

## DOCKETED

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Appendix 3A-1b  
Appendix H to the Interconnection  
Study Report

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# Queue Cluster 7 Phase II – Appendix H

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Short Circuit Calculation Study Results

NOVEMBER 24, 2015

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Table H.3.1a: Existing System with the inclusion of Projects in 2015 Three-Phase-to-ground Fault Analysis

Bus Name	Bus KV	PRE CASE		POST CASE		DELTA KA
		X/R	KA	X/R	KA	
Antelope	525	20.5	32.1	20.8	32.8	0.7
Colorado River	525	18.5	13.4	19	13.8	0.4
Eldorado	525	12.1	46.7	12.3	47.5	0.8
Lugo	525	21.7	45.9	21.8	46.1	0.2
Red Bluff	525	18.6	14.7	18.9	15	0.3
Vincent	525	18.7	40.7	18.9	42.1	1.4
Whirlwind	525	21	29.9	21.3	30.7	0.8
Antelope	230	24.3	36.3	24.6	36.6	0.3
Arcogen	230	16.7	35.5	16.6	35.7	0.2
Barre	230	22.1	58.8	22	59.1	0.3
Center	230	14.9	41.3	14.9	41.7	0.4
Chino	230	14.9	36.5	17.5	47.5	11
Colorado River	230	39.1	14.5	41.2	15.6	1.1
Del Amo	230	16.7	45.2	16.6	45.5	0.3
Devers	230	21.1	37.7	21.2	38	0.3
El Nido	230	17.8	38.1	17.7	38.2	0.1
El Segundo	230	18	33.4	18	33.5	0.1
Ellis	230	17.3	41.6	17.2	41.7	0.1
Etiwanda	230	25.8	55	25.2	56.9	1.9
Gould	230	15	16.1	12.5	23.5	7.4
Highwind	230	22	15.6	22	15.7	0.1
Hinson	230	17.6	40.6	17.6	40.8	0.2
La Fresa	230	22.4	44.4	22.3	44.7	0.3
Laguna Bell	230	15.4	35	15.1	36	1
Lewis	230	21.5	48.7	21.4	49	0.3
Lighthipe	230	17	42.8	17.1	43.2	0.4
Long Beach	230	12.3	27.4	12.2	27.5	0.1
Mesa	230	15.5	49.5	16.1	52.8	3.3
Mira Loma A	230	22.3	47.6	20.5	52.1	4.5
Mira Loma B	230	24.7	54.3	22.4	61.5	7.2
Olinda	230	14.7	30	14.7	30.2	0.2
Ormond Beach	230	32.6	31.4	32.4	31.6	0.2
Pardee	230	15.9	55.1	15.6	57.1	2
Pearblossom	230	5.6	9.9	5.5	10.1	0.2
Rancho	230	26.1	55.9	25.4	57.9	2
Redondo	230	23.3	44.3	23.3	44.6	0.3
Rio Hondo	230	14.5	31.2	14.4	31.4	0.2
San Bernardino	230	20.1	36.4	20	36.5	0.1
Serrano	230	26.4	56.9	26.3	57.3	0.4
Sylmar (SCE)	230	15.3	60.6	15.2	61.4	0.8
Villa Park	230	24.8	50	24.7	50.3	0.3
Vincent A	230	22.6	54.3	20.9	60.4	6.1
Vincent B	230	22.6	54.3	20.9	60.4	6.1
Vista	230	16.3	45.8	16.2	46	0.2
Walnut	230	15.9	34.9	15.9	35.2	0.3
Altwind	115	11.3	15.9	11.1	16.1	0.2

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Buckwind	115	15.3	18.4	15.1	18.7	0.3
Devers	115	39.9	24.1	39.1	24.5	0.4
Farrell	115	10.1	13.1	10	13.3	0.2
Garnet	115	18	18	17.7	18.2	0.2
Sanwind	115	9.9	13.6	9.8	14	0.4
Terawind	115	16.6	20	16.3	20.3	0.3
Tiffanywind	115	14	18.3	13.8	18.5	0.2
Venwind	115	6.2	15.2	6.1	15.3	0.1
Cal Cement	66	18.1	18.6	18.1	18.7	0.1
Chino_A	66	45.9	29.8	55.7	31.3	1.5
Chino_B	66	45.9	29.8	55.7	31.3	1.5
Del Sur	66	8.8	19.2	8.8	19.5	0.3
Gould	66	26.4	11	26.4	11.8	0.8
Laguna Bell AB	66	42.2	21.9	42.1	22	0.1
Laguna Bell DE	66	34.6	27.7	34.5	27.8	0.1
Mesa	66	38.3	32	39.6	32.4	0.4
Mira Loma	66	41.4	37.7	41	38.3	0.6
Oasis	66	5.5	9.2	5.7	9.5	0.3
Padua	66	32	25.6	31.9	25.7	0.1
Ritter Ranch	66	7.7	11.6	7.7	11.7	0.1
Saugus_A	66	34.1	38	34.1	38.2	0.2
Saugus_C	66	34.1	38	34.1	38.2	0.2
Viejo	66	31.9	17.6	32.7	17.8	0.2
Windhub66_A	66	45.1	25.1	45.5	25.2	0.1
Windhub66_B	66	45.1	25.1	45.5	25.2	0.1
Antelope	66	29.4	32.6	29.4	33.2	0.6

Table H.3.1b: Existing System with the inclusion of Projects in 2015 Single-Phase-to-ground Fault Analysis

