Draft
2019 Transmission Maintenance and Compliance Review Report

Fernando E. Cornejo
Senior Advisor, Regulatory Affairs

2018-2019 Transmission Maintenance and Compliance Review Stakeholder Meeting
May 29, 2019

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2019 TMCR Stakeholder Meeting Agenda

Topic	Presenter	Time
Introduction/Overview	Fernando Cornejo	10:00 – 10:30
Compliance – TLRR	Corey Semrow	10:30 – 10:55
Infrastructure Replacement - Substation	John Mount	10:55 – 11:20
Infrastructure Replacement – Transmission	Dana Bullock	11:20 – 11:45
LUNCH		11:45 – 1:00
Work Performed by Operating Agent	Tracee Reeves	1:00 – 1:20
Operations Support – Substation Capital Maintenance	David Parque	1:20 – 1:40
Operations Support – Seismic Activity	Jenny Pearce	1:40 – 2:00
Physical/Cyber Security	Alex Benoliel	2:00 – 2:15
Next Steps/Wrap-up	Fernando Cornejo	2:15 – 2:30

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Safety Protocol

Actions in the event of an emergency:

- CPR/AED Certified Personnel -
- 911 Caller in Case of Emergency –
- Meet First Responder & retrieve AED -
- Fire Extinguishers – directly outside of door
- Nearest First Aid Kit – directly outside of door
- In an emergency you will hear alarm and see strobe lights

Evacuation Location

Introduction and Overview

Draft 2019 TMCR Report – Background and Summary

Fernando E. Cornejo
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TMCR Background

- August 31, 2018, FERC accepted SCE's proposal for a new process (i.e. TMCR) which, subject to certain exceptions, will cover proposed SCE facilities and projects that will have their costs recovered through transmission rates (FERC Docket: ER18-370-00)
    - September 28, 2018, SCE submitted its compliance filing with FERC
- Tariff requires SCE to post draft TMCR Report by no later than May 15 and to subsequently host a stakeholder meeting
- Stakeholders will have an opportunity to provide comments on the draft TMCR Report
- SCE will consider stakeholders' comments in the development of the final TMCR Report
- After posting of the final TMCR Report, stakeholders may submit comments on considerations for the following year's TMCR

Stakeholder Process Timeline

DUE DATE	ACTIVITY
May 8, 2019	SCE circulated TMCR stakeholder meeting notice
May 15, 2019	SCE posted 2019 draft TMCR report
Today	SCE conducts stakeholder meeting and posts comments template
June 26, 2019	Stakeholders comments due on draft TMCR report
July 10, 2019	SCE posts stakeholder comments on draft TMCR report
August 28, 2019	SCE posts final TMCR report
September 11, 2019	Stakeholders comments due on final TMCR report
September 25, 2019	SCE posts stakeholder comments on final TMCR report

