	580,902	616,665

Flex-2-2																											
Alternative	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
Alberhill System Project	16,073	17,694	18,742	19,913	21,061	22,432	23,867	25,576	27,463	29,493	31,363	33,581	35,953	38,453	40,933	43,910	46,712	49,510	52,625	55,838	59,004	62,271	65,483	68,912	72,411	75,555	78,723
SCE Orange County	13,084	14,219	14,990	15,842	16,649	17,640	18,655	19,822	21,195	22,508	23,756	25,175	26,811	28,372	29,910	32,008	33,756	35,489	37,493	39,525	41,523	43,575	45,538	47,733	49,988	51,842	53,863
SDG&E and Centralized BESS in Valley South	12,311	13,409	14,135	14,917	15,732	16,635	17,528	18,656	19,867	21,146	22,292	23,579	25,137	26,703	28,120	29,898	31,556	33,257	35,072	36,970	38,761	40,658	42,617	44,631	46,599	48,553	50,492
Mira Loma and Centralized BESS in Valley South	10,482	11,411	12,011	12,686	13,367	14,080	14,864	15,871	16,898	17,980	18,827	19,952	21,243	22,471	23,660	25,212	26,641	27,859	29,591	31,210	32,658	34,180	35,714	37,308	38,967	40,472	41,951
Centralized BESS in Valley South	5	17	24	32	42	55	73	97	126	160	201	255	328	422	529	649	775	917	1,075	1,251	1,452	1,649	1,866	2,101	2,359	2,582	2,808
Mira Loma	10,482	11,411	12,011	12,686	13,367	14,080	14,864	15,871	16,898	17,980	18,827	19,952	21,243	22,471	23,660	25,212	26,641	27,859	29,591	31,208	32,649	34,163	35,684	37,265	38,911	40,403	41,869
SDG&E	12,311	13,409	14,135	14,917	15,732	16,635	17,528	18,656	19,867	21,146	22,292	23,579	25,137	26,703	28,120	29,898	31,556	33,257	35,072	36,970	38,761	40,658	42,617	44,631	46,599	48,553	50,492
Menifee	11,221	12,145	12,787	13,549	14,199	15,001	15,909	16,835	17,914	19,200	20,114	21,304	22,570	23,956	25,297	26,953	28,393	29,764	31,534	33,151	34,881	36,682	38,263	40,062	41,858	43,386	45,035
Valley South to Valley North and Centralized BESS in Valley South and Valley North	11,221	12,145	12,787	13,549	14,199	15,001	15,909	16,835	17,914	19,200	20,114	21,304	22,570	23,956	25,297	26,953	28,393	29,764	31,534	33,151	34,881	36,683	38,269	40,074	41,881	43,419	45,077
Valley South to Valley North to Vista and Centralized BESS in Valley South	11,221	12,145	12,787	13,549	14,199	15,001	15,909	16,835	17,914	19,200	20,114	21,304	22,570	23,956	25,297	26,953	28,393	29,764	31,534	33,151	34,881	36,683	38,269	40,074	41,881	43,419	45,077
Valley South to Valley North and Distributed BESS in Valley South	11,221	12,145	12,787	13,549	14,199	15,001	15,909	16,835	17,914	19,200	20,114	21,304	22,570	23,956	25,297	26,953	28,393	29,764	31,534	33,151	34,881	36,683	38,269	40,074	41,881	43,419	45,077
Valley South to Valley North to Vista	11,221	12,145	12,787	13,549	14,199	15,001	15,909	16,835	17,914	19,200	20,114	21,304	22,570	23,956	25,297	26,953	28,393	29,764	31,534	33,151	34,881	36,682	38,263	40,062	41,858	43,386	45,035
Valley South to Valley North	11,221	12,145	12,787	13,549	14,199	15,001	15,909	16,835	17,914	19,200	20,114	21,304	22,570	23,956	25,297	26,953	28,393	29,764	31,534	33,151	34,881	36,682	38,263	40,062	41,858	43,386	45,035

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 5/3/2021

Question DG-C-10 Revised:

Provide savings by year not on an NPV basis and by the four metrics.