Bus Name	Bus KV	PRE CASE		POST CASE		DELTA KA
		X/R	KA	X/R	KA	
Antelope	525	18.3	28.4	18.4	28.8	0.4
Colorado River	525	13.2	10.9	13.5	11.3	0.4
Eldorado	525	10.7	37.4	11.4	39.9	2.5
Lugo	525	11.8	35.8	11.8	36	0.2
Mira Loma	525	12.1	31.2	12.2	31.3	0.1
Red Bluff	525	11.7	12.4	11.7	12.6	0.2
Vincent	525	15.6	33.7	15.8	34.5	0.8
Whirlwind	525	16.3	26.8	16.3	27.3	0.5
Antelope	230	25.7	40.9	26	41.2	0.3
Barre	230	13.9	46.4	13.9	46.5	0.1
Center	230	14.8	34	14.8	34.2	0.2
Chino	230	11.5	32.5	12.6	41.2	8.7
Colorado River	230	26.8	15.7	27.7	16.9	1.2
Del Amo	230	11.3	42	11.3	42.2	0.2
Devers	230	18.7	42.7	18.7	43	0.3
El Nido	230	16.7	37.3	16.6	37.4	0.1
Etiwanda	230	18.1	55.7	17.8	57	1.3
Hinson	230	19.4	36.3	19.4	36.5	0.2

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La Fresa	230	19.7	42.5	19.7	42.7	0.2
Laguna Bell	230	12.9	32.6	12.5	33.2	0.6
Lewis	230	15.5	44.9	15.4	45.1	0.2
Lighthipe	230	11.7	39.4	11.6	39.7	0.3
Mesa	230	11.4	41.6	11.2	43.8	2.2
Mira Loma A	230	15.7	49.3	14.8	52.6	3.3
Mira Loma B	230	16	53.9	15.4	60.1	6.2
Moorpark	230	24.1	29.8	23.9	30	0.2
Olinda	230	12.6	26	12.6	26.1	0.1
Pardee	230	13.8	40.5	13.5	41.5	1
Rancho	230	18.5	57.8	18.1	59.3	1.5
Redondo	230	29.6	40.5	29.5	40.7	0.2
Rio Hondo	230	16.1	26.6	16	26.7	0.1
Sylmar (SCE)	230	12.6	66.7	12.5	67.4	0.7
Villa Park	230	17.4	44.3	17.4	44.4	0.1
Vincent A	230	19.7	55.3	18.9	59.8	4.5
Vincent B	230	19.7	55.3	18.9	59.8	4.5
Walnut	230	16.7	33.5	16.7	33.7	0.2
Altwind	115	9.2	13.4	9.1	13.5	0.1
Buckwind	115	11.6	16.8	11.5	16.9	0.1
Devers	115	35.3	27.8	34.6	28.3	0.5
Garnet	115	13.5	17	13.3	17.1	0.1
Terawind	115	12.6	19	12.5	19.3	0.3
Tiffanywind	115	10.9	16.7	10.8	16.8	0.1
ANTELOPE	66	24	21.9	23	22.7	0.8
Chino_A	66	29.2	18.7	30.4	19.1	0.4
Chino_B	66	29.2	18.7	30.4	19.1	0.4
Gould	66	25.3	10	25.2	10.4	0.4
Mira Loma	66	29.5	28.7	29.3	28.9	0.2
Ritter Ranch	66	9.1	5.4	9	5.5	0.1

Table H.3.2a: Inclusion of Projects in 2016 Three-Phase-to-ground Fault Analysis

Bus Name	Bus KV	PRE CASE		POST CASE		DELTA KA
		X/R	KA	X/R	KA	
Antelope	525	20.8	32.8	21.2	35.5	2.7
Colorado River	525	19.0	13.8	19.5	14.4	0.6
Eldorado	525	12.3	47.5	11.8	50.4	2.9
Lugo	525	21.8	46.1	18.8	49.7	3.6
Mira Loma	525	24.1	34.2	22.4	38.4	4.2
Red Bluff	525	18.9	15.0	19.2	15.4	0.4
Serrano	525	25.5	30.8	24.5	32.2	1.4
Vincent	525	18.9	42.1	18.9	46.9	4.8
Whirlwind	525	21.3	30.7	21.7	33.1	2.4
Antelope	230	24.6	36.6	25.9	38.9	2.3
Barre	230	22.0	59.1	21.9	59.5	0.4
Center	230	14.9	41.7	14.9	41.8	0.1
Chino	230	17.5	47.5	17.2	48.9	1.4
Colorado River	230	41.2	15.6	31.9	21.6	6.0