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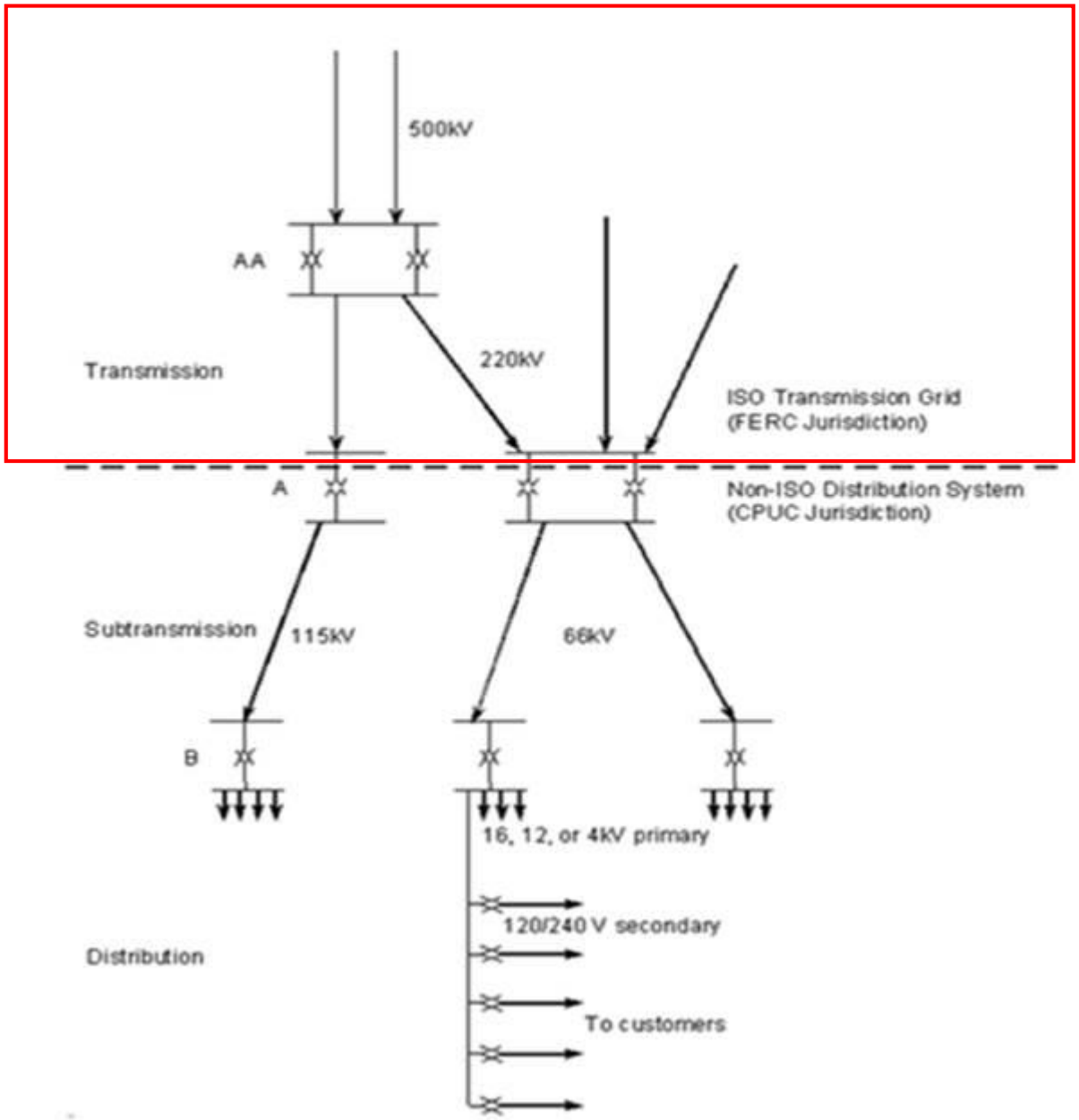
Overview of SCE's Transmission and Distribution System



Overview of TMCR Process

- Annual process open to all stakeholders
- Reviews SCE transmission projects not assessed in CAISO's TPP, and other exemptions, whose costs are recovered in CAISO's TAC
- *In-Scope*: Compliance (NERC, WECC, and CPUC driven); Infrastructure Replacement; Operational Support, and Work Performed by Operating Agent
- *Out-of-Scope*: CAISO TPP or generator interconnection projects; projects initiated and online within 2 years; projects related to security; and primarily distribution projects with ancillary transmission elements
- Covers years "3-5" of a five year window (2021 – 2023 for this 2019 TMCR process); Years "1-2" (2019-2020) covered by FERC formula rate case process

2021- 2023 TMCR Forecast

	2021	2022	2023	Total
Compliance	$ 102,555,959	$ 150,031,513	$ 172,114,623	$ 424,702,096
Infrastructure Replacement	$ 77,155,674	$ 85,951,664	$ 73,664,502	$ 236,771,840
Work by Operating Agent	$ 835,800	$ 1,937,750	$ 878,050	$ 3,651,600
Operations Support	$ 11,272,372	$ 11,383,286	$ 9,102,764	$ 31,758,422
Physical Security Enhancement Programs	$ 19,930,545	$ 19,438,285	$ 12,166,939	$ 51,535,770
Total	**$ 211,750,350**	**$ 268,742,498**	**$ 267,926,878**	**$ 748,419,729**

Compliance - TLRR

Corey Semrow
Senior Project Manager, Transmission & Distribution

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Compliance - TLRR

Description: SCE conducted a rating assessment of its CAISO-controlled and 115 kV radial lines built before 2005 to identify spans potentially not meeting the CPUC's GO 95 clearance requirements under certain operating conditions and atmospheric conditions. SCE committed to NERC/WECC to remediate all identified potential clearance issues for the CAISO-controlled facilities by 2025 and the 115 kV radial lines by 2030.

Criteria: Outlined in Table 1 of Section III of GO 95, titled "Basic Minimum Allowable Vertical Clearance of Wires Above Railroads, Thoroughfares, Ground or Water Surfaces; Also Clearances from Poles, Buildings, Structures or Other Objects." (*Available at http://www.cpuc.ca.gov/gos/GO95/go_95_table_1.html*.)

