BEFORE THE PUBLIC UTILITIES COMMISSION OF THE

STATE OF CALIFORNIA

Order Instituting Rulemaking to Implement Electric Utility Wildfire Mitigation Plans Pursuant to Senate Bill 901 (2018).	R.18-10-007

SOUTHERN CALIFORNIA EDISON COMPANY'S (U338-E) REPORT ON DATA COLLECTION FOR WILDFIRE MITIGATION PLANS REPORT

PATRICIA CIRUCCI
RUSSELL A. ARCHER
MARGARITA GEVONDYAN

Attorneys for
SOUTHERN CALIFORNIA EDISON COMPANY

2244 Walnut Grove Avenue
Post Office Box 800
Rosemead, California 91770
Telephone: (626) 302-2865
E-mail: Russell.Archer@sce.com

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Southern California Edision Company (SCE) hereby submits its Report on Data Collection for Wildfire Mitigation Plans (Report) as directed by the California Public Utilities Commission (CPUC or Commission) in Decision 19-05-036, Ordering Paragraph No. 2. SCE's Report is included below. Appendix A of the Report includes the Data Dictionary requested by the Commission in Ordering Paragraph No. 2(b). Appendix B of the Report includes resumes of the experts SCE consulted as also requested by the Commission in Ordering Paragraph No. 2.

Respectfully submitted,

PATRICIA CIRUCCI
RUSSELL A. ARCHER
MARGARITA GEVONDYAN

/s/ Russell A. Archer
By: Russell A. Archer
Attorneys for
SOUTHERN CALIFORNIA EDISON COMPANY
2244 Walnut Grove Avenue
Post Office Box 800
Rosemead, California 91770
Telephone: (626) 302-2865
E-mail: Russell.Archer@sce.com

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Attachment

SCE Report on Data Collection for Wildfire Mitigation Plans

(U 338-E)

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Southern California Edison Company's Report for Data Collection for Wildfire Mitigation Plans

Rosemead CA
July 30, 2019

Contents

I. Introduction

Pursuant to Decision (D.)19-05-036, issued by the California Public Utilities Commission (Commission or CPUC), Southern California Edison Company (SCE) respectfully submits its Data Collection for Wildfire Mitigation Plans report (Report). This Report includes a description of SCE's datasets that could be useful in assessing the effectiveness of its 2019 Wildfire Mitigation Plan (WMP) in reducing catastrophic wildfire risk and its proposed performance metrics to measure the effectiveness of the WMP. Lastly, this Report suggests new areas of data collection and a way to make relevant data available to third-party researchers amongst other requirements.

II. Background

California Senate Bill 901 (SB 901), enacted in 2018, adopted new provisions of Public Utilities Code (PUC) Section 8386 requiring all California electric utilities to prepare, submit and implement annual wildfire mitigation plans that include construction, operation and maintenance of the utilities' electrical lines and equipment in a manner that will help minimize the risk of catastrophic wildfires associated with those electrical lines and equipment. Part (c)(4) of Section 8386 requires the WMP to include a description of the metrics the electrical corporation plans to use to evaluate its plan's performance and the assumptions that underlie the use of those metrics.

In its 2019 WMP, SCE included a suite of controllable and quantifiable metrics to assess compliance with the activities described in its plan. SCE also included three indicators to evaluate trends to help inform current and future wildfire risk reduction strategies and programs. As described in Section 6.2 of SCE's 2019 WMP, the completion of the individual programs and activities in the plan are expected to result in an overall reduction of controllable fire ignition events over time.

In the WMP Guidance Decision (D.19-05-036), the Commission ordered all respondent electrical corporations to prepare this Report addressing certain information and obtaining expert consultation regarding data analysis. The Commission explained that this Report is the first step of a process, as part of Phase 2 of Rulemaking (R.)18-10-007. It includes parties' ability to comment on this Report and for the Commission's Safety and Enforcement Division (SED) to facilitate workshops to develop a common template for capturing output-based performance metrics to evaluate how the mitigation activities and programs successfully lowered the risk of catastrophic wildfires.

In the SCE-specific WMP Decision (D.19-05-038), the Commission further explained that metrics are not intended to support the Commission's ability to determine whether the utility is in compliance with the WMP, but rather to inform the Commission on whether the programs proposed in the WMP are effective at minimizing the risk of catastrophic wildfire from electrical lines and equipment. The Commission also noted that SCE's "indicators" or "metrics" must identify and track trends associated with utility-caused wildfires. This decision stated that even if the risk elements associated with fire spread potential are not directly in the control of

utilities, it is imperative to track data showing when and where ignitions are occurring to properly evaluate the risk of catastrophic wildfires posed by electrical lines and equipment. The Commission also ordered SCE to explain how, if implemented, each alternative technology included in its WMP will be analyzed for effectiveness.

Given the direction in D.19-05-036 and D.19-05-038, SCE includes the required categories of information in this Report along with performance metrics that are intended to evaluate the effectiveness of the strategies and programs included in its 2019 WMP.

III. Report Overview

This Report includes the following sections to meet the requirements set forth in D.19-05-036 and D.19-05-038.

Section IV includes a "Data and Map Product Catalogue" that lists, identifies, and describes datasets SCE possesses, collects and maintains that could be useful in assessing the effectiveness of its WMP in reducing catastrophic wildfire risk. This section does not list every system SCE uses and focuses on only those datasets that have useful information to assess the WMP's effectiveness at reducing wildfire risk.

Section V provides an overview of the data dictionaries, tables, attributes, field descriptions of the data fields, etc. in the datasets identified in Section IV. The actual data dictionaries are included in Appendix A for easy reference.

Section VI includes performance metrics that SCE proposes to use to assess whether the WMP is having or will have the desired result (i.e., a reduction in the risk of catastrophic wildfire). SCE's proposed performance metrics are based on data that it currently collects and uses and does not include data that is still in development.

Section VII includes new areas of data collection that could assist in assessing WMP effectiveness and describes current plans related to data that are in process.

Section VIII includes an overview of collecting and using the data for future wildfire mitigation efforts.

Section IX includes an overview for making the data available to third-party researchers for the purposes of improving wildfire mitigation.

Section X includes a summary of SCE's expert consultation regarding data analysis for wildfire mitigation efforts.

Section XI provides information regarding an SCE-specific requirement outlined in D.19-05-038 to explain how, if implemented, each alternative technology included in its 2019 WMP will be analyzed for effectiveness.

IV. Data and Map Product Catalogue

SCE has several hundred information systems that support various parts of its business operations. Most of these systems do not contain information that could assist with measuring the effectiveness of SCE's wildfire mitigation strategies and programs. Table IV-1, below, contains a list of a small set of SCE's datasets and a brief description indicating how this information may be useful to understand the effectiveness of the strategies and programs included in its 2019 WMP. Of these datasets, few are necessary to determine the effectiveness of SCE's WMP. The pertinent data in evaluating the effectiveness of the SCE's WMP include:

- Ignitions
- Faults
- Wire Downs

Ultimately, ignition data is the most pertinent information in assessing the effectiveness of SCE's wildfire strategies and programs in reducing wildfires. Information regarding faults, wire downs, weather, location and other attributes related to SCE's overheard infrastructure can also be useful and these datasets are further described in Section V below along with their corresponding data dictionaries in Appendix A. Additionally, these data sources are all indicators of system performance and focus on the events that did or could lead to a devastating wildfire. Furthermore, SCE notes that it uses several systems which do not contain data that correlate with the effectiveness of the WMP and these datasets have been omitted from this Report. For example, SCE's Fleet Management data which includes SCE vehicle location and speed of travel, was not deemed relevant in determining the effectiveness of SCE's WMP strategies and programs.

Table IV-1: Datasets in Current Use Containing Useful information for Measuring Effectiveness of SCE's 2019 WMP in reducing Wildfire Risk

System/Dataset Name	System/Dataset Description
Outage Database and Reliability Metrics System	Tracks distribution, substation, and transmission unplanned outages that affect a single line transformer or more on SCE's grid.
Wire Down Database	Stores information regarding events involving low-hanging conductors and conductors that contact the ground.
All Ignitions	Contains information regarding the initial triggering event for a fire ignition along with pertinent data attributes such as asset and inspection information. The dataset includes CPUC Reportable Ignitions and ignitions that do not meet the CPUC reportable criteria.
CPUC Reportable Ignitions	Contains information regarding the initial triggering event for a fire ignition along with pertinent data attributes.
Atmospheric Data Solutions (ADS)	High Performance Computing Clusters (HPCCs) are used to help model the atmosphere and fuel conditions across SCE's High Fire Risk Area (HFRA) for Public Safety Power Shutoff (PSPS) and other applications.
Fulcrum	Data collection field tool and work management system for SCE's Hazard Tree Management Program.

V. Data Dictionaries

The datasets described above contain useful information to assess the effectiveness of SCE's 2010 WMP at reducing wildfires. The data dictionary tables and sample data for the datasets described above are contained in Appendix A. Further descriptions of these datasets are provided below.