Response to Question DG-C-10 Revised:

Revision 1 of this data request is being submitted to reflect changes documented in Southern California Edison's February 1, 2021 Amended Motion to Supplement the Record.

Refer to SCE's response to A.09-09-022 TURN-SCE-Alberhill-006 Question 03b, which provides the requested information (attached hereto).

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 4/17/2020

Question DG-C-11:

Does the B/C include the risk introduced when the spare is used for mitigation?

Response to Question DG-C-11:

The cost-benefit analysis includes a scenario in which two of the three transformers (1AA, 2AA, and/or 5AA spare) available to serve the Valley South System experience a simultaneous outage, leaving only one remaining transformer. This scenario is quantified using the Flex-2-2 metric. There are other, more likely, operating events that could cause brief interruptions of service to customers during switching to realign the transformers and allow the Valley North System tie-lines to be used; however, these scenarios are not reflected in the cost-benefit analysis.

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 4/17/2020

Question DG-C-12:

During the in-person meeting on 3/3, it was discussed that the creation of tie-lines is a main priority of the project. What alternative solutions are being considered to create tie lines now and augment with behind the meter storage systems later on?

Response to Question DG-C-12:

SCE evaluated five hybrid alternatives in the cost-benefit analysis that initially construct system tie-lines and are then later augmented by battery energy storage system (BESS) as needed. These include:

- Valley South to Valley North and Distributed BESS in Valley South
- Valley South to Valley North and Centralized BESS in Valley South and Valley North
- Valley South to Valley North to Vista and Centralized BESS in Valley South
- SDG&E and Centralized BESS in Valley South
- Mira Loma and Centralized BESS in Valley South

Distributed BESS options are more reflective of the system performance specific to behind-the-meter storage systems than are centralized (subtransmission level) BESS options. However, from a system perspective, energy storage and other distributed energy resources (DERs), whether behind-the-meter, front-of-the meter, or centralized, similarly serve to reduce system level loading at the level in the system in which they are installed. The approach to represent DERs as BESS was taken as a simplified means to represent the impact of either front-of-the-meter or behind-the-meter DER installations. For the purpose of the alternatives analysis, this approach to represent DERs is considered appropriate because:

- The models assume sufficient DER capacity (represented as storage) is available to satisfy system requirements over the period of the analysis – eliminating questions of resource availability. Sourcing large quantities of solar capacity to serve the system at periods of peak demand (5:00-6:00 PM) is difficult without associated storage.
- Cost and declining cost curves of BESS solutions are defensible, and uncertainties can be addressed via sensitivity cases
- The Centralized BESS location(s) were chosen to optimize system benefits to the extent that capacity-only solutions can be effective for this purpose. Further optimization of distributed

DER siting was not deemed to be useful in the context of the significant changes in distribution system configuration and customer distribution/characteristics expected to occur between now and the time (after 2031) when the incremental BESS additions would be required.

When the need date for the incremental capacity additions approached, SCE could, under the appropriate regulatory framework at the time, construct or source available front-of-the-meter and behind-the-meter DER technologies at market prices to meet the incremental need.

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 4/17/2020

Question DG-A-1:

During the in-person meeting on 3/3, the sensitivity analysis performed on the proposed alternatives was discussed. On which scenario was the analysis run (e.g. Spatial forecast)?

Response to Question DG-A-1:

The Item A Spatial Load forecast is a 10-year forecast that was extended to 30 years for three different load growth scenarios as described in Section 5.4 of Item C: the Spatial Base forecast (high forecast), the Spatial Effective PV forecast (middle forecast) and the Spatial PVWatts forecast (low forecast). The Spatial Effective PV forecast is considered to be the base forecast used for the cost-benefit analysis, as it is considered to represent the most likely future long-term load forecast scenario. Sensitivity on this forecast was performed (see Section 8.3 of Item C) by using the other two 30-year load forecasts as inputs (specifically defining the upper and lower range of sensitivity) into the cost-benefit model. All three forecasts use the methodology of the 10-year Spatial Load forecast in that they aggregate load growth of discrete 150-acre areas over the entire Valley South (and Valley North) Electrical Needs Area; but they differ in their assumptions of load-modifying DER growth rates.