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Del Amo	230	16.6	45.5	16.6	45.6	0.1
Devers	230	21.2	38.0	21.4	38.4	0.4
Eldorado	230	17.4	56.1	17.3	56.7	0.6
Eldorado_2	230	43.5	19	43.7	19.1	0.1
Ellis	230	17.2	41.7	17.1	41.9	0.2
Etiwanda	230	25.2	56.9	24.7	58.4	1.5
Highwind	230	22.0	15.7	21.7	16.4	0.7
Hunt. Beach. A	230	16.8	36.7	16.8	36.8	0.1
Hunt. Beach. B	230	16.8	36.7	16.8	36.8	0.1
Kramer	230	16.2	18.0	15.9	18.8	0.8
Lewis	230	21.4	49.0	21.2	49.6	0.6
Lugo	230	27.9	39.8	27.6	40.5	0.7
Luz	230	19.5	10.4	19.3	10.6	0.2
Mesa	230	16.1	52.8	16.2	53.1	0.3
Mira Loma A	230	20.5	52.1	20.4	54.1	2.0
Mira Loma B	230	23.7	60.8	23.5	63.3	2.5
Olinda	230	14.7	30.2	14.6	30.4	0.2
Pardee	230	15.6	57.1	15.5	57.7	0.6
Rancho	230	25.4	57.9	24.8	59.5	1.6
Red Bluff	230	38.1	14.1	30.5	20.1	6.0
San Bernardino	230	20.0	36.5	19.8	36.8	0.3
Serrano	230	26.3	57.3	26.0	58.5	1.2
Sylmar (SCE)	230	15.2	61.4	15.2	61.7	0.3
Victor	230	15.7	23.8	18.2	32.5	8.7
Villa Park	230	24.7	50.3	24.5	51.0	0.7
Vista	230	16.2	46.0	16.0	46.7	0.7
Walnut	230	15.9	35.2	15.8	35.4	0.2
Whirlwind	230	38.9	31.2	36.0	40.1	8.9
Whirlwind_2	230	38.9	31.2	36.0	40.1	8.9
Buckwind	115	15.1	18.7	15.1	18.8	0.1
Devers	115	39.1	24.5	39.4	24.7	0.2
Terawind	115	16.3	20.3	16.4	20.4	0.1
Tiffanywind	115	13.8	18.5	13.8	18.6	0.1
Lewis	69	30.4	44.7	30.4	44.8	0.1
Antelope	66	29.4	33.2	30.3	34.0	0.8
Cal Cement	66	18.1	18.7	18.1	18.9	0.2
Chino_A	66	55.7	31.3	55.9	31.4	0.1
Chino_B	66	55.7	31.3	55.9	31.4	0.1
Del Sur	66	8.8	19.5	8.9	20.0	0.5
Mira Loma	66	41.0	38.3	41.3	38.5	0.2
Ritter Ranch	66	7.7	11.7	7.7	11.8	0.1
Windhub66_A	66	45.5	25.2	46.3	25.7	0.5
Windhub66_B	66	45.5	25.2	46.3	25.7	0.5

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Table H.3.2b: Inclusion of Projects in 2016 Single-Phase-to-ground Fault Analysis

Bus Name	Bus KV	PRE CASE		POST CASE		DELTA KA
		X/R	KA	X/R	KA	
Antelope	525	18.4	28.8	18.2	30.8	2.0
Colorado River	525	13.5	11.3	16.3	13.5	2.2
Eldorado	525	11.4	39.9	11.1	41.3	1.4
Lugo	525	11.8	36.0	10.9	37.5	1.5
Mira Loma	525	12.2	31.3	11.3	34.6	3.3
Red Bluff	525	11.7	12.6	14.1	14.6	2.0
Serrano	525	14.0	27.4	13.6	28.1	0.7
Vincent	525	15.8	34.5	14.7	37.8	3.3
Whirlwind	525	16.3	27.3	17.3	30.3	3.0
Antelope	230	26.0	41.2	27.0	43.8	2.6
Barre	230	13.9	46.5	13.8	46.7	0.2
Chino	230	12.6	41.2	12.3	42.0	0.8
Colorado River	230	27.7	16.9	25.8	24.5	7.6
Devers	230	18.7	43.0	18.9	43.4	0.4
El Segundo	230	18.0	32.9	18.2	33.1	0.2
Eldorado	230	16.0	52.7	15.9	53.1	0.4
Eldorado_2	230	40.7	21.4	40.8	21.6	0.2
Etiwanda	230	17.8	57.0	17.3	58.1	1.1
Kramer	230	11.1	15.5	10.2	16.5	1.0
Lewis	230	15.4	45.1	15.3	45.4	0.3
Lugo	230	22.4	40.6	18.4	41.0	0.4
Mesa	230	11.2	43.8	11.2	44.0	0.2
Mira Loma A	230	14.8	52.6	14.0	54.4	1.8
Mira Loma B	230	15.9	59.5	16.3	61.3	1.8
Pardee	230	13.5	41.5	13.4	41.7	0.2
Rancho	230	18.1	59.3	17.6	60.5	1.2
Red Bluff	230	26.6	15.2	24.3	22.7	7.5
San Bernardino	230	18.5	38.6	18.4	38.8	0.2
Serrano	230	19.1	58.9	18.9	59.7	0.8
Sylmar (SCE)	230	12.5	67.4	12.5	67.6	0.2
Victor	230	12.1	20.8	6.6	26.3	5.5
Villa Park	230	17.4	44.4	17.3	44.8	0.4
Vista	230	13.2	41.2	13.0	41.6	0.4
Whirlwind	230	31.7	34.1	29.6	44.6	10.5
Whirlwind_2	230	31.7	34.1	29.6	44.6	10.5
Devers	115	34.6	28.3	34.8	28.5	0.2
Kramer	115	13.1	23.9	12.9	24.3	0.4
Terawind	115	12.5	19.3	12.5	19.4	0.1
Victor	115	18.7	24.7	17.7	26.7	2.0
Antelope	66	23.0	22.7	23.2	22.9	0.2
Windhub66_A	66	21.2	17.5	21.2	17.6	0.1
Windhub66_B	66	21.2	17.5	21.2	17.6	0.1



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Table H.3.3a: Inclusion of Projects in 2017 Three-Phase-to-ground Fault Analysis