A. Outage Database and Reliability Metrics System

SCE's Outage Database and Reliability Metrics System (ODRM) is a Windows application, with a backend Oracle database, which tracks distribution, substation, and transmission unplanned outages that affect a single line transformer or more on SCE's grid. For all such outages, the restoration steps, the associated times, customers affected, and associated outage causes are recorded. ODRM contains all unplanned outages and these could include outages that were taken to make an emergency repair, such as a car hit pole.

B. Wire Down Database

SCE's Wire Down Database stores information regarding events involving low-hanging conductors and conductors that contact the ground. This dataset provides wire down counts based on repair orders that indicate if a wire was down. This dataset shows events classified as a wire down incident if a conductor is physically on the ground or if the conductor resides eight feet or lower from the ground. The wire down dataset provides other useful information from these events, such as the location at which the wire down occurred, conductor type, the triggering event that initiated the wire down, as well as the controllability of the event.

C. All Ignitions

CPUC Reportable Ignitions dataset, as described below, is limited to certain criteria. In 2019, SCE began to document all ignitions that allegedly involved SCE facilities, excluding events that are under investigation. As such, this dataset contains additional information regarding the initial triggering event for a fire ignition along with pertinent data attributes such as structure involved, the date, inspection information, High Fire designation (if applicable) and approximate time of ignition along with outage information. The information contained in this dataset represents the most accurate information to the best of SCE's knowledge based on the data reviewed.

D. CPUC Reportable Ignitions

Pursuant to D.14-02-015, Fire Incident Data Collection Plan, electrical utilities have been directed to submit to the CPUC information that is useful in identifying operational and/or environmental trends relevant to fire-related events that meet the following conditions:

- A self-propagating fire of material other than electrical and/or communication facility, and
- The resulting fire traveled greater than one linear meter from the ignition point, and
- The utility has knowledge that the fire occurred.

This dataset contains information regarding the initial triggering event for a fire ignition along with pertinent data attributes such as type of equipment involved, the date and approximate time of ignition along with the suppressing agency and size of the fire. The information contained in this dataset represents the most accurate information to the best of SCE's knowledge based on the data reviewed.

E. Atmospheric and Fuel Data

SCE has acquired two High Performance Computing Clusters (HPCCs) in order to perform high resolution weather and fuel modeling by vendor Atmospheric Data Solutions (ADS). HPCCs are used to help model the atmosphere and fuel conditions across the service territory at a two-kilometer horizontal resolution out to five days with hourly output. The HPCCs will be using the Weather Research and Forecasting (WRF) model to downscale coarse resolution numerical weather models that have been made publicly available through the National Center for Environmental Prediction (NCEP). The WRF model will be using a configuration that is customized to account for the unique and complex topography that spans SCE's service territory allowing for more accurate forecasts of wind, temperature, humidity, etc. These forecasts will help SCE meteorologists be more precise with wind (speed and direction) estimates, especially during PSPS activations. In addition, forecasts of vegetation conditions will be combined with weather projections to estimate potential fire activity which will be distilled down into a single index called the Fire Potential Index (FPI). The FPI, along with expected wind speeds, will be the governing factors that decide whether a PSPS activation will occur or not. As described further in the Sections below, SCE is in process of building out these systems and does not currently calculate a daily FPI. However, SCE does possess certain weather data that can be useful.

F. Fulcrum

Fulcrum is a data collection field tool and work management system for SCE's Hazard Tree Management Program. The application is used as the field tool to collect Subject Tree data. This dataset includes tree, location, and customer information (where applicable). The Fulcrum application provides a utility arborist a standardized process to perform tree risk assessments. The output of each assessment is tracked in this dataset and will assist the utility arborist in determining the need to mitigate a Hazard Tree or monitor Subject Trees.

VI. Proposed Wildfire Risk Reduction Metrics

Metrics identified in the WMP Guidance Decision closely relate to the "indicators" proposed by SCE in its 2019 WMP, which included wire downs, ignitions, and counts of faults. SCE included indicators in its WMP to evaluate trends to help inform current and future wildfire risk reduction strategies and programs. These measures, however, were not intended to evaluate compliance performance because drivers contributing to these measures include uncontrollable factors, including outcomes that vary from year-to-year for reasons outside of the utility's control, making it difficult to set accurate and achievable goals.

As described in its 2019 WMP and subsequent responses to ALJ requests, SCE expects the cumulative effect of its wildfire mitigation activities to reduce the controllable drivers that cause wire downs, ignitions, and counts of faults over time. Changes in trends for these measures are expected to take several years as certain wildfire mitigations such as the Wildfire Covered Conductor Program (WCCP) will require many years to deploy throughout SCE's HFRA. Additionally, uncontrollable drivers such as weather can affect these measures.

In D.19-05-038, the Commission explained that metrics are not intended to be used to determine utility compliance with the WMP, that metrics should track trends associated with utility-caused wildfires, and that it is imperative to track metrics that may reflect elements not directly in the control of utilities. The Commission also noted in the WMP Guidance Decision seven specific useful metrics across various WMPs.[1] Given Commission guidance, SCE proposes six metrics to assess the effectiveness of SCE's 2019 WMP as provided in Table VI-1 below.

[1] *See* D.19-05-036 at pp. 25-26.

Table VI-1: Proposed WMP Performance Metrics

#	Proposed Metric	Description of Metric	Data Needed
1	Number of Wire Down Events within HFRA[2]	All primary wire down events, filtered by HFRA	Wire Down Database
2	Number of Ignitions Associated with Utility Equipment within HFRA[3]	All CPUC reportable ignition events, filtered by equipment failure, filtered by HFRA	CPUC Reportable Ignitions
3	Number of Outages Associated with Utility Equipment Failure Caused within HFRA	All outage events[4], filtered by equipment failure, filtered by HFRA	ODRM
4	Number of Contact From Object-Associated Ignitions within HFRA[4]	All CPUC reportable ignition events, filtered by driver for contact with object (including vegetation caused), filtered by HFRA	CPUC Reportable Ignitions
5	Number of Contact From Object-Associated Outages within HFRA	All outage events, filtered by driver for contact with object (including vegetation caused), filtered by HFRA	ODRM
6	Number of Conventional Blown Fuse Events	All outage events, filtered by incidents where a fuse was blown	ODRM

There are a few differences between SCE's proposed metrics above and the seven metrics included in the WMP Guidance Decision, which include:

- Wire Down Events within High Fire-Thread District (HFTD) Areas
    - The number of wire down events within HFTD areas, when the Fire Potential Index (FPI) is rated as very high or higher

[2] Wire down and ignition metrics are similar to Approved Safety Performance Metrics outlined in the SMAP Decision issued 5/6/2019, Decision 19-04-020.
[3] Equipment Failure Caused Ignitions includes wire-to-wire contact.
[4] Contact from Object includes a range of drivers in addition to vegetation caused, including animal, balloon, and vehicle. SCE data will categorize Contact from Object events to show vegetation-associated outages and ignitions as called for in the WMP Decision.

- Equipment Caused Ignitions in HFTD Areas
- Vegetation Caused Ignitions in HFTD Areas
    - The number of vegetation caused outages within HFTD areas, when the FPI is rate as very high or higher
- Vegetation Caused Ignitions in HFTD Areas
- Faults on Circuits in HFTD
    - Counts of all faults on HFTD circuits associated with contact from object or equipment failures
- Number of Conventional Blown Fuse Events
- Number of National Fire Danger Rating System (NFDRS) "Very Dry" and "Dry" Days

The first difference across several proposed metrics relates to the difference between the CPUC HFTD map and SCE's HFRA. In the near future, SCE intends to formally petition the CPUC to adopt approximately 1% of SCE's non-CPUC HFRA into the HFTD. For the purposes of this Report, SCE labels several metrics for measurement in HFRA, whereas the WMP Guidance Decision notes these as HFTD metrics.

The second difference relates to Metrics #1 and #5. The WMP Guidance Decision notes that a version of these metrics overlaid with criteria for when the Fire Potential Index (FPI) is rated as "very-high or higher" would be useful. The proposals listed above focus on metrics that SCE currently collects and uses and does not include data that is still in development. SCE is currently developing FPI processes and systems and is suggesting this as a key dataset in the following section for Potential Future Data Information and Collection. SCE anticipates being able to utilize FPI data in 2020 as further described in the sections below.

The third difference relates to Metrics #3 and #5 and a metric noted in the WMP Guidance Decision as "Faults on Circuits in HFTD." SCE proposes Metrics #3 and #5, which will track all outages in the HFRA. SCE leverages outage data to track the number of faults and does not differentiate fault counts with a separate data set.[5]

The fourth difference relates to a metric noted in the WMP Guidance Decision regarding the Number of NFDRS "Very Dry" and "Dry" Days. SCE is not the owner of this data and thus does not recommend including it as part of its metrics.

[5] All outage events include momentary outages that are less than five minutes where the system could momentarily trip, throw sparks, and cause an ignition, even if it re-tests and re-connects once a fault is cleared.