A battery cost sensitivity analysis which considers lower than expected future battery costs was analyzed by reducing total BESS capex costs by 50% (see Section 8.4 of Item C). The PVRR for BESS alternatives was then recalculated using these reduced costs, and was used as inputs into the cost-benefit model, along with the three load forecasts described above.

In total, six benefit-to-cost ratios were determined, covering both the base results and the sensitivity results:

1. Spatial Effective PV and Base BESS Model (Baseline Case)
2. Spatial Effective PV and Reduced-Cost BESS Model (Sensitivity)
3. Spatial Base and Base BESS Model (Sensitivity)
4. Spatial Base and Reduced -Cost BESS Model (Sensitivity)
5. Spatial PVWatts and Base BESS Model (Sensitivity)
- Spatial PVWatts and Reduced -Cost BESS Model (Sensitivity)

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 4/17/2020

Question DG-C-13:

Are the uncertainty scores and costs in Table 8-2 factored into the cost-benefit analysis?

Response to Question DG-C-13:

Yes, the uncertainty scores are factored into the cost-benefit analysis. The percentages in Table 8-2 are applied to the total capital costs (in 2019 dollars) of each alternative. The cost tables for each alternative in Appendix C reflect escalation according to each alternative project implementation and capital spend timeline.

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DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 4/17/2020

Question DG-C-14:

Confirm that battery capital costs \$/kWh and \$/kW are considered at the year the battery is needed, not based on present costs. Explain how the cost sensitivity (50% reduction) at year it was applied (what does "arbitrarily" here refer to - the % reduction in cost chosen?).

Response to Question DG-C-14:

Yes, the battery capital costs are based on the need year of the battery, not present costs. The battery prices (in \$/kWh) decrease at a rate of 3.6% per year, and the inverter prices (in \$/kW) decrease at a rate of 1.5% per year. Both price trends were assumed to stabilize in 2030. This model was used to develop the total capital cost associated with the battery scope of the applicable alternatives.

As part of the sensitivity analysis, a 50% reduction was applied to the total battery capex for all BESS alternatives. This is to say, for each alternative with BESS installations (whose costs were established based on the methodology described in the first part of this response), the sensitivity analysis included a 50% reduction in those costs in whichever year they occurred. The cost reduction value of 50% was selected to provide an aggressive low-range bookend of the sensitivity analysis. The PVRR for the BESS alternatives was recalculated using the reduced battery capex cost.

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 4/17/2020

Question DG-C-15:

Explain the large nominal capital cost requirement of Alternative (X) (Valley South to Valley North and Centralized BESS in Valley South and Valley North) compared to Alternative (Y) (Valley South to Valley North and Centralized BESS in Valley South), and its relatively lower accrual of benefits (only \$137m more than Alternative (Y))?

Response to Question DG-C-15:

Based on the referenced \$137M delta in benefits posed in the question, SCE understands Alternative Y to be the Valley South to Valley North and Distributed BESS in Valley South alternative (not the cited Valley South to Valley North and Centralized BESS in Valley South alternative). The large capital cost difference is primarily driven by the inclusion of BESS scope in the Valley North System (totaling 147 MW / 790 MWh per Table C-27) for Alternative X. This scope was included to address the forecasted Valley North N-0 overloads in 2037 (see Valley South to Valley North results in Table 6-3). Alternative Y does not include scope in the Valley North System. SCE elected not to include scope to address the same forecasted Valley North System overloads associated with Alternative Y (again, see Table 6-3), but instead let these overloads accrue as unrealized benefits. This was done in order to study the cost effectiveness of a BESS system relative to the cost of unserved load. The approach demonstrates that the significant capital costs associated with implementing a BESS to address future N-0 system overloads results in only a modest amount (\$137M) of incremental benefits. Note however that, despite the modest monetized N-0 benefits, SCE would regardless implement some cost-effective project to serve these future capacity needs in Valley North.