Bus Name	Bus KV	PRE CASE		POST CASE		DELTA KA
		X/R	KA	X/R	KA	
Antelope	525	21.6	35.2	21.4	36	0.8
Colorado River	525	19.5	14.4	19.7	14.6	0.2
Eldorado	525	12.3	47.5	11.9	50.8	3.3
Lugo	525	21.9	46.6	18.8	49.6	3
Mira Loma	525	23.9	36.5	22.5	37.5	1
Red Bluff	525	19.2	15.4	19.4	15.5	0.1
Serrano	525	25.4	31.7	24.5	32.2	0.5
Vincent	525	19.4	46.2	19	47.3	1.1
Whirlwind	525	22	32.9	22.1	33.9	1
Alamitos B	230	15.8	30.7	15.7	30.8	0.1
Antelope	230	26	38.8	26.1	39	0.2
Barre	230	22	59.4	21.7	60.4	1
Center	230	14.9	41.7	14.8	41.9	0.2
Chino	230	17.4	48.3	17.2	48.7	0.4
Colorado River	230	31.9	21.6	32.6	22.2	0.6
Del Amo	230	16.6	45.5	16.5	45.8	0.3
Devers	230	21.4	38.3	21.4	38.4	0.1
Eldorado	230	17.4	56.1	16.9	57.2	1.1
Eldorado_2	230	43.5	19	16.3	27.2	8.2
Ellis	230	17.2	41.8	17.4	43.3	1.5
Etiwanda	230	25.4	56.2	25	56.7	0.5
Highwind	230	21.8	16.4	21.5	16.6	0.2
Ivanpah	230	26.5	10.9	19.8	12.6	1.7
Lewis	230	21.4	49.4	21.1	50	0.6
Lugo	230	28.3	39.9	27.7	40.4	0.5
Mesa	230	16.2	53	16.1	53.2	0.2
Mira Loma A	230	20.8	53.6	20.5	54.2	0.6
Mira Loma B	230	23.1	56.7	22.7	57.2	0.5
Rancho	230	25.7	57.2	25.1	57.7	0.5
Santiago	230	17.7	26.3	18.4	28.7	2.4
Serrano	230	26.4	58.1	25.9	58.9	0.8
Victor	230	18.5	32.3	18.2	32.5	0.2
Villa Park	230	24.7	50.8	24.4	51.4	0.6
Vincent A	230	27.6	41.3	27.5	41.6	0.3
Vincent B	230	23.1	45.1	23	45.4	0.3
Vista	230	16.4	45.9	16.2	46.1	0.2
Whirlwind	230	36.3	40	37.2	42.1	2.1
Whirlwind_2	230	36.3	40	37.2	42.1	2.1
Ivanpah	115	29.4	17.2	27.4	18.1	0.9
Lewis	69	30.5	44.8	30.4	44.9	0.1
Ellis A	66	34.1	28.6	34.3	28.7	0.1
Johanna	66	43.9	20.5	45	20.7	0.2
Santiago A	66	45.8	22.9	48.1	23.3	0.4
Santiago B	66	35.7	22	36.9	22.4	0.4

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Table H.3.3b: Inclusion of Projects in 2017 Single-Phase-to-ground Fault Analysis

Bus Name	Bus KV	PRE CASE		POST CASE		DELTA KA
		X/R	KA	X/R	KA	
Antelope	525	18.4	30.7	18.3	31.2	0.5
Colorado River	525	16.3	13.5	16.4	13.6	0.1
Eldorado	525	11.4	39.9	11.1	41.7	1.8
Lugo	525	11.6	36	10.9	37.3	1.3
Mira Loma	525	10.5	32.2	10.2	32.7	0.5
Serrano	525	13.9	27.8	13.7	28	0.2
Vincent	525	15	37.5	14.8	38.1	0.6
Whirlwind	525	17.5	30.2	17.7	31.2	1
Antelope	230	27.1	43.7	27.2	43.9	0.2
Barre	230	13.9	46.7	13.7	47.1	0.4
Chino	230	12.5	41.4	12.4	41.6	0.2
Colorado River	230	25.8	24.5	26	24.9	0.4
Del Amo	230	11.3	42.2	11.3	42.3	0.1
Eldorado	230	15.9	52.7	15.7	53.4	0.7
Eldorado_2	230	40.7	21.4	17.7	28.9	7.5
Ellis	230	18.2	36.3	18	37.1	0.8
Etiwanda	230	17.9	56.4	17.7	56.7	0.3
Ivanpah	230	21.7	9.6	12.2	12.8	3.2
Lewis	230	15.4	45.3	15.3	45.6	0.3
Lugo	230	18.6	40.6	18.3	40.9	0.3
Mira Loma A	230	13.9	53.6	13.8	54	0.4
Mira Loma B	230	13.9	50.8	13.8	51.2	0.4
Pardee	230	13.4	41.7	14.4	44.5	2.8
Rancho	230	18.2	58.6	18	59	0.4
Santiago	230	18.3	25.4	18.1	29	3.6
Serrano	230	19.1	59.4	18.8	59.9	0.5
Victor	230	6.7	26.2	6.6	26.3	0.1
Villa Park	230	17.4	44.7	17.2	45	0.3
Vincent A	230	23.9	42.3	23.9	42.5	0.2
Vincent B	230	19.7	45.8	19.6	46	0.2
Vista	230	13.2	41.1	13.1	41.3	0.2
Whirlwind	230	29.8	44.5	30.4	47.3	2.8
Whirlwind_2	230	29.8	44.5	30.4	47.3	2.8
Ivanpah	115	26.3	19.4	23.5	20.8	1.4
Santiago A	66	39.8	20.8	40	21	0.2
Santiago B	66	23.5	16.2	23.5	16.4	0.2

Table H.3.4a: Inclusion of Projects in 2018 Three-Phase-to-ground Fault Analysis

Bus Name	Bus KV	PRE CASE		POST CASE		DELTA KA
		X/R	KA	X/R	KA	
Colorado Rvr	525	19.7	14.6	21.9	16.8	2.2
Red Bluff	525	19.4	15.5	20.6	16.9	1.4
Serrano	525	24.5	32.2	24.5	32.4	0.2
Colorado Rvr	230	32.6	22.2	37.5	23.8	1.6
Devers	230	21.4	38.4	21.9	39.5	1.1