VII. Potential Future Data Information and Collection

SCE continues to focus on meteorology data and is undertaking an effort to collect historical data and record FPIs on non-event days for data consistency. Correlating weather, environmental, and fuel data with existing outage and wire down data will provide insights to making operational decisions which will reduce fire threats and risks within SCE's HFRA. As an additional step, SCE is looking to align with the other Investor Owned Utilities (IOUs) in data collection efforts and calibrate on output categories (e.g., "Normal", "Elevated", or "Extreme") and definition of outputs to ensure consistency across the utilities.

SCE is also developing a new data collection field tool and work management system for its Distribution and Transmission Vegetation Management Programs. One of the core functions in Vegetation Management is inspection of SCE's Distribution and Transmission system for potential vegetation-related encroachment violations. As vegetation is identified for additional clearance during the inspection process, work will be dispatched to tree contractors to implement the prescribed remedies. Vegetation inspections, tree pruning, and work assignments will be documented in this system. Relevant constraints such as permitting restrictions, accessibility issues, customer refusal to perform the work, and other abnormal field conditions will also be documented in this new dataset for record keeping purposes.

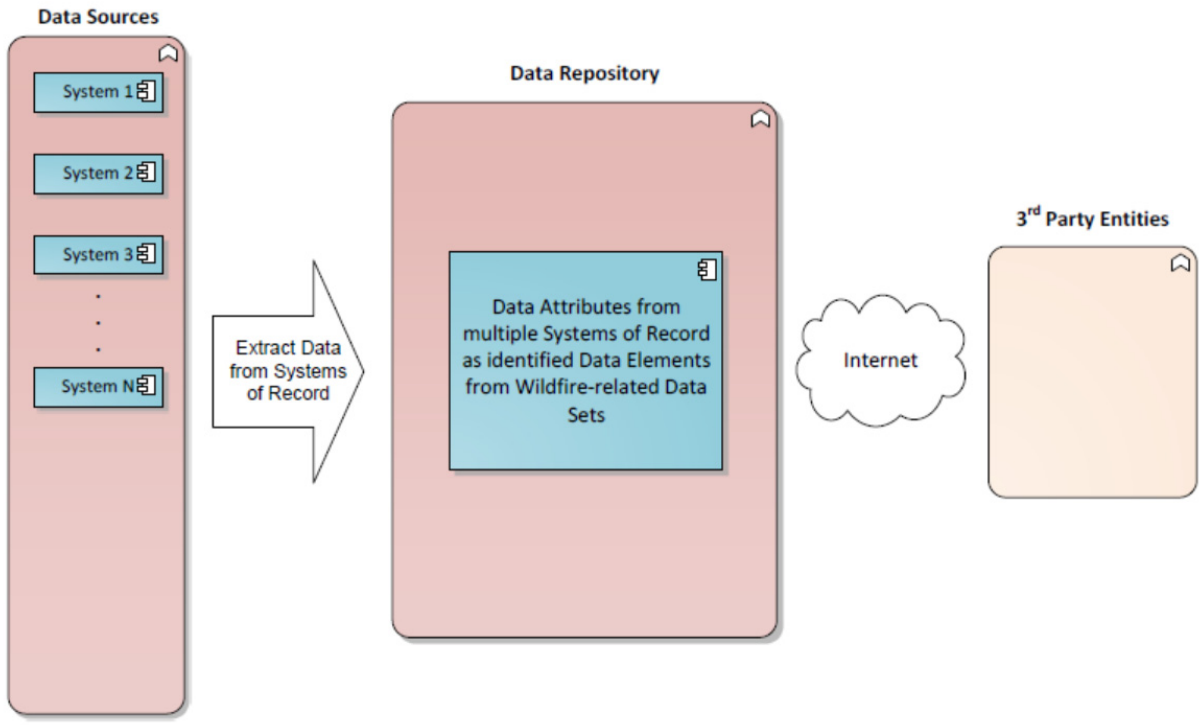
VIII. Proposed Schedule for Potential Future Data Information

SCE proposes a stakeholder engagement process led by the CPUC to have more clarity on the data that needs to be collected to improve evaluation of wildfire mitigation effectiveness. SCE also recommends an annual reporting cycle. Seasonal variability within any year can mask longer-term trends and provide false indication of particular mitigations being effective or ineffective. SCE expects the mitigation activities and programs it has undertaken to reduce the risk of wildfires over time, and annual reports will facilitate analyzing these trends. Annual reporting will also be consistent with other Commission reporting requirements such as the reports for Reportable Fires and Reliability data.

IX. Proposed Data Sharing

SCE uses multiple data systems to plan, design, operate, monitor and maintain its grid infrastructure and related assets. The systems pertaining to the WMP and the relevant data attributes have been catalogued and described in Sections IV and V of this Report. In order to provide access to third parties, the first step would be to conduct workshops with the respondent electric corporations, SED staff, parties, and industry experts to develop a standard for the data attributes to be shared, their definitions, and the relevant granularity. These workshops should also focus on setting standards on data access methods and information handling requirements for confidential data including, for example, CEII and NERC-CIP information. The data sources identified in Section IV vary, ranging from asset records of SCE's distribution and transmission infrastructure to work management for equipment maintenance and inspection to operational systems monitoring the grid. Additionally, very large datasets are being developed for environmental conditions including temperature, humidity, wind, vegetation and fuel loads. The volume and complexity of organizing and storing this data for third-party access, such as in an enterprise data warehouse, will require a significant effort to plan and execute. Given the diversity of data sources and uses, SCE will need to perform detailed analyses to develop integrated business requirements and business processes prior to system design and implementation. Figure IX-1, below, provides an illustrative architectural depiction for taking source data from various datasets, compiling that information into a repository and then ultimately granting access to third parties.

Figure IX-1: Illustrative 3rd Party Researcher Data Access



X. Data Analysis Expert Consultation

The Guidance Decision requires utilities to consult with experts in data analysis to ensure they gather data that allows assessment, including using common data gathering methods across utilities. In response to this requirement SCE consulted with experts from Technosylva and University of California, San Diego (UCSD). Direct comments from Technosylva experts are provided below along with information obtained from a UCSD expert that focus on datasets and information in development stages as well other important data that can improve the ability to measure effectiveness of wildfire mitigation efforts at reducing wildfire risk.

A. David Buckley & Joaquin Ramirez, Ph.D., Technosylva

SCE is implementing two related systems to quantify wildfire risk and risk reduction. One is used specifically for asset hardening project planning, while the other is used to support daily operational risk assessment for PSPS. Both systems use the same core modeling framework that relies on Wildfire Analyst Enterprise and SCE asset data. Wildfire Analyst Enterprise is also used by Pacific Gas and Electric Company (PG&E) and San Diego Gas & Electric Company (SDG&E) for quantifying wildfire risk and risk reduction metrics.

The first system, the Wildfire Risk Reduction Model (WRRM) system, integrates wildfire ignition probability with spread predictions to calculate the expected risk (consequence) from fires associated with SCE infrastructure. This system combines equipment failure data and ignition probability models with conditional risk for SCE assets to quantify expected risk. WRRM will be used to quantify the potential risk reduction from specific asset hardening and replacement plans. The system uses millions of fire spread predictions based on years of historical weather and fire analysis to calibrate fire spread simulations to calculate risk. This is overlaid on asset characteristics to calculate expected risk. The WRRM software user interface facilitates project planning and "what-if" comparisons to guide engineers in defining optimal asset hardening projects. Risk is quantified before and after asset replacement providing the basis for consistently reporting and comparing risk reduction efforts over time which, once in place, can be useful in measuring the effectiveness of SCE's wildfire mitigation strategies and programs. As assets are hardened in the field, regular asset data updates help ensure that the expected risk is continually recalculated to reflect the most up to date outputs and outcomes.

The second system, Wildfire Risk Forecasting System (FireCast), uses advanced daily weather prediction models combined with fire spread prediction models to quantify the

conditional and expected risk for SCE assets. The wildfire risk forecast is calculated daily providing a 72-hour forecast of risk associated with each SCE asset. Risk is defined as the consequence (impacts) of fires ignited from each asset each hour. Conditional risk is the measure of risk associated with an asset should a fire ignite. Expected risk is the conditional risk combined with the asset ignition probability identifying those assets with a greater likelihood to cause fires with impacts. This system will utilize approximately 75 million fire spread predictions each day to calculate the risk metrics.

FireCast allows SCE to identify those circuits and assets most prone to catastrophic impacts should a fire ignite from those assets. FireCast provides the information necessary for SCE to support PSPS decisions. By comparing the daily risk forecasts over time, such as through a fire season or longer, the level of risk reduction can be calculated on a per-asset, and per-administrative-area basis.

Both the WRRM and FireCast systems are anticipated for production implementation in Q4 2019 with resulting data being available in 2020. In addition, three new areas of data collection would support more accurate calculation of wildfire risk using the WRRM and FireCast systems. These are described below.

1. Asset Characteristics

Collecting data that confirms current asset characteristics, such as type, subtype/material, size and age can greatly enhance the ability to quantify failures and ignition probability.