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

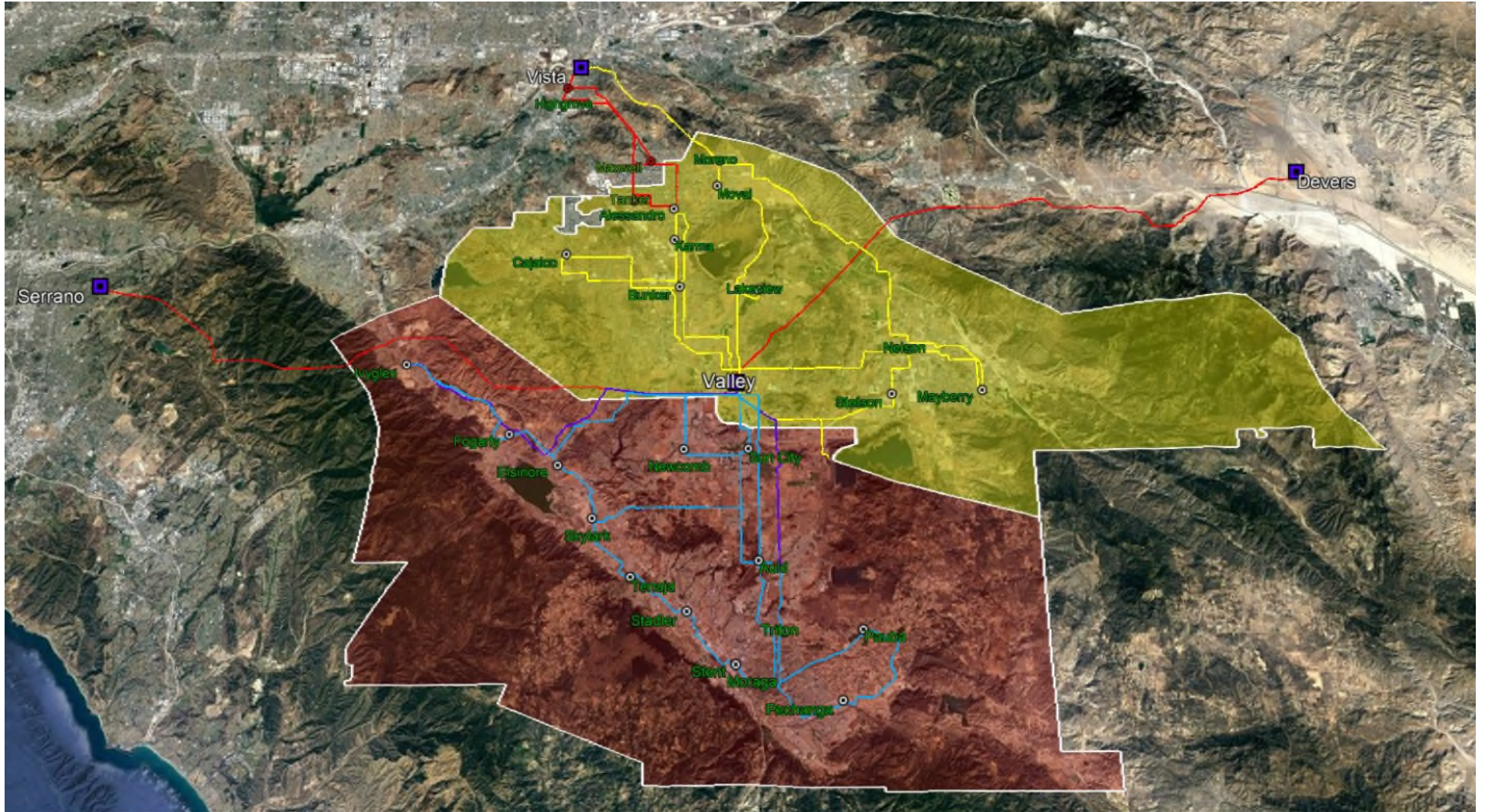
Response Date: 4/20/2020

Question DG-MISC-41:

Provide regional system maps showing all relevant information about substations, transmission lines, subtransmission lines and distribution circuits for the area encompassed by both the Alberhill study area and all related Electrical Needs Areas.