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Mirage	230	10.1	18.1	10.1	18.3	0.2
Red Bluff	230	30.7	20.2	33.3	21.1	0.9
Serrano	230	25.9	58.9	26	59	0.1
Altwind	115	11.1	16.1	10.9	16.6	0.5
Buckwind	115	15.1	18.8	14.9	19.4	0.6
Devers	115	39.4	24.7	40.8	25.9	1.2
Farrell	115	9.9	13.3	9.8	13.6	0.3
Garnet	115	17.7	18.3	17.4	18.9	0.6
Sanwind	115	9.8	14	9.7	14.4	0.4
Terawind	115	16.4	20.5	16.2	21.3	0.8
Tiffanywind	115	13.8	18.6	13.6	19.3	0.7
Venwind	115	6.1	15.4	6	15.8	0.4
Banducci	66	0	0	3.3	2.9	2.9

Table H.3.4b: Inclusion of Projects in 2018 Single-Phase-to-ground Fault Analysis

Bus Name	Bus KV	PRE CASE		POST CASE		DELTA KA
		X/R	KA	X/R	KA	
Colorado Rvr	525	16.4	13.6	18.1	16.5	2.9
Red Bluff	525	14.1	14.6	14.1	15.8	1.2
Colorado Rvr	230	26	24.9	30	27.2	2.3
Devers	230	18.9	43.4	19.2	44.4	1
Red Bluff	230	24.4	22.8	25.3	23.7	0.9
Altwind	115	9.1	13.5	9	13.8	0.3
Buckwind	115	11.4	17	11.3	17.5	0.5
Devers	115	34.8	28.5	36.3	29.9	1.4
Farrell	115	9.7	12.6	9.6	12.8	0.2
Garnet	115	13.3	17.2	13.1	17.6	0.4
Terawind	115	12.5	19.4	12.4	20	0.6
Tiffanywind	115	10.8	16.9	10.6	17.4	0.5
Valley AB	115	48.5	25.6	48.7	25.7	0.1
Banducci	66	0	0	4.3	1.8	1.8

Table H.3.5a: Inclusion of Energy Only Projects Post 2018 Three-Phase-to-ground Fault Analysis

Bus Name	Bus KV	PRE CASE		POST CASE		DELTA KA
		X/R	KA	X/R	KA	
Alberhil	525	0	0	23.5	23.2	23.2
Antelope	525	21.4	36	21.9	36.8	0.8
Colorado River	525	21.9	16.8	22.8	18.7	1.9
Eldorado	525	11.9	50.8	11.9	51.5	0.7
Lugo	525	18.8	49.7	18.9	51.2	1.5
Mira Loma	525	22.5	37.5	22.4	39	1.5
Red Bluff	525	20.6	16.9	21.6	19.9	3
Serrano	525	24.5	32.4	24.2	35.2	2.8
Valley A	525	26	19.3	25.7	24.4	5.1
Valley B	525	26	19.3	25.7	24.4	5.1
Vincent	525	19	47.3	19.5	48.8	1.5
Whirlwind	525	22.1	33.9	22.6	34.7	0.8

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Antelope	230	26.1	39	26.4	39.4	0.4
Barre	230	21.7	60.5	21	63.2	2.7
Center	230	14.8	41.9	15.5	45.7	3.8
Chino	230	17.2	48.8	17.5	49.5	0.7
Colorado River	230	37.5	23.8	40.3	26.1	2.3
Del Amo	230	16.5	45.8	16.5	47	1.2
Devers	230	21.9	39.5	22.7	41.7	2.2
Eldorado	230	16.9	57.3	16.9	57.6	0.3
Eldorado_2	230	16.3	27.2	16.6	28.2	1
Ellis	230	17.4	43.3	16.6	45.5	2.2
Etiwanda	230	24.9	56.8	25.2	58	1.2
Hunt. Beach. A	230	16.8	37.8	15.9	39.2	1.4
Hunt. Beach. B	230	16.8	37.8	15.9	39.2	1.4
Jasper	230	0	0	12.6	9	9
Kramer	230	15.9	18.8	15.8	19.5	0.7
Lewis	230	21.1	50.1	20.7	52	1.9
Lugo	230	27.7	40.5	28.2	41.3	0.8
Luz	230	19.3	10.6	20.7	11.7	1.1
Mesa	230	16.1	53.2	16.6	57.4	4.2
Mira Loma B	230	22.7	57.3	22.7	59.1	1.8
Olinda	230	14.6	30.3	14.9	33.6	3.3
Pardee	230	15.5	57.6	15.5	58.1	0.5
Pastoria	230	13.5	30.2	13.8	30.7	0.5
Primm	230	18.9	12.1	19	12.2	0.1
Rancho	230	25.1	57.8	25.4	59.1	1.3
Red Bluff	230	33.3	21.1	37.7	26.9	5.8
Rio Hondo	230	14.8	30.9	14.8	31.4	0.5
San Onofre	230	17.9	27.5	14	43.4	15.9
Santiago	230	18.4	28.7	17.3	31.6	2.9
Serrano	230	26	59	25.7	62	3
Sylmar (SCE)	230	15.2	61.7	15.2	62	0.3
Victor	230	18.2	32.5	18.1	33	0.5
Villa Park	230	24.4	51.5	24	53.7	2.2
Vincent A	230	27.5	41.6	27.9	45.5	3.9
Vincent B	230	23	45.4	23.3	46	0.6
Walnut	230	15.8	35.4	16	36.7	1.3
Whirlwind	230	37.2	42.1	38.5	43.9	1.8
Wildlife	230	0	0	14.7	24.1	24.1
Alberhil	115	0	0	60.8	19.9	19.9
Altwind	115	10.9	16.6	10.9	16.8	0.2
Buckwind	115	14.9	19.4	14.8	19.7	0.3
Devers	115	40.8	25.9	41.9	26.4	0.5
Farrell	115	9.8	13.6	9.8	13.8	0.2
Garnet	115	17.4	18.9	17.5	19.1	0.2
Kramer	115	13.9	23.9	14	24.2	0.3
Sanwind	115	9.7	14.4	9.6	14.5	0.1
Terawind	115	16.2	21.3	16.2	21.6	0.3
Tiffanywind	115	13.6	19.3	13.5	19.5	0.2