2. Surface Fuels

The calculation of accurate fire behavior is highly dependent on accurate, high resolution surface fuels data. While many organizations use the USGS LANDFIRE or CAL FIRE source datasets, these have been found to be too coarse and typically out of date. The development of a robust and accurate fuels dataset is necessary to ensure that fire spread prediction reflects past observed and expected fire behavior.

SCE is working closely with Technosylva to develop an enhanced surface fuels dataset for the entire service territory and adjacent areas that incorporates the most recent disturbances and properly addresses accuracy requirements. This will integrate LiDAR data to provide very high-resolution fuels in Wildland Urban Interface (WUI) areas so that robust

modeling of fire spread and impacts can be calculated. The impacts of wildfires are highest in the WUI areas and finer resolution fuels data is critical to delineate fire spread.

In addition, SCE is embarking on the implementation of an on-going fuels updating process that will help ensure fuels data are continually updated throughout the year as disturbances occur. This is consistent with approaches being implemented by SDG&E and PG&E.

3. Egress

To better understand risk associated with SCE assets and other values at risk (e.g., buildings) commonly impacted by wildfires, SCE is developing an egress model for the entire service territory that will incorporate the ability of communities to evacuate during fire scenarios. Egress is an important element of the risk calculation, and Technosylva is enhancing the wildfire risk consequence model with egress analysis models.

Technosylva Inc. is the leading provider of wildfire risk analysis systems for the electric utility industry. Their wildfire risk systems, WRRM and FireCast, have been adopted by SDG&E, SCE and PG&E. These analysis methods not only quantify wildfire risk, but also facilitate the calculation of risk reduction using data collected and derived daily. Technosylva recently presented these methods at the CPUC Wildfire Technology Innovation Summit in addition to their solutions being showcased by SDG&E at the event kickoff.

B. Neal Driscoll, Ph.D. & Graham Kent, Ph.D., ALERTWildfire

SCE is collaborating with ALERTWildfire, a consortium of universities (Nevada Seismological Laboratory at University of Nevada, Reno (UNR), UCSD and the University of Oregon), to develop new data collection field tools in its HFRA to provide real-time data feeds to first responders and the public. ALERTWildfire has developed high-definition (HD), pan, tilt, zoom (PTZ), near-infrared fire camera technology to confirm emergency 911 calls, provide situational awareness, and in extreme scenarios help sequence evacuations.

New software and hardware advances provide SCE control of the HD PTZ cameras for real-time, remote observation. This technology supports ignition confirmation as well as continuous situational awareness and has tracked 350+ fires in the last two years. Ongoing research is improving various aspects of this technology including, for example, network fail-overs and topologies to improve network resilience during a fire event to provide a seamless environment

for fire personnel and first responders. These fire camera networks also provide real-time data streams to Emergency Command Centers (ECCs) that allow first responders to scale their response and marshal resources during fire disasters. The ALERTWildfire camera network also supports other research efforts including providing erosion and regrowth patterns after fires (using archived data images) as well as examining tree die off due to decreased rainfall and bark beetle infestation. In addition, the time lapsed fire camera data is being used to constrain fire dynamics and locally generated fire conditions associated with large, devastating firestorms.

ALERTWildfire continues to work with SCE and fire personnel in each region to ensure appropriate training on how to access and use the ALERTWildfire system. SCE fire management can log directly into the cameras via a state-of-the-art platform (which is both secured and encrypted) to pan, tilt, and zoom the cameras. In collaboration with ALERTWildfire, SCE approves all requests for access to control the cameras. Software development of the control access system records the identity of the user who last performed a specific camera action. Ongoing software development will provide continued enhancement of data transfer processes. Within this structure, users who have permission to move cameras are identified by user group (e.g., CAL FIRE, USFS, SCE, and County Fire Departments) and user name, which is displayed and updated on the image banner when the camera is accessed and moved, allowing real-time assessment of camera operation. Time-lapse server software allows a standalone image server to produce selectable sets of on-demand custom time-lapse views. The public also has the ability to view the cameras via the Amazon cloud and perform 12-hour time lapse, triangulation, and zoom (www.alertwildfire.org). The public do not have control of the cameras.

PTZ camera data frames are recorded by UNR on Linux servers housed at a minimum of two secure locations, for data redundancy. Using the frames, one-hour movies are produced at the highest frame rate possible. After 30 days, the data is downsized (frames) to every 10 seconds and stored in perpetuity. The public has access to the archived data stored on the Linux servers.

ALERTWildfire is collaborating with University of California Berkeley FUEGO (Fire Urgency Estimator in Geosynchronous Orbit) and Mayday.ai to develop a more robust Artificial Intelligence (AI) and integrated nested platform for early fire detection. To date, emergency 911 calls beat AI in early fire detection. The incipient phase of a fire (first critical hour) is the most crucial time to attack and suppress wildfires. Both satellite and camera data are

employed to refine the machine learning and AI capabilities. The GOES satellites have 0.5 – 2 km resolution, making the camera data with resolution of approximately 10s of meters critical input to AI research. Furthermore, applying these algorithms to individual cameras will improve detection of changes to the environment as one algorithm does not fit all, in large part due to changes in vegetation, moisture content (e.g., marine layer), and topography.

Other AI approaches leverage threshold-based algorithms, which can produce false positives. In contrast, ALERTWildfire leverages detection of changes to the environment (referred to as object change based detection) and have employed AI to expedite and automate this detection method, which has markedly reduced false positives. This object change based detection AI also has been used on the ALERTWildfire camera data, yielding improved real-time fire detection capability. It is this nested approach of employing both satellite and ALERTWildfire camera data for object change based detection AI that is expected to improve fire detection capability in comparison to 911 calls. Future goals are to have the satellite ignition detections drive the ALERTWildfire camera network for real-time confirmation.

XI. Alternative Technology

This section provides a brief overview of SCE's alternative technologies included in Section 4.7 of SCE's 2019 WMP and discusses how effectiveness of these studies/pilots could be understood should the technologies be implemented.

A. Advanced Unmanned Aerial Systems Study

The goal of the Advanced Unmanned Aerial Study (UAS) Study is to support the development of Beyond Visual Line of Sight (BVLOS) UAS flight operations, with initial focus on aerial patrols of overhead infrastructure prior to and after a fire-weather event, with two key objectives: 1) locating conditions which may pose an ignition risk and 2) expediting the restoration of power following a Public Safety Power Shutoff (PSPS) to minimize the outage impacts on customers safely re-energization. These use cases illustrate the types of information that can be used to reduce the risk of fires, minimize the impact on customers including the impacts of remediation activities such as PSPS, and measure the effectiveness of SCE's programs. If the study results are positive and this technology is deployed, SCE expects to expand the collection and use of relevant data. Many factors, described below, will be assessed to determine the feasibility of implementation and potential for assessing effectiveness.

- Success in identifying potentially dangerous conditions during UAV aerial line patrols that could present utility ignition risk, both before and after elevated fire weather conditions and prior to the re-energization of lines;
- Success in conducting UAV aerial patrols using Extended Visual Line of Sight (EVLOS), often seen as a prerequisite step before BVLOS;
- The ease/speed with which SCE may obtain a Temporary Flight Restriction (TFR) via the Federal Aviation Administration Special Governmental Interest (SGI) process prior to, during, or after a fire-weather event in order to clear the airspace that would enable a safe and efficient BVLOS UAV flight;
- Success with which video can be streamed in real or near real time back to a central operations center where qualified electrical workers can review the live video feed;
- Learning about various conflict/collision detection and avoidance technologies/processes and what roles SCE communications/technology play in successfully applying these practices to enable safe and efficient BVLOS flights;
- Learning more about: [1] the types of UAS that are better suited for these tasks, [2] safety considerations, [3] logistical concerns, [4] the roles best suited for UAS (vs. helicopters), [5] cybersecurity considerations, [6] response/mobilization timeframes, and

[7] the costs associated with conducting these patrols on an individual flight or event basis.

B. CAL FIRE Exempt Surge Arresters

CAL FIRE exempt surge arresters are designed to limit arcs/sparks or hot particles to prevent the ignition of flammable vegetation. SCE designed a pilot to assess new surge arrestors in the marketplace that could obtain CAL FIRE exempt status and further limit arcs/sparks or hot particles reduction ignition risk. Surge arresters are traditionally applied for lightning protection of overhead equipment and in conjunction with underground cable transitions. Recently, one vendor has been approved for pilot applications in the SCE distribution system by successfully meeting SCE requirements and qualifications for Cal Fire exemption status. The SCE pilot testing is intended to gain installation experience through several controlled applications that can help in developing installation instructions, standards, and training material using the lessons learned during the pilot. There are two areas SCE anticipates to target for wildfire related efforts with these latest surge arrester designs. First and most notably, is deploying CAL FIRE exempt surge arresters in conjunction with SCE's covered conductor installation. SCE requirements for covered conductor include surge arresters to be applied on most overhead equipment installations. Successful outcome of this pilot would see improvements in protecting the insulating cover from lightning induced fault events which can also damage the conductor. The second area under consideration for the new surge arresters include operating schemes that would produce increased ground voltages to drastically limit the ground fault current levels and reduced potential for ignitions from ground faults. Recent developments in arrester technology have allowed this device to gain CAL FIRE exempt status. Tracking fire ignition events and fault events would be the two main data points to measure effectiveness of these new surge arrestors should they be implemented.