Response to Question DG-MISC-41:

Please see the attached file titled “A.09-09-022 ED-Alberhill-SCE-Supplemental Data Request 003 Question DG-MISC-41.kmz” which contains the requested substation, transmission line, and subtransmission line map information. Distribution circuit maps are provided within the CYME models, which SCE is providing in its forthcoming response to questions in 2020-0213 Data Request No. 02.



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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC

Prepared by: Paul McCabe

Job Title: Senior Advisor

Received Date: 4/6/2020

Response Date: 5/7/2020

Question DG-MISC-42:

Provide relevant load and power flow data for the substations, transmission lines, subtransmission lines and distribution circuits for the area depicted on the regional system maps as described above.

Response to Question DG-MISC-42:

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 4/20/2020

Question DG-G-1:

Page 146 of Quanta’s “Cost Benefit Analysis of Alternatives” states that “the cost for each project is provided by SCE, in the PVRR and Aggregated (Total Capital Expenditure) representation.” Provide SCE's breakout by main categories of Construction Capital and Operational expenditures (and timing of proposed spending) for each alternative.

Response to Question DG-G-1:

The attached document titled “A.09-09-022 ED-Alberhill-SCE-Supplemental Data Request 003 Question DG-G-1.xlsx” provides annual O&M costs, and a breakout of main cost categories for each alternative.

Annual O&M costs rounded to the nearest \$M.

Total O&M	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
Alberhill	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 6	\$ 6	\$ 6	\$ 6	\$ 6	\$ 6	\$ 7	\$ 7	\$ 7	\$ 7	\$ 7	\$ 7	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 9	\$ 9	\$ 9
SDG&E	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 6	\$ 6	\$ 6	\$ 6	\$ 6	\$ 6	\$ 7	\$ 7	\$ 7	\$ 7	\$ 7
SCE Orange County	\$ 7	\$ 7	\$ 7	\$ 7	\$ 7	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 9	\$ 9	\$ 9	\$ 9	\$ 9	\$ 10	\$ 10	\$ 10	\$ 10	\$ 11	\$ 11	\$ 11	\$ 12	\$ 12	\$ 12	\$ 12	\$ 13
Menifee	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 5	\$ 5	\$ 5	\$ 5
Mira Loma	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4
Valley South to Valley North	\$ 1	\$ 1	\$ 1	\$ 1	\$ 1	\$ 1	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 3
Valley South to Valley North to Vista	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 4	\$ 4
Centralized BESS	\$ 2	\$ 2	\$ 3	\$ 3	\$ 3	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 5	\$ 5	\$ 6	\$ 6	\$ 6	\$ 7	\$ 7	\$ 8	\$ 8	\$ 8	\$ 8	\$ 9	\$ 9	\$ 10	\$ 10	\$ 10	\$ 11
Valley South to Valley North and Distributed BESS	\$ 1	\$ 1	\$ 1	\$ 1	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3
SDG&E and Centralized BESS	\$ 4	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 6	\$ 6	\$ 6	\$ 6	\$ 6	\$ 6	\$ 7	\$ 7	\$ 8	\$ 8	\$ 9	\$ 9	\$ 9	\$ 10	\$ 10	\$ 10	\$ 10	\$ 11
Mira Loma and Centralized BESS	\$ 3	\$ 3	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 5	\$ 5	\$ 5	\$ 6	\$ 6	\$ 7	\$ 7	\$ 7	\$ 7	\$ 7	\$ 8	\$ 9	\$ 9	\$ 9	\$ 9	\$ 10	\$ 10	\$ 10
Valley South to Valley North and Centralized BESS	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 4	\$ 4	\$ 4	\$ 4	\$ 5	\$ 6	\$ 7	\$ 7	\$ 7	\$ 8	\$ 8	\$ 8
Valley South to Valley North to Vista and Centralized BESS	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 4	\$ 4	\$ 4	\$ 4	\$ 4	\$ 5