Projects: See next slide

TLRR – Forecast

2021 FORECAST	2022 FORECAST	2023 FORECAST	TOTAL
$ 102,555,959	$ 150,031,513	$ 172,114,623	$ 424,702,096

PIN	Project Title	OD	2021	2022	2023	Total
	Big Creek No 1 - Rector	2021	14,201,823	-	-	14,201,823
	Colorado River - Red Bluff No 1	2021	12,744,000	-	-	12,744,000
	Ellis - Santiago	2021	342,200	-	-	342,200
	Gould - Sylmar - Metro West	2021	442,500	-	-	442,500
	Gould - Sylmar - North Coast	2021	216,333	-	-	216,333
	Johanna - Santiago	2021	200,600	-	-	200,600
	Pardee - Pastoria - North Coast	2021	6,096,057	-	-	6,096,057
	Big Creek No 3 - Big Creek No 4	2022	11,800	11,800	-	23,600
	Big Creek No 3 - Rector 1	2022	17,723,600	17,711,800	-	35,435,400
	Pardee - Pastoria - Warne - North Coast	2022	200,600	1,274,400	-	1,475,000
	Bailey - Pardee	2023	7,434,000	9,152,080	6,490,000	23,076,080
	Big Creek No 1 - Big Creek No 2	2023	11,800	413,000	2,328,111	2,752,911
	Big Creek No 2 - Big Creek No 3	2023	59,000	1,261,800	3,813,318	5,134,118
	Big Creek No 3 - Rector 2	2023	613,600	11,800	9,204,000	9,829,400
	Serrano - Valley - San Jac	2023	-	2,976,371	2,964,571	5,940,942
	Big Creek No 2 - Big Creek No 8	2024	11,800	11,800	11,800	35,400
	Big Creek No 3 - Big Creek No 8	2024	11,800	11,800	755,200	778,800
	Eagle Mountain - Blythe	2024	236,000	12,221,045	8,825,000	21,282,045
07298	**Transmission Line Rating Remediation (Exempt from Licensing)**		**$ 60,557,513**	**$ 45,057,696**	**$ 34,391,999**	**$ 140,007,209**
07867	TLRR Eldorado-Lugo-Pisgah 220kV Transmission	2024	10,534,617	20,577,151	13,459,556	44,571,324
07905	TLRR Control-Haiwee 115kV Subtrans	2024	9,847,369	26,372,022	36,190,445	72,409,836
07904	TLRR Ivanpah-Coolwater-Kramer-Inyokern 115kV Subtrans	2025	13,764,619	46,986,481	69,317,509	130,068,609
07906	TLRR Control-Silver Peak 55kV Subtrans	2025	7,851,841	11,038,163	18,755,114	37,645,118
	Total Transmission Line Rating Remediation (TLRR)		**$ 102,555,959**	**$ 150,031,513**	**$ 172,114,623**	**$ 424,702,096**
	Total Compliance		**$ 102,555,959**	**$ 150,031,513**	**$ 172,114,623**	**$ 424,702,096**

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Infrastructure Replacement - Substation

John Mount
Senior Manager, Transmission & Distribution

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Infrastructure Replacement - Substation

Description: Substation Infrastructure Replacement program (Sub IR) is a programmatic replacement of substation equipment and structures, including maintaining an adequate inventory of critical, long lead-time equipment.

Criteria:

- Aged assets that are nearing the end of life; assets that have become obsolete in the industry; assets that are problematic to the resiliency of the system; assets with poor maintenance history.