C. Meter Alarming for Downed Energized Conductor

Meter alarming for downed energized conductor is a machine-learning algorithm that uses existing smart meter data to detect the presence of downed, energized conductors. The use of data from SCE smart meters, combined with other circuit information, has shown promise in identifying downed energized conductors. These downed energized conductors situations are commonly referred to as High Impedance (HiZ) fault conditions. Where the meters detect these HiZ faults, SCE is able to rapidly de-energize the circuitry and dispatch patrols to precise locations for the downed conductor. Though the correlation between HiZ

faults and ignitions is not well understood at this time, faster detection and response is expected to help with faster activation of fire suppression efforts and reduced public safety risks associated with downed energized conductors. Tracking fire ignition events, fault events, and response times are data points that could be useful in understanding effectiveness of this technology.

D. Distribution Fault Anticipation

This technology is a predictive algorithm that leverages electrical system measurements to recognize current and voltage signatures, which are indicative of potential equipment failures. The DFA technology is intended to detect line events which could have potential to ignite wildfires. Results from this analysis can be paired with historical trends of equipment failure leading to ignitions to estimate risk reduction of proactive action prior to equipment failure. Ignition data would be the primary metric to measure this technology's effectiveness.

E. Rapid Earth Fault Current Limiter and Arc Suppression Coils

These technologies are substation devices that limit ground fault current levels and increase ground fault protection sensitivity. These technologies have the potential to substantially limit the amount of energy released in the event of a downed power line or ground fault and reduce the probability of ignitions. Rapid Earth Fault Current limiting technology such as Ground Fault Neutralizers (GFN) or Arc Suppression Coils (ASC) are standard requirements in Australia. Immediate efforts are focused on understanding the portions of SCE's electric system that will best benefit from these devices without excessive modifications. Additional efforts will be required to review research conducted in Australia and develop effectiveness parameters for these technologies if deployed in SCEs electric system. Ignition data can help assess the effectiveness of these devices. Fault frequencies can be an additional measure, but this will require further study.

F. Alternate Fault Detection Technologies

These technologies include fault detection schemes that use voltage or other measurements to improve fault detection beyond traditional means. Overcurrent protection has traditionally been applied in distribution systems to isolate faulted circuitry and allow coordination on multiple devices on the electric system. SCE is exploring technology and fault detection options that can complement DFA, GFN, and ASC options mentioned above along with existing programs such as covered conductor. For example, GFN and ASC devices can have limited application for underground cable, and SCE anticipates the need for these alternate

option(s) to help reduce wildfire risk in target areas. Ignition and fault data would likely be the two data elements that would be useful in understanding the effectiveness of these technologies.

G. Fire-resistant poles

Fire-resistant poles are created by applying surface treatments, such as wrapping a composite shield around the pole. They are intended to enhance the resiliency of SCE's infrastructure and help with rapid restoration. Improved electric service restoration time, reduction of pole failures, or even the lack of electric service interruption should poles withstand a passing fire would be useful information to understand the effectiveness of this technology.

H. Substation Class Electronic Fuses

Substation class electronic fuses can be remotely programmed to activate enhanced fusing protection during high fire risk conditions and are being explored as an alternative or supplemental technology to Fast Curve relay settings for circuit breakers for providing fault energy reduction for distribution circuits. The fusing technology provides current limiting capability, a feature that existing circuit breakers do not have. Trial installations are expected to help collect detailed information on installation expenses and understand operation and maintenance requirements. Reductions in fault energy will be a key determining factor in understanding the effectiveness of this technology.

I. CAL FIRE Exempt Electronic Reclosers

Single phase reclosers have recently been developed that are capable of providing a cost-effective means for de-energizing all three phases following a single-phase fault to prevent energized wire down situations. Singe phase reclosers provide fault clearance benefits similar to fuses and service reliability benefits provided by reclosers. Based on recent increases in manufacturer fault interrupting ratings, SCE is assessing incorporation of these reclosers into branch circuit protection as an alternative to branch line fusing. Operating strategies have not yet been developed which would allow both current limiting fuses and single-phase reclosers to be partnered together providing both benefits of current limitation and gang operation. These devices can also potentially control the capacitive line and cable charging current imbalance for some of the alternative fault detection technologies such as ungrounded and resonant grounded systems. SCE will be reviewing the benefits these devices can provide in wildfire risk reduction and during regular operations prior to deployment.

J. Vibration Dampers

Vibration dampers are hardware attached to conductors to inhibit conductor fatigue from vibration. Vibration dampers are currently not common to SCE distribution circuitry. However, in longer spans, these may increase the service life of conductor hardware attachments by protecting against the long-term impacts of vibration. Infrared scanning along with aerial inspections are presently being used to detect possible degradation from vibration such as hot connectors or insulator tie wire damage. Where these degraded conditions are found in the long-span situations, remediation efforts may include vibration dampers in addition to increased wire size or alternate insulator selection. Vibration dampers can improve service life lessening long-term maintenance costs and reducing faults by extending the expected conductor and conductor hardware service life.

K. Ridge Pin Construction

Ridge Pin construction, also known as triangular construction, increases the radial separation between the center phase conductor and the two outside conductors to reduce the potential for conductor-to-conductor contact. This construction, which can be used in difficult terrain conditions where line spacers cannot be installed, can help maintain conductor clearances during turbulent wind conditions. Conductor to conductor contact produces incandescent particles that have the potential for igniting surrounding fuels such as vegetation and may lead to conductor separation and down wire events. The ridge pin construction application would likely be reserved for selective modification to SCE circuitry.

L. Expanded Connector Selection in HFRA

SCE intends to refine its distribution overhead standards requirements to include the bolted wedge connector for connector selection for HFRA application. Wedge connector technology has shown to provide excellent operating performance for conductor connections. Connector degradation may lead to wire separations or produce incandescent particles that can ignite fuels below, such as vegetation. This type of degradation may be experienced during large energy transfers during faulted conditions. Inspections can sometimes proactively identify degraded connections. Bolted wedge connectors in targeted HFRA circuitry will provide long-term improvements in connector service life. Ignition and fault data as well as connector service life would be key metrics to assess the effectiveness of new connector technology.

Appendix A

Data Dictionary

Wire Down Data Dictionary

Attribute_Name	Data_Source	Data_Type	Description
SEQ_NUM	SAS VA Wire Down	Integer	OMS sequence number
CAD_ID	SAS VA Wire Down	Text	OMS CAD_ID for outage
OMS_ID	SAS VA Wire Down	Integer	ID for outage
ACTUAL_COMPLETION_DATE	SAS VA Wire Down	Date	Actual date notification was completd
INCIDENT_DATE	SAS VA Wire Down	Date	Date that the wire down occurred
YEAR	SAS VA Wire Down	Integer	Year of the wire down
MONTH	SAS VA Wire Down	Integer	Month of the wire down
MED	SAS VA Wire Down	Text	Major Event Day flag for very large outages
LINE_CLASSIFICATION	SAS VA Wire Down	Text	Primary / Secondary voltage indicator
CITY	SAS VA Wire Down	Text	City that the wire down occurred
DISTRICT	SAS VA Wire Down	Text	SCE Distribution District
REGION	SAS VA Wire Down	Text	SCE Distribution Region
DIVISION	SAS VA Wire Down	Text	SCE Distribution division
CIRCUIT	SAS VA Wire Down	Text	Circuit that the wire down occurred
SUBSTATION	SAS VA Wire Down	Text	Closest substation to the wire down
SUB_NUM	SAS VA Wire Down	Integer	SCE substation assigned number
SUB_TYPE	SAS VA Wire Down	Text	Equipment
HIGH_VOLT	SAS VA Wire Down	Text	Voltage of the equipment
SECTOR	SAS VA Wire Down	Text	SCE Grid Operation sector location
TRIGGER	SAS VA Wire Down	Text	What caused the wire down
CONTROLLABLE	SAS VA Wire Down	Text	Wire down classification for controllable/uncontrollable
CONDUCTOR_MATERIAL	SAS VA Wire Down	Text	Wire material material
CONDUCTOR_TYPE	SAS VA Wire Down	Text	Wire type
CONDUCTOR_SIZE	SAS VA Wire Down	Text	Wire size
ENERGIZED_ON_GRND	SAS VA Wire Down	Text	Indicator for hot down wire
STRUCTURE_NUM	SAS VA Wire Down	Text	Equipment structure number
Latitude	SAS VA Wire Down	Decimal	Approximately LAT of wire down
Longitude	SAS VA Wire Down	Decimal	Approximately LONG of wire down