Alberhill System Project	TOTAL	PRIOR	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Licensing	27	24	1	2	0	-	-	-	-	-	-	-
Substation	215	-	-	-	10	74	109	22	-	-	-	-
<i>Substation Estimate</i>	<i>196</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>9</i>	<i>68</i>	<i>99</i>	<i>20</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
<i>Owners Agent (10% of construction)</i>	<i>19</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>1</i>	<i>6</i>	<i>10</i>	<i>2</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
Corporate Security	4	-	-	-	-	-	3	2	-	-	-	-
Bulk Transmission	53	-	-	-	3	18	26	5	-	-	-	-
Subtransmission	51	-	-	-	2	18	26	5	-	-	-	-
Transmission Telecom	0	-	-	-	-	-	-	0	-	-	-	-
Distribution	4	-	-	-	-	1	2	1	-	-	-	-
IT Telecom	7	-	-	-	-	2	3	1	-	-	-	-
RP	34	16	-	-	2	15	2	-	-	-	-	-
Environmental	28	-	-	-	1	7	11	9	-	-	-	-
Subtotal Direct Cost	424	40	1	2	19	135	182	45	-	-	-	-
Subtotal Battery Cost	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Uncertainty	121	-	-	-	-	-	-	-	121	-	-	-
Total with Uncertainty	545	40	1	2	19	135	182	45	121	-	-	-
Total Capex	545	40	1	2	19	135	182	45	121	-	-	-

PVRR	545
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SDG&E	TOTAL	PRIOR	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Licensing	31	24	1	2	2	1	-	-	-	-	-	-
Substation	99	-	-	-	-	2	19	52	25	-	-	-
<i>Substation Estimate</i>	<i>82</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>2</i>	<i>16</i>	<i>44</i>	<i>21</i>	<i>-</i>	<i>-</i>	<i>-</i>
<i>Owners Agent (10% of construction)</i>	<i>16</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>0</i>	<i>3</i>	<i>8</i>	<i>4</i>	<i>-</i>	<i>-</i>	<i>-</i>
Corporate Security	3	-	-	-	-	-	-	1	1	-	-	-
Bulk Transmission	112	-	-	-	-	2	22	59	29	-	-	-
Subtransmission	42	-	-	-	-	1	8	22	11	-	-	-
Transmission Telecom	3	-	-	-	-	-	-	-	3	-	-	-
Distribution	6	-	-	-	-	0	1	3	2	-	-	-
IT Telecom	4	-	-	-	-	-	1	2	1	-	-	-
RP	20	-	-	-	-	-	12	8	-	-	-	-
Environmental	40	-	-	-	-	2	4	20	14	-	-	-
Subtotal Direct Cost	359	24	1	2	2	8	67	168	86	-	-	-
Subtotal Battery Cost	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Uncertainty	181	-	-	-	-	-	-	-	181	-	-	-
Total with Uncertainty	540	24	1	2	2	8	67	168	267	-	-	-
Total Capex	540	24	1	2	2	8	67	168	267	-	-	-