IR Substation - Forecast

2021 FORECAST	2022 FORECAST	2023 FORECAST	TOTAL
$ 51,655,674	$ 57,451,664	$ 52,664,502	$ 161,771,840

PIN	Project Title	OD	2021	2022	2023	Total	Unit Count (if available)
	Replace Bulk Power Circuit Breakers - CHEVGEN	2021	-	106,514	194,530	301,044	2
	Replace Bulk Power Circuit Breakers - DEVERS	2021	312,795	-	-	312,795	3
	Replace Bulk Power Circuit Breakers - DEVERS	2022	1,912,400	819,600	-	2,732,000	2
	Replace Bulk Power Circuit Breakers/Switches - VINCENT	2023	100,000	3,953,104	1,594,188	5,647,292	6
	Replace Bulk Power Circuit Breakers - RANCHO VISTA	2021	583,590	-	-	583,590	6
	Replace Bulk Power Circuit Breakers - PADUA	2021	179,901	-	-	179,901	1
	Replace Bulk Power Circuit Breakers - COOLWATER	2021	1,334,295	-	-	1,334,295	5
	Replace Bulk Power Circuit Breakers - MIRA LOMA	2023	-	1,912,400	819,600	2,732,000	2
	Replace Bulk Power Circuit Breakers - INYO	2023	-	217,880	180,320	398,200	1
	Replace Bulk Power Switches - VILLA PARK	2021	774,075	-	-	774,075	6
	Replace Bulk Power Switches - RIVERTEX	2021	97,265	-	-	97,265	1
04211	**Total Replace Bulk Power Circuit Breakers/Switches**		**$ 5,294,321**	**$ 7,009,498**	**$ 2,788,638**	**$ 15,092,457**	**35**
	Substation Transformer Bank Replacement (AA-Bank & A-Bank) - ANTELOPE	2021	2,100,000	-	-	2,100,000	1
	Substation Transformer Bank Replacement (AA-Bank & A-Bank) - MIRA LOMA	2023	1,168,191	4,789,584	5,607,318	11,565,093	2
	Substation Transformer Bank Replacement (AA-Bank & A-Bank) - LA CIENEGA	2021	2,862,795	-	-	2,862,795	1
	Substation Transformer Bank Replacement (AA-Bank & A-Bank) - PADUA	2021	2,100,000	-	-	2,100,000	1
	Substation Transformer Bank Replacement (AA-Bank & A-Bank) - SERRANO	2022	9,077,032	10,626,768	-	19,703,800	4
	Substation Transformer Bank Replacement (AA-Bank & A-Bank) - VINCENT	2023	1,660,443	6,807,773	7,970,076	16,438,292	3
05210	**Total Substation Transformer Bank Replacement Program (AA-Bank & A-Bank)**		**$ 18,968,461**	**$ 22,224,125**	**$ 13,577,394**	**$ 54,769,980**	**12**
	FERC Emergency Equipment Program (EEP)	2021-2023	2,961,871	8,873,013	1,441,606	13,276,490	6
	FERC Spare Transformer Equipment Program (STEP)	2021-2023	2,961,871		14,970,000	17,931,871	3
03362	**Total Critical Spare Equipment Program**		**$ 5,923,741**	**$ 8,873,013**	**$ 16,411,606**	**$ 31,208,360**	**9**
05089	Bulk Power 500kV & 220kV Line Relay Replacement	2021-2023	9,676,288	8,000,001	8,000,000	25,676,289	
04756	Substation Miscellaneous Equipment Additions & Betterment	2023	11,792,863	11,345,027	11,886,864	35,024,754	
	Total Substation Infrastructure Replacement		**$ 51,655,674**	**$ 57,451,664**	**$ 52,664,502**	**$ 161,771,840**	

Infrastructure Replacement - Transmission

Dana Bullock
Director, Transmission

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Infrastructure Replacement - Transmission

Description: The programmatic replacement of aged transmission assets that are nearing the end of the asset lifecycle or special projects placed into the Infrastructure Replacement program.

Criteria: Replace the following commodities for the following reasons:

- Switch Replacement Program – replacement of switches that are obsolete and no longer manufactured.
- Pothead Replacement Program – older style potheads show propensity to fail after 20-25 years of use.
- Underground Cable Replacement Program – through cable analytics, poor performing underground cables are identified to be replaced.
- Pole Replacement Program – generally limited to non-deteriorated pole replacement, primarily geared to replace wood pole freeway crossings with steel poles. (In this 2019 TMCR, there are no transmission costs associated with this element.)
- Line Relocation Program – lines relocated for safety and reliability reasons due to flooding, property disputes, access issues, etc.

Commodities included in 2019 TMCR:

- Overhead (OH) Conductor Replacement Program: through OH conductor testing, poor performing circuits are replaced. Also, this commodity is cross-referenced with the expertise of engineers to determine the remaining lifespan of the conductor.

- Tower Corrosion - where in-service failures can have more significant consequences, visual inspection is performed to assess external corrosion which can result in equipment being mitigated prior to an in-service failure therefore extending the life of the asset.