Wire Down Sample Data Set

SEQ_NUM	#0009	#0011	#0013	#0041	#0046	#0064
CAD_ID	GO 052317-00604	GO 052317-00590	GO 052417-00227	GO 032217-00738	GO 080616-00301	GO 072816-00062
OMS_ID	116738759	116721486	116746760	116524529	115865813	115844055
E	01Jun2017	25May2017	01Jun2017	07Apr2017	24Aug2016	29Jul2016
INCIDENT_DATE	23May2017	23May2017	24May2017	22Mar2017	06Aug2016	28Jul2016
YEAR	2017	2017	2017	2017	2016	2016
MONTH	01May2017	01May2017	01May2017	01Mar2017	01Aug2016	01Jul2016
MED	No	No	No	No	No	No
LINE_CLASSIFICATION	Primary	Primary	Primary	Primary	Primary	Primary
CITY	Corona	Tulare	Ontario	Hemet	Gardena	Long Beach
DISTRICT	Ontario	San Joaquin Valley	Ontario	Menifee	South Bay	Long Beach
REGION	Metro East	San Joaquin	Metro East	San Jacinto Valley	Metro West	Metro West
DIVISION	SE Division	NW Division	SE Division	SE Division	NW Division	NW Division
CIRCUIT	VASSAL	TLSMITH	GALVIN	FRUITVALE	RHUMBA	FAIRMAN
SUBSTATION	CORONA	LIBERTY	EUCLID	NELSON	BRIGHTON	SUNNYSIDE
SUB_NUM	8279	5312	5644	8038	5226	5785
SUB_TYPE	B BANK	B BANK	LOOP FED SUB	B BANK	B BANK	B BANK
HIGH_VOLT	66KV	66KV	12KV	115KV	66KV	66KV
SECTOR	MIRA LOMA	SAN JOAQUIN	MIRA LOMA	VALLEY	EL NIDO	LIGHTHIPE
TRIGGER	Mylar Balloon	Other Public Action	Car Hit	Animal	Unknown	Car Hit
CONTROLLABLE	Uncontrollable	Uncontrollable	Uncontrollable	Controllable	Uncontrollable	Uncontrollable
CONDUCTOR_MATERIAL	Copper	Copper	Unknown	Aluminum	Aluminum	Aluminum
CONDUCTOR_TYPE	Bare	Bare	Unknown	ACSR	ACSR	ACSR
CONDUCTOR_SIZE	#6	#6	Unknown	#4	1/0 stranded	1/0 stranded
ENERGIZED_ON_GRND	Unk	Unk	Unk	Unk	No	No
STRUCTURE_NUM	209758s	1507257E	698629E	4062141E	1141267E	4559217E
Latitude	33.877344	36.247518	34.07681	33.756368	33.89062	33.820776
Longitude	-117.554635	-119.324236	-117.636607	-117.015156	-118.296165	-118.16738

Outage Database and Reliability Metrics System (ODRM)

Attribute_Name	Data_Source	Data_Type	Definition
Year	ODRM	Integer	The year outage started
Day	ODRM	Date	The day outage started
SYS_OUT_ID	ODRM	Integer	Identification ID for System Outage
INIT_TYPE_DESC	ODRM	Text	Outage Initiation Type
RMI3_CAUSE_DESC	ODRM	Text	Outage Cause Description
RMI6_CAUSE_TYPE_DESC	ODRM	Text	Outage Cause Type
RMI19_CAUSE_CATEGORY_DESC	ODRM	Text	Outage Cause Category description
DISTRB_OUTG_ID	ODRM	Integer	Distribution Outage Incident ID
CKT_NUM	ODRM	Integer	Circuit Identification Number
CKT_NAM	ODRM	Text	Circuit Name
SUBSTATION	ODRM	Text	Substation for the Outage
SC_Nam	ODRM	Text	Switch Center for the outage
DISTRB_OUTG_DEV_ID	ODRM	Integer	Device Level Outage ID
EQUIP_STN_NO	ODRM	text	Equipment Structure Number
DEV_OUTG_STRT_TS	ODRM	DateTime	Outage Started DateTime
DEV_OUTG_END_TS	ODRM	DateTime	Outage End DateTime
DNSTRM_OUTG_CUST_QTY	ODRM	Integer	Down Stream Customer Quantity

ODRM Sample Data Set

Year	2019	2019	2019
Month	6	6	6
Day	6/9/2019	6/9/2019	6/9/2019
SYS_OUT_ID	331476	331477	331536
INIT_TYPE_DESC	Area Outage (partial outages/BLF)	Area Outage (partial outages/BLF)	Area Outage (partial outages/BLF)
RMI3_CAUSE_DESC	OTHER-SEE NOTES	CONTRACT CREW	OTHER-SEE NOTES
RMI6_CAUSE_TYPE_DESC	STRUCTURE	STANDARD OPERATION	STRUCTURE
RMI19_CAUSE_CATEGORY_DESC	CROSSARM	CROSSARM	POLE
ReportCategory	Other	Operation	Other
DISTRB_OUTG_ID	121522462	121522522	121522533
CMPLX_CAD_ID			
CKT_NUM	17731	07793	19528
CKT_NAM	THACHER	GUST	WINERY
SUBSTATION	OJAI	NORTHWIND	PAUBA
DISTRICTNAME	VENTURA	TEHACHAPI	WILDOMAR
Region Name	NORTH COAST	RURALS	SAN JACINTO
SC_Nam	VENTURA	VINCENT	VALLEY
DISTRB_OUTG_DEV_ID	2041553143	2041553259	2041553291
DEV_OUTG_STRT_TS	6/9/2019 08:01:25 AM	6/9/2019 09:10:39 AM	6/9/2019 06:26:00 AM
DEV_OUTG_END_TS	6/9/2019 11:05:13 AM	6/9/2019 11:59:48 AM	6/9/2019 10:57:23 AM
DURATION	183.8		271.3833333
DNSTRM_OUTG_CUST_QTY	1	2	3

CPUC Reportable Ignitions

Attribute_Name*	Data_Source	Data_Type	Description
Utility Name	Watch Office/Wire Down	Text	Name of utility reporting the event
Date	Watch Office/Wire Down	Date	Date the event started
Time	Watch Office/Wire Down	Time	The time the event started
Location	Watch Office/Wire Down	Decimal	Latitude and longitude coordinates of the point of ignition
Material at Origin	Watch Office/Wire Down	Text	Material involved in the initial fueling of the fire
Land Use at Origin	Watch Office/Wire Down	Text	Nature of land use in the vicinity of the point of the fire's origin (i.e., Urban, Rural9)
Size	Watch Office/Wire Down	Decimal	An approximation of the fire size
Suppressed by	Watch Office/Wire Down	Text	Who suppressed the fire
Suppressing Agency	Watch Office/Wire Down	Text	If the fire was suppressed by a fire agency or agencies, insert the lead agency when one or more agency was involved
Facility Identification	Watch Office/Wire Down	Text	Utility's description of the pole and/or equipment involved
Other Companies	Watch Office/Wire Down	Text	Other Companies that were attached to pole in question and known to the utility. If the facilities involved were not overhead leave this field blank
Voltage	Watch Office/Wire Down	Text	Nominal voltage rating of all the utility equipment and/or circuit involved in the fire, use volts
Equipment Involved With Ignition	Watch Office/Wire Down	Text	The equipment that supplied the heat that ignited the reported fire
Type	Watch Office/Wire Down	Text	The equipment involved in the event (overhead, padmounted or subsurface)
Outage	Watch Office/Wire Down	Text	Was there an outage involved in the event
Outage Date	Watch Office/Wire Down	Date	Outage Start Date, if one is associated with the event
Outage Time	Watch Office/Wire Down	Time	Outage Start Time, if one is associated with the event
Suspected Initiating Event	Watch Office/Wire Down	Text	The suspected initiating event based on initial field observations
Equipment /Facility Failure	Watch Office/Wire Down	Text	The specific equipment associated with the reported fire. (Only to be used if "Equipment/Facility Failure" is selected as Suspected Initiating Event)
Contact From Object	Watch Office/Wire Down	Text	The first object that contacted the Communication or Electric Facilities (Only to be used if "Contact from Object" is selected as Suspected Initiating Event)
Facility Contacted	Watch Office/Wire Down	Text	The first facility that was contacted by an outside object (Only to be used if "Contact from Object" is selected as Suspected Initiating Event)
Contributing Factor	Watch Office/Wire Down	Text	Factors that contributed to the ignition
Notes	Watch Office/Wire Down	Text	An Optional Field, list additional information that could be useful when examining data