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Venwind	115	6	15.8	5.9	16	0.2
Lewis	69	30.4	44.9	30.4	45.3	0.4
Antelope	66	30.4	34.1	30.4	34.5	0.4
Barre AB	66	47.1	23.6	50.3	30	6.4
Center B	66	22.3	27.5	22.8	27.8	0.3
Del Sur	66	8.9	20	8.9	20.2	0.2
Ellis A	66	34.3	28.7	34.2	28.9	0.2
Johanna	66	45	20.7	46.3	22.7	2
Mesa	66	39.8	32.5	41	32.9	0.4
Olinda	66	37	22.6	38.5	23.1	0.5
Rio Hondo	66	24.8	32.3	24.8	32.5	0.2
Santiago A	66	48.1	23.3	48.1	23.7	0.4
Santiago B	66	36.9	22.4	36.7	22.8	0.4
Viejo	66	32.8	17.9	32.8	18.3	0.4
Villa Park	66	43.5	32.7	43.5	32.9	0.2
Walnut	66	31.6	30.3	32	30.6	0.3
Wilderness	66	0	0	32.9	27.3	27.3

Table H.3.5b: Inclusion of Energy Only Projects Post 2018 Single-Phase-to-ground Fault Analysis

Bus Name	Bus KV	PRE CASE		POST CASE		DELTA KA
		X/R	KA	X/R	KA	
Alberhil	525	0	0	14	23.5	23.5
Antelope	525	18.3	31.2	18.3	31.7	0.5
Colorado Rvr	525	18.1	16.5	18.6	18.2	1.7
Eldorado	525	11.1	41.7	11.1	42.5	0.8
Lugo	525	10.9	37.3	10.9	38.1	0.8
Mira Loma	525	10.2	32.7	10	33.5	0.8
Red Bluff	525	14.1	15.8	14.9	18.4	2.6
Serrano	525	13.6	28.1	12.4	30.6	2.5
Valley A	525	15.2	19.7	13.8	24.8	5.1
Valley B	525	15.2	19.7	13.8	24.8	5.1
Vincent	525	14.8	38.1	15	39.1	1
Whirlwind	525	17.7	31.2	17.9	32.2	1
Antelope	230	27.2	43.9	27.4	44.3	0.4
Barre	230	13.7	47.1	13.3	48.2	1.1
Center	230	14.8	34.3	14.3	39.1	4.8
Chino	230	12.4	41.6	12.5	41.9	0.3
Colorado Rvr	230	30	27.2	31.2	30.4	3.2
Del Amo	230	11.3	42.4	11.2	43	0.6
Devers	230	19.2	44.4	19.4	46.4	2
El Segundo	230	17.9	33	19.2	33.6	0.6
Eldorado	230	15.7	53.4	15.7	53.7	0.3
Eldorado_2	230	17.7	28.9	17.9	30.4	1.5
Ellis	230	18	37.1	17.1	39.5	2.4
Etiwanda	230	17.7	56.8	17.7	57.6	0.8
Hunt. Bch. A	230	19.9	29	18.9	33.6	4.6
Hunt. Bch. B	230	19.9	29	18.9	33.6	4.6
Jasper	230	0	0	10.5	6.7	6.7

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Kramer	230	10.2	16.5	9.6	17.1	0.6
Lewis	230	15.2	45.7	14.9	46.8	1.1
Lugo	230	18.3	40.9	18.5	41.8	0.9
Luz	230	12.7	9.8	15.8	11.5	1.7
McCullough	230	13.6	51	13.6	51.2	0.2
Mesa	230	11.1	44	11.2	48.6	4.6
Mira Loma B	230	13.8	51.2	14	52	0.8
Olinda	230	12.5	26.2	11.4	29.5	3.3
Pardee	230	14.4	44.5	14.3	44.7	0.2
Pastoria	230	13.2	27.6	14.7	32.5	4.9
Rancho	230	18	59.1	18	60	0.9
Red Bluff	230	25.3	23.7	27.8	30.6	6.9
Rio Hondo	230	16.3	26.5	16.2	26.7	0.2
Santiago	230	18.1	29	17.5	31	2
Serrano	230	18.8	60	17.8	62.9	2.9
Victor	230	6.6	26.3	6.6	26.6	0.3
Villa Park	230	17.2	45	16.7	46.3	1.3
Vincent A	230	23.9	42.5	23.9	46.1	3.6
Vincent B	230	19.6	46	19.7	46.6	0.6
Walnut	230	16.6	33.8	16.6	34.6	0.8
Whirlwind	230	30.4	47.3	30	50.1	2.8
Whirlwind_2	230	30.4	47.3	30	50.1	2.8
Wildlife	230	0	0	15.9	18.5	18.5
Alberhil	115	0	0	49.7	24.8	24.8
Altwind	115	9	13.8	9	13.9	0.1
Buckwind	115	11.3	17.5	11.3	17.7	0.2
Devers	115	36.3	29.9	36.8	30.4	0.5
Garnet	115	13.1	17.6	13.3	17.9	0.3
Kramer	115	12.9	24.3	12.7	24.5	0.2
Terawind	115	12.4	20	12.3	20.2	0.2
Tiffanywind	115	10.6	17.4	10.6	17.5	0.1
Valley AB	115	48.7	25.7	50.7	26.7	1
Valley D	115	50.3	23.9	32.2	39.3	15.4
Victor	115	17.7	26.7	17.7	26.8	0.1
Antelope	66	23.2	22.9	23.2	23	0.1
Barre AB	66	29.9	16.8	27.7	28.7	11.9
Center B	66	24.1	20.9	24.4	21	0.1
Johanna	66	30.6	13.2	34.6	15.7	2.5
Mesa	66	29.5	20	29.7	20.1	0.1
Olinda	66	26.7	15.1	27	15.2	0.1
Santiago A	66	40	21	40.1	21.2	0.2
Viejo	66	28	12.3	28	12.5	0.2
Wilderness	66	0	0	11.5	23.2	23.2