IR Transmission - Forecast

2021 FORECAST	2022 FORECAST	2023 FORECAST	TOTAL
$ 25,500,000	$ 28,500,000	$ 21,000,000	$ 75,000,000

PIN	Project Title	OD	2021	2022	2023	Total
	Chevmain-El Segundo Trans IR OH Conductor	**2022**	1,500,000	2,500,000		4,000,000
	El Nido-El Segundo Trans IR OH Conductor	**2022**	1,500,000	2,500,000		4,000,000
	Chevmain-El Nido Trans IR OH Conductor	**2022**	1,500,000	2,500,000		4,000,000
07890	**Total Transmission IR OH Conductor**		**$ 4,500,000**	**$ 7,500,000**	**$ -**	**$ 12,000,000**
03364	Tower Corrosion		21,000,000	21,000,000	21,000,000	63,000,000
	Total Transmission Infrastructure Replacement		**$ 25,500,000**	**$ 28,500,000**	**$ 21,000,000**	**$ 75,000,000**

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Work Performed by Operating Agent

Tracee Reeves
Principal Manager, Transmission & Distribution

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Work Performed by Operating Agent

Description: Under this category, work activities are coordinated by Los Angeles Department of Water and Power (LADWP) (Operator of the Pacific Direct Current Intertie (PDCI).

Criteria: Prioritization and planning of work belongs to LADWP.

Project: The replacement of approximately 80,000 old porcelain suspension insulators with new glass insulators. The existing porcelain insulators are approaching their end of service life and are not compliant with current industry standards.

2021 FORECAST	2022 FORECAST	2023 FORECAST	TOTAL
$ 835,800	$ 1,937,750	$ 878,050	$ 3,651,600

Operation Support – Substation Capital Maintenance

David Parque
Principal Manager, Corporate Real Estate

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Operation Support – Substation Capital Maintenance

Description: Program seeks to preserve the value of SCE's buildings, equipment, and grounds, making them as safe and productive as reasonably possible. Though facility work orders respond to incidents as they occur, proper asset management also requires a proactive capital maintenance program to repair or replace building systems and components that are damaged, degraded, non-operational, non-compliant, or have reached their end of useful life.

Criteria: SCE has developed an Asset Management Methodology to prioritize facility and capital work. SCE evaluates three factors: (a) the condition of a facility (Facility Condition Index); (b) the need for a facility to deliver utility services to SCE customers (Asset Priority Index); and (c) the functionality and utility of a facility for business use(s) (Fitness for Purpose).

2021 FORECAST	2022 FORECAST	2023 FORECAST	TOTAL
$ 5,545,717	$ 5,656,631	$ 5,769,764	$ 16,972,112

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Operation Support – Seismic Activity

Jennifer Pearce
Principal Manager, Business Resiliency

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Operation Support – Seismic Activity

Description: Program objectives are to: (1) assess SCE's electric infrastructure, non-electric facilities, generation, and IT/Telecomm infrastructure to identify what seismic mitigations are needed, and (2) mitigate risks by making the necessary retrofits and improvements in order to reduce the risk of harm to workers, customers and communities due to a moderate or major earthquake.

Criteria: SCE conducts hazard and vulnerability assessments on its infrastructure in order to (1) understand the seismic exposure and impacts of seismic events, (2) assess the functionality and stability of the infrastructure if a seismic event occurred, and (3) identify appropriate design standards and codes to mitigate seismic risk(4) prioritize mitigation. Assessments utilize a combination of site surveys, seismic modeling, and geographic information systems.

Projects: Transmission Substation Retrofits; Transmission Tower Mitigation

2021 FORECAST	2022 FORECAST	2023 FORECAST	TOTAL
$ 5,726,655	$ 5,726,655	$ 3,333,000	$ 14,786,310

Physical/Cyber Security

Alex Benoliel

Director, Corporate Security

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Physical/Cyber Security

Includes projects that further enhance the security of SCE's substations, which is driven by SCE's need to:

- Make physical security upgrades to protect critical facilities against attacks resulting from the NERC CIP-014 assessments.
- Install systems and processes needed to comply with NERC CIP V6 requirements for protecting Low Impact BES Cyber Assets.
- Upgrade elements of existing security systems at facilities that create unacceptable risk due to disrepair or obsolescence.
- Install security and access control systems at locations that have no existing security system or centrally managed access controls.
- Deploy a system to comprehensively track, manage and report on physical protection systems and security assets throughout their entire life cycle.

The expected cost is approximately $51.5 million for 2021-2023.

Next Steps

June 26 – stakeholder comments due on draft TMCR Report

July 10 – SCE posts stakeholder comments*

August 28 – SCE posts final TMCR Report

September 11 – stakeholder comments due on Final TMCR Report

*Submit comments to case.admin@sce.com