*** per D.14-02-015, Appendix C**

PUC Reportable Report*

Utility Name		SCE	SCE	SCE
Fire Start	Date	12/21/17	12/5/17	12/1/17
	Time	23:40	11:38	14:29
	Latitude	34.179529	33.95701	33.76145
	Longitude	-118.133769	-117.861324	-117.266669
	Material at Origin	Vegetation	Vegetation	Vegetation
	Land Use at Origin	Urban	Urban	Rural
Fire	Size	Less Than .25 Acres	Less Than .25 Acres	.26 - 9.99 Acres
	Suppressed by	Fire Agency	Fire Agency	Unknown
	Suppressing Agency			
Utility Facility	Facility Identification	OH-4513407E	OH-788945H	OH-4404592e
	Other Companies			
	Voltage (Volts)	120/240 V	12kV	12kV
	Equipment Involved With Ignition	Conductor	Conductor	Conductor
	Type	Overhead	Overhead	Overhead
Outage	Was There an Outage	Yes	Yes	Yes
	Date	12/21/17	12/5/17	12/1/17
	Time	23:40	11:38	14:29
Field Observations	Suspected Initiating Event	Contact From Object	Contact From Object	Equipment/Facility Failure
	Equipment /Facility Failure			
	Contact From Object		Balloons	
	Facility Contacted			
	Contributing Factor	Unknown	Unknown	Unknown

* Empty cells indicate no available data at time of collection

All Ignitions Data Dictionary

Attribute Name	Data Source	Data Type	Description
Date	Fire Event Data	Date	Date of event
Time	Fire Event Data	Time	Time of Event
Customers Impacted	Fire Event Data	Integer	Customers affected by outage
"Circuit Name"	Fire Event Data	Text	Circuit Name
"Voltage (kV)"	Fire Event Data	Text	Voltage of Circuit
"System Voltage Level T, S, DP, DS?"	Fire Event Data	Text	Type of voltage, i.e., distribution primary, distribution secondary transmission
Source Substation	Fire Event Data	Text	Substation Feeding Circuit Involved
Structure #, Unique ID	Fire Event Data	Text	Pole and Or Equipment Number
HFRA	Fire Event Data	Text	Is the structure located in a High Fire Area
Suspected Initiating Event	Fire Event Data	Text	The suspected initiating event based on field information
EOI Inspection Date	Fire Event Data	Date	Date Structure was inspected by EOI program

All Ignitions Sample Data Set

Date	4/8/2019	4/9/2019	4/26/2019
Time	3:30 PM	4:53 AM	2:58 PM
Customers Impacted	0	2,400	2,200
"Circuit Name"	MARGUERITA	San Nicholas	"Bear Valley Stonewood"
"Voltage (kV)"	16 kV	16 kV	33kV & 12kV
"System Voltage Level T, S, DP, DS?"	Distribution Primary	Distribution Primary	Distribution Primary
Source Substation	Alhambra	Casitas	Zanja Yucaipa
Structure #, Unique ID	OH-4090802E	OH-4754671E	2260760E
"HFRA? (Y/N) If Y, T3, T2, SB322"	No	No	CPUC Tier 3
Cause of Ignition	"Animal Contact (Bird)"	"Equipment Failure (Cap Bank)"	Metallic Balloon
EOI Inspection Date	N/A	N/A	1/20/2019

Fulcrum Data Dictionary*

Attributes	Data Source	Description
SCE Facilities	Fulcrum	SCE specific data such as circuit name, voltage, structure number, vegetation grid ID
Tree Information	Fulcrum	Subject tree species, height, DBH, quantity, photos
Tree Assessment Information	Fulcrum	Risk score, tree defects, site conditions
Customer Information	Fulcrum	Name, address, phone, email
Mitigation Information	Fulcrum	Mitigation prescription (remove/prune), work completion date
QC Information	Fulcrum	Completed work verification, inspection date

*** Attributes here are high level summary and will contain multiple sub attributes (i.e. tree - species, height, etc.)**

Fulcrum Sample Data Set

latitude	33.98060242	33.99586683	33.99392985	33.99413718	33.9940718
longitude	-117.0543255	-117.0536724	-117.0532885	-117.0545249	-117.0551216
district	Redlands_31	Redlands_31	Redlands_31	Redlands_31	Redlands_31
circuit	CONINE_3934	CONINE_3934	CONINE_3934	CONINE_3934	CONINE_3934
voltage	2.4-21kV (distribution)	2.4-21kV (distribution)	2.4-21kV (distribution)	2.4-21kV (distribution)	2.4-21kV (distribution)
grid	Grid 40	Grid 46	Grid 46	Grid 46	Grid 46
high fire threat district	HFTD	HFTD	HFTD	HFTD	HFTD
property type	County	Private	Private	Private	Private
assessment access	yes	yes	yes	yes	yes
status	subject tree	subject tree	subject tree	ee required	subject tree
species	Eucalyptus	Maple	Cypress	Mulberry	Maple
quantity	1	1	3	1	2
dbh	25-36	13-24	13-24	25-36	13-24
height	65	40	70	48	48
risk rank score	42	28	17	49	43
site conditions	No Impact	Cultural disturbance to landscape - natural or unnatural	Cultural disturbance to landscape - natural or unnatural	Cultural disturbance to landscape - natural or unnatural	Cultural disturbance to landscape - natural or unnatural
tree lean	Slight or No lean (<7 degrees lean)	Slight or No lean (<7 degrees lean)	Slight or No lean (<7 degrees lean)	Slight or No lean (<7 degrees lean)	Slight or No lean (<7 degrees lean)
overall tree condition	Minor defects	Minor defects	No defects	Minor defects	Moderate defects
selected work prioritization	Priority 3- subject tree	Priority 3- subject tree	Priority 3- subject tree	Priority 3- subject tree	Priority 3- subject tree
qc assessment missed subject tree	no	no	no	no	no

ADS Data Dictionary

Variable	Units	Value	Description
Datetime	Hour/minutes	date/time	Model forecast date and time
Circuit		Text	Circuit Name
District		Text	District Name
County		Text	County in which circuit is in
Substation		Text	Substation in which circuit is associated with
Max_Wind	Miles per hour	Decimal	Maximum surface sustained wind speeds
Max_Gust	Miles per hour	Decimal	Maximum surface wind gust
Min_RH	Percent	Decimal	Minimum surface based Relative Humidy
Max_DD		Decimal	Maximum surface based dewpoint depression
Max_Hrly_Rain	Inches	Decimal	Maximum hourly rainfall
Accum_Rain	Inches	Decimal	Accumulated rainfall
Max_T	Degrees F	Decimal	Maximum surface based temperature
Min_T	Degrees F	Decimal	Minimum surface based temperture
Max_FPI		Decimal	Fire Potential Index
ERC		Decimal	Energy Release Component
F10	Percent	Decimal	10 hour dead fuel moisture timelag
LFM	Percent	Decimal	Live fuel moisture

ADS Sample Data Set

Datetime	7/22/2019 12:00	7/22/2019 15:00	7/22/2019 18:00	7/22/2019 21:00	7/23/2019 0:00	7/23/2019 3:00
Circuit	ABACUS	ABACUS	ABACUS	ABACUS	ABACUS	ABACUS
District	31	31	31	31	31	31
County	San Bernardino	San Bernardino	San Bernardino	San Bernardino	San Bernardino	San Bernardino
Substation	HIGHLAND	HIGHLAND	HIGHLAND	HIGHLAND	HIGHLAND	HIGHLAND
Max_Wind	6.89	10.1	9.37	10.22	5.49	2.5
Max_Gust	10.71	17.05	15.5	16.29	8.09	2.61
Min_RH	22.27	16.73	16.49	26.54	35.87	43.09
Max_DD	44.43	53.19	53.57	39.35	29.82	24.35
Max_Hrly_Rain	0	0	0	0	0	0
Accum_Rain	0	0	0	0	0	0
Max_T	94.59	100.45	100.33	92.38	83.29	79.28
Min_T	81.25	91.51	91.52	79.33	75.55	73.99
Max_FPI	8.42	9.42	9.42	8.74	7.78	7.78
ERC	32.3	57.61	72.36	73.06	71.78	69.88
F10	0.19	0.2	0.14	0.12	0.11	0.12
LFM	0.7	0.7	0.7	0.7	0.7	0.7

Appendix B

Resumes of Experts

Summary of Qualifications	
Name of Individual	David Buckley
Position Title	Vice President & COO
Employer's Name and Address (street, city, and zip code)	Name: Technosylva Inc. Address: 2261 Caminito Preciosa Norte, La Jolla, CA 92037
Individual's Phone Number and Email Address	Phone: (970) 213-4635 Email: dbuckley@technosylva.com
Job Description	In his role as the Vice-President at Technosylva Inc., he leads all major consulting projects as the Project Manager and Senior Consultant. David specializes in quickly being able to understand a client's problems, and crafting technical solutions to address these needs by building and managing a team of technical and subject matter experts. He specializes in building diverse teams of technical specialists and subject matter experts and leading them through a successful project life cycle. This includes numerous large scale projects for states and federal wildfire management agencies.
Experience, Capabilities, and Credentials	David is the project lead for past and current wildfire risk modeling application implementations for San Diego Gas & Electric (SDG&E), Southern California Edison (SCE), and Pacific Gas & Electric (PG&E). In this role he is well versed in understanding the requirements, priorities and gaps with implementing "big data" modeling solutions that utilize state-of-the-art weather and wildfire models for electric utility. These solutions derive real-time wildfire risk metrics daily for both IOU service territories and asset infrastructure. This is supplemented by his past experience leading wildfire risk assessments for 30 state agencies (including California), as well as several risk assessments for local California government agencies, the California insurance industry, USMC Camp Pendleton, USFS Angeles National Forest, and USFS Cleveland National Forest.