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Table H.3.6a: Inclusion of In-Flight upgrades and All Other Pending Deliverability Network Upgrades  
Three-Phase-to-ground Fault Analysis

Bus Name	Bus KV	PRE CASE		POST CASE		DELTA KA
		X/R	KA	X/R	KA	
Alberhil	525	23.5	23.2	23.2	23.7	0.5
Antelope	525	21.9	36.8	22	37.4	0.6
Colorado River	525	22.8	18.7	21.7	22.6	3.9
Eldorado	525	11.9	51.5	11.9	51.6	0.1
Lugo	525	18.9	51.2	19.2	52.4	1.2
Mesa	525	0	0	24.8	29.3	29.3
Mira Loma	525	22.4	39	23	41	2
Red Bluff	525	21.6	19.9	21.4	22.2	2.3
Valley A	525	25.7	24.4	25.6	25.2	0.8
Valley B	525	25.7	24.4	25.6	25.2	0.8
Vincent	525	19.5	48.8	19.6	50.3	1.5
Whirlwind	525	22.6	34.7	22.6	35.2	0.5
Alamitos A	230	22.4	32.8	22.2	33	0.2
Alamitos B	230	14.3	29.5	14.2	29.7	0.2
Antelope	230	26.4	39.4	26.6	39.6	0.2
Arcogen	230	16.4	35.2	16.3	35.9	0.7
Barre	230	21	63.2	20.7	63.8	0.6
Center	230	15.5	45.7	15.4	46.7	1
Chino	230	17.5	49.5	17.7	50.1	0.6
Colorado River	230	40.3	26.1	41.9	28.3	2.2
Del Amo	230	16.5	47	16.1	49.4	2.4
Devers	230	22.7	41.7	25.2	49.1	7.4
El Casco	230	11.2	11.7	18.4	17.6	5.9
El Nido	230	17.6	36.5	17.6	37.3	0.8
El Segundo	230	18.4	32.8	18.4	33.4	0.6
Ellis	230	16.6	45.5	16.5	45.8	0.3
Etiwanda	230	25.2	58	27.5	59.8	1.8
Goodrich	230	13.3	21.9	14.3	27.8	5.9
Gould	230	12.5	23.7	12.9	25.3	1.6
Hinson	230	17.3	40.2	17.2	41	0.8
Hunt. Beach A	230	15.9	39.2	15.8	39.4	0.2
Hunt. Beach B	230	15.9	39.2	15.8	39.4	0.2
La Fresa	230	20.3	41.3	20.5	42.6	1.3
Laguna Bell	230	14.9	36	16.8	56.8	20.8
Lewis	230	20.7	52	20.6	52.2	0.2
Lighthipe	230	16.7	42.3	16.6	42.9	0.6
Long Beach	230	12.2	27.2	12.1	27.6	0.4
Lugo	230	28.2	41.3	28.5	41.5	0.2
Mesa	230	16.6	57.4	18.9	60.1	2.7
Mesa_2	230	0	0	19.3	63.6	63.6
Mira Loma A	230	20.8	53.4	21.1	54.1	0.7
Mira Loma B	230	22.7	59.1	24	60.5	1.4
Olinda	230	14.9	33.6	14.9	33.8	0.2
Ramon	230	9.9	18.3	9.8	19.1	0.8
Rancho	230	25.4	59.1	27.6	60.9	1.8

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Red Bluff	230	37.7	26.9	38.8	28.2	1.3
Redondo	230	19.5	38.8	19.6	39.5	0.7
Rio Hondo	230	14.8	31.4	15.9	32.9	1.5
San Bernardino	230	20.1	36.3	25	41.2	4.9
San Onofre	230	14	43.4	14.3	47.3	3.9
Santiago	230	17.3	31.6	17.3	32	0.4
Serrano	230	25.7	62	25.7	62.5	0.5
Villa Park	230	24	53.7	24	53.9	0.2
Vincent B	230	23.3	46	23.3	46.3	0.3
Vista	230	16.3	43.6	20.5	47.9	4.3
Walnut	230	16	36.7	16.1	37	0.3
Westwing	230	15.8	62.4	15.9	62.7	0.3
Whirlwind	230	38.5	43.9	38.7	44.2	0.3
Whirlwind_2	230	38.5	43.9	38.7	44.2	0.3
Wildlife	230	14.7	24.1	15.2	24.7	0.6
Altwind	115	10.9	16.8	10.8	17.2	0.4
Buckwind	115	14.8	19.7	14.9	20.2	0.5
Devers	115	41.9	26.4	44.9	27.3	0.9
Farrell	115	9.8	13.8	9.7	14	0.2
Garnet	115	17.5	19.1	17.5	19.5	0.4
Sanwind	115	9.6	14.5	9.6	14.8	0.3
Terawind	115	16.2	21.6	16.3	22.1	0.5
Tiffanywind	115	13.5	19.5	13.5	20	0.5
Venwind	115	5.9	16	5.9	16.3	0.3
Vista	115	26.9	19.6	28.7	19.9	0.3
Del Amo	66	57.5	23.1	57.9	23.2	0.1
Etiwanda B	66	52.2	15.5	53.3	26.5	11
Gould	66	26.4	11.8	26.9	11.9	0.1
La Fresa B	66	39.8	26.1	40	26.2	0.1
Lag. Bell AB	66	41.8	22	49.6	23.4	1.4
Lag. Bell DE	66	34.4	27.8	38.4	29.4	1.6
Mesa	66	41	32.9	44.4	33.4	0.5
Rio Hondo	66	24.8	32.5	25.9	32.9	0.4
San Bernardino	66	38.5	30.7	43	31.6	0.9
Vista A	66	38	26.9	40.6	27.1	0.2
Vista C	66	22.7	25.8	23.5	26.1	0.3
Wilderness	66	32.9	27.3	33.6	27.5	0.2