PVRR	469
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SCE Orange County	TOTAL	PRIOR	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Licensing	31	24	1	2	2	1	-	-	-	-	-	-
Substation	90	-	-	-	-	2	16	32	24	16	-	-
<i>Substation Estimate</i>	<i>60</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>1</i>	<i>12</i>	<i>24</i>	<i>15</i>	<i>8</i>	<i>-</i>	<i>-</i>
<i>Owners Agent (10% of construction)</i>	<i>30</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>1</i>	<i>4</i>	<i>8</i>	<i>9</i>	<i>8</i>	<i>-</i>	<i>-</i>
Corporate Security	3	-	-	-	-	-	-	-	1	1	-	-
Bulk Transmission	347	-	-	-	-	7	50	86	105	100	-	-
Subtransmission	25	-	-	-	-	0	4	6	7	7	-	-
Transmission Telecom	5	-	-	-	-	-	-	1	2	1	-	-
Distribution	6	-	-	-	-	-	1	2	2	2	-	-
IT Telecom	3	-	-	-	-	-	-	1	1	1	-	-
RP	63	-	-	-	-	-	38	26	-	-	-	-
Environmental	65	-	-	-	-	3	3	16	19	23	-	-
Subtotal Direct Cost	637	24	1	2	2	13	111	168	163	152	-	-
Subtotal Battery Cost	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Uncertainty	314	-	-	-	-	-	-	-	314	-	-	-
Total with Uncertainty	951	24	1	2	2	13	111	168	477	152	-	-
Total Capex	951	24	1	2	2	13	111	168	477	152	-	-

PVRR	806
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Valley South to Valley North and Centralized BESS in Valley South and Valley North	TOTAL	PRIOR	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
Licensing	31	24	1	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Substation	89	-	-	-	-	1	2	5	-	-	-	-	-	-	-	-	-	-	5	20	-	-	-	-	19	27	-	-	10	-	-	
Substation Estimate	80	-	-	-	-	0	1	2	-	-	-	-	-	-	-	-	-	-	5	19	-	-	-	-	18	26	-	-	9	-	-	
Owners Agent (10% of construction)	9	-	-	-	-	0	1	3	-	-	-	-	-	-	-	-	-	-	0	1	-	-	-	-	1	1	-	-	1	-	-	
Corporate Security	3	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bulk Transmission	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Subtransmission	57	-	-	-	-	6	17	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Transmission Telecom	2	-	-	-	-	0	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Distribution	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
IT Telecom	2	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RP	5	-	-	-	-	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Environmental	18	-	-	-	-	1	7	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Subtotal Direct Cost	208	24	1	2	2	12	31	55	-	-	-	-	-	-	-	-	-	-	5	20	-	-	-	-	19	27	-	-	10	-	-	
Subtotal Battery Cost	606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	164	-	-	-	-	182	74	-	-	122	64	-	
Uncertainty	325	-	-	-	-	-	-	-	140	-	-	-	-	-	-	-	-	-	1	50	-	-	-	-	54	27	-	-	36	17	-	
Total with Uncertainty	1,139	24	1	2	2	12	31	55	140	-	-	-	-	-	-	-	-	-	6	233	-	-	-	-	256	129	-	-	167	81	-	
Total Capex	1,139	24	1	2	2	12	31	55	140	-	-	-	-	-	-	-	-	-	6	233	-	-	-	-	256	129	-	-	167	81	-	
Battery Revenue	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	6	7	8	9	10	11	12	13	14	14		

PVRR 358

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

DATA REQUEST SET CPUC - Supplemental Data Request – 003

To: CPUC
Prepared by: Paul McCabe
Job Title: Senior Advisor
Received Date: 4/6/2020

Response Date: 3/22/2021

Question DG-G-1 Revised:

Page 146 of Quanta’s “Cost Benefit Analysis of Alternatives” states that “the cost for each project is provided by SCE, in the PVRR and Aggregated (Total Capital Expenditure) representation.” Provide SCE's breakout by main categories of Construction Capital and Operational expenditures (and timing of proposed spending) for each alternative.

Response to Question DG-G-1 Revised:

Revision 1 of this data request is being submitted to reflect changes documented in Southern California Edison’s revised Compliance Filing dated February 1, 2021.

The attached document titled “A.09-09-022 ED-Alberhill-SCE-Supplemental Data Request 003 Question DG-G-1 Rev1.xlsx” provides annual O&M costs, and a breakout of main cost categories for each alternative.