Table H.3.6b Inclusion of In-Flight upgrades and All Other Pending Deliverability  
Single-Phase-to-ground Fault Analysis

Bus Name	Bus KV	PRE CASE		POST CASE		DELTA KA
		X/R	KA	X/R	KA	
Alberhil	525	14	23.5	13.9	23.9	0.4
Antelope	525	18.3	31.7	18.1	32.1	0.4
Colorado River	525	18.6	18.2	17.4	21	2.8
Lugo	525	10.9	38.1	10.7	38.7	0.6
Mesa	525	0	0	13.9	25.1	25.1



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Mira Loma	525	10	33.5	10.3	35.3	1.8
Red Bluff	525	14.9	18.4	14.5	19.8	1.4
Serrano	525	12.4	30.6	12.2	30.9	0.3
Valley A	525	13.8	24.8	13.7	25.4	0.6
Valley B	525	13.8	24.8	13.7	25.4	0.6
Vincent	525	15	39.1	14.1	40.4	1.3
Whirlwind	525	17.9	32.2	17.8	32.5	0.3
Alamitos A	230	15.2	31.3	15.1	31.4	0.1
Antelope	230	27.4	44.3	27.5	44.4	0.1
Arcogen	230	17.1	29.9	17.1	30.2	0.3
Barre	230	13.3	48.2	13.2	48.4	0.2
Center	230	14.3	39.1	14.2	39.7	0.6
Chino	230	12.5	41.9	13.6	44.3	2.4
Colorado River	230	31.2	30.4	31.6	32.5	2.1
Del Amo	230	11.2	43	10.7	44.3	1.3
Devers	230	19.4	46.4	21.9	52	5.6
El Casco	230	6.6	10.2	12.7	12.6	2.4
El Nido	230	16.6	36.2	16.5	36.7	0.5
El Segundo	230	19.2	33.6	19.1	33.9	0.3
Ellis	230	17.1	39.5	17.1	39.7	0.2
Etiwanda	230	17.7	57.6	19.1	60.7	3.1
Hinson	230	19.1	36.1	19.2	36.5	0.4
Hunt. Beach A	230	18.9	33.6	18.9	33.7	0.1
Hunt. Beach B	230	18.9	33.6	18.9	33.7	0.1
La Fresa	230	18.8	39	18.4	39.7	0.7
Laguna Bell	230	12.2	33.3	3.3	39.2	5.9
Lewis	230	14.9	46.8	14.9	46.9	0.1
Lugo	230	18.5	41.8	18.5	42	0.2
Mesa	230	11.2	48.6	13.5	50.6	2
Mesa_2	230	0	0	13.3	63.4	63.4
Mira Loma A	230	14	53.1	14.8	54.1	1
Mira Loma B	230	14	52	13.9	53.4	1.4
Mirage	230	10.6	16.5	10.6	17	0.5
Olinda	230	11.4	29.5	11.3	29.7	0.2
Rancho	230	18	60	18.9	62.5	2.5
Red Bluff	230	27.8	30.6	28.1	31.7	1.1
Rio Hondo	230	16.2	26.7	14	30.1	3.4
San Bernardino	230	18.5	38.5	24.4	41.3	2.8
San Onofre	230	8	30.7	8.6	47.8	17.1
Santiago	230	17.5	31	17.6	31.3	0.3
Serrano	230	17.8	62.9	17.8	63.3	0.4
Villa Park	230	16.7	46.3	16.7	46.4	0.1
Vincent A	230	23.9	46.1	23.6	46.3	0.2
Vincent B	230	19.7	46.6	18.1	46.7	0.1
Vista	230	13.2	40.8	15.8	43.7	2.9
Walnut	230	16.6	34.6	16.4	35	0.4
Westwing	230	12	57.9	12	58.1	0.2
Whirlwind	230	30	50.1	30	50.3	0.2

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Whirlwind_2	230	30	50.1	30	50.3	0.2
Wildlife	230	15.9	18.5	16.3	18.8	0.3
Altwind	115	9	13.9	8.9	14.1	0.2
Buckwind	115	11.3	17.7	11.3	17.9	0.2
Devers	115	36.8	30.4	39.1	31.2	0.8
Farrell	115	9.6	12.9	9.5	13	0.1
Garnet	115	13.3	17.9	13.3	18.2	0.3
Terawind	115	12.3	20.2	12.3	20.6	0.4
Tiffanywind	115	10.6	17.5	10.6	17.8	0.3
Valley AB	115	50.7	26.7	51.1	26.9	0.2
Valley D	115	32.2	39.3	32.4	39.5	0.2
Vista	115	24.6	22	26.1	22.2	0.2
Etiwanda B	66	31.8	12.8	31.6	19.9	7.1
Lag. Bell AB	66	27.5	15.6	28.5	16.1	0.5
Lag. Bell DE	66	22	22	22.6	22.7	0.7
Mesa	66	29.7	20.1	30.4	20.3	0.2
Rio Hondo	66	18.2	19.3	18.4	19.4	0.1
San Bernardino	66	26.3	23.3	27.1	23.6	0.3
Vista A	66	26.3	21.9	26.9	22	0.1
Vista C	66	13.7	20.4	13.9	20.5	0.1