David Buckley

Current Position:

- Vice-President & COO, Technosylva Inc. La Jolla, CA 92037.

Education:

- 1979 B.A Geography, York University, Toronto, Canada.
- 1987 M.A. Geography, University of Alberta, Edmonton, Alberta, Canada.

Summary of Qualifications:

Mr. Buckley has over 30 years of experience integrating forestry and wildfire models with GIS technology to address operational requirements and solve problems within government and the private sector in the United States and Canada. In his role as the Vice-President at Technosylva Inc., he leads all major consulting projects as the Project Manager and Senior Consultant. David specializes in quickly being able to understand a client's problems, and crafting technical solutions to address these needs by building and managing a team of technical and subject matter experts.

David is the project lead for past and current wildfire risk modeling application implementations for San Diego Gas & Electric (SDG&E), Southern California Edison (SCE), and Pacific Gas & Electric (PG&E). In this role he is well versed in understanding the requirements, priorities and gaps with implementing "big data" modeling solutions that utilize state-of-the-art weather and wildfire models for electric utility. These solutions derive real-time wildfire risk metrics daily for both IOU service territories and asset infrastructure. This is supplemented by his past experience leading wildfire risk assessments for 30 state agencies (including California), as well as several risk assessments for local California government agencies, the California insurance industry, USMC Camp Pendleton, USFS Angeles National Forest, and USFS Cleveland National Forest.

In collaboration with Dr. Joaquin Ramirez, CEO & CTO of Technosylva, David has established Technosylva as the leading wildfire risk modeling service provider in the Nation. Their combined operational and modeling experience is encapsulated in the Technosylva suite of products, Wildfire Analyst™, fiResponse™ and Tactical Analyst™. These products provide the foundation for offering real-time solutions to support preparedness planning and incident response by integrating the latest research into operational environments. Mr. Buckley and Dr. Ramirez continue to manage a close partnership with leading fire weather and fire behavior scientists across the US and Europe, collaborating on projects together as both partners and prime contractor. This includes numerous projects for the USFS Fire Sciences Laboratory.

Relevant Research Project Experience:

David has considerable project experience leading the implementation of wildfire risk and response models over the past 6 years. This includes (in chronological order):

1. Pacific Gas & Electric, Wildfire Risk Forecasting System (FireCast), Wildfire Risk Simulation Application (FireSim) – Implementations (2019 – on-going)
2. Southern California Edison, Wildfire Risk Forecasting System (FireCast), Wildfire Risk Simulation Application (FireSim), and Wildfire Risk Reduction Model (WRRM) – Implementations (2018 – on-going)

3. San Diego Gas & Electric Company – Wildfire Risk Modeling Operational System Enhancements & Maintenance (2018 – on-going)
4. fiResponse™ - State of Tennessee, Division of Forestry – Wildfire Incident Management, Dispatching & Resource Tracking System (2019)
5. fiResponse™ - State of Florida, Florida Forest Service – Wildfire Incident Management, Dispatching & Resource Tracking System (2019)
6. fiResponse™ - State of Mississippi, Forestry Commission – Wildfire Incident Management, Dispatching & Resource Tracking System (2018-9)
7. Colorado State Forest Service, Colorado Forest Atlas Web Portal (2018- ongoing)
8. Colorado State Forest Service, Colorado Wildfire Risk Assessment Update & Web Portal Update (2018) – www.ColoradoWildfireRisk.com
9. Colorado State Forest Service, Colorado Forest Action Plan Web Application (2018) – fap.ColoradoForestAtlas.org
10. Nebraska Forest Service, Public Wildfire Risk Viewer Web Application (2018)
11. Nebraska Forest Service, Wildfire Burn Probability Modeling (2017-18)
12. San Diego Gas & Electric – Mobile Wildfire Simulation Modeling Application (2018)
13. San Diego Gas & Electric – Operational Wildfire Risk Modeling Application (2017-2018)
14. Colorado Wildfire Risk Assessment Update & Fuels Mapping Project (2017-18)
15. Inland Empire Fire Safe Council (CA), Community Wildfire Protection Plan Web Application (2017-18) – firecom.technosylva.com
16. San Diego Gas & Electric – Fuels Mapping Project (2016-17)
17. USDA Forest Service, Cleveland National Forest – WUI Wildfire Risk Analysis (2016-17)
18. USDA Missoula Fire Lab – WFAS Next Generation Web & Mobile Applications (2017-on-going)
19. USDA Missoula Fire Lab – WindNinja Mobile Application Development (2018)
20. fiResponse™ - State of Texas Wildfire Incident Management, Dispatching & Resource Tracking System (2015 – 2018)
21. fiResponse™ - British Columbia Wildfire Service - Wildfire Incident Management, Dispatching & Resource Tracking System (2015 – 2018)
22. fiResponse™ - State of Virginia Wildfire Incident Management, Dispatching & Resource Tracking System (2015-2018)
23. fiResponse™ - State of Georgia Wildfire Incident Management, Dispatching & Resource Tracking System (2016 – 2018)
24. USFS Missoula Fire Lab – Firefighter Safety Distance Mobile Application (2015-on-going)
25. San Diego Gas & Electric Company – Wildfire Risk Modeling Operational System (2016 – 2017)
26. San Diego Gas & Electric Company – Wildfire Risk Reduction Model Desktop Application (2014-15)

Summary of Qualifications	
Name of Individual	Dr. Joaquin Ramirez
Position Title	President and CTO
Employer's Name and Address (street, city, and zip code)	Technosylva Inc. 2261 Caminito Preciosa Norte La Jolla, Ca 92037
Individual's Phone Number and Email Address	Phone: (858) 729-3648 Email: jramirez@technosylva.com
Job Description	Dr. Ramirez is the President and CTO at Technosylva. He is the lead technical architect in the design and development of the most advanced wildfire software analysis tools, in use actively across California including CAL FIRE, USFS, and SDG&E, SCE, and PG&E.
Experience, Capabilities, and Credentials	Dr. Ramirez has 24 years of experience as Wildland Fire Technologist, specializing in the integration of the latest wildfire fire behavior science into operational solutions. He has a Ph.D in Forestry and has led fire modeling implementation projects in Spain, Portugal, Chile and the U.S. He is the creator of several of the most advanced fire behavior software model implementations, including the SDG&E WRRM and Technosylva's Wildfire Analyst software product. Since he moved to San Diego in 2011, he has been the technical lead for all the wildfire risk modeling application implementations for San Diego Gas & Electric (SDG&E), Southern California Edison (SCE), and Pacific Gas & Electric (PG&E). Joaquin has also led the technical implementation of fire modeling for the MCB Camp Pendleton dynamic fuels mapping and risk assessment project; the USFS Cleveland National Forest WUI Risk Analysis, and the current USFS Angeles National Forest fuels mapping and WUI risk analysis project. Joaquin continues to be closely tied to fire behavior modeling researchers collaborating with Dr. Matt Jolly (USFS Missoula Fire Lab), Dr. David Riano (UC Davis), and several CAL FIRE Battalion/Division Chiefs, and agency FBANs. Prior to his move to San Diego in 2012, Joaquin was also a visiting scholar at SDSU 2010 and at UCSD 2013.

Dr. Joaquin Ramirez

Current Position:

- President & CTO, Technosylva Inc. La Jolla, CA 92037.

Education:

- 2005, Executive MBA, ESCP - EAP
- 2003 Ph.D. Forestry, University of Leon, Spain
- 1995 MsC. Forest Engineering, University of Lerida, Spain
- 1990, B.A. Forestry, University Politechnical of Madrid , Spain

Relevant Research Project Experience:

1. Pacific Gas & Electric, Wildfire Risk Forecasting System (FireCast), Wildfire Risk Simulation Application (FireSim) – Implementations (2019 – on-going)
2. Southern California Edison, Wildfire Risk Forecasting System (FireCast), Wildfire Risk Simulation Application (FireSim), and Wildfire Risk Reduction Model (WRRM) (2018 – on-going)
3. San Diego Gas & Electric Company – Wildfire Risk Modeling Operational System Enhancements & Maintenance (2018 – on-going)
4. Pocket Wildfire Analyst (fire simulation mobile application) (2018) http://pocket.wildfireanalyst.com
5. Nebraska Forest Service, Wildfire Burn Probability Modeling (2017-18)
6. Colorado State Forest Service, Colorado Wildfire Risk Assessment Update (2018)
7. Chilean Corporacion Nacional Forestal (2016-2018) – Wildfire Analysis Unit development support.
8. USFS Angeles National Forest Wildfire Risk Assessment - High Resolution Fuels Map and WUI Risk Analysis (2018)
9. USFS Cleveland National Forest Wildfire Risk Assessment - High Resolution Fuels Map and WUI Risk Analysis (2016-17)
10. Inland Empire Fire Safe Council (CA), Community Wildfire Protection Plan Web Application (2017-18) – firecom.technosylva.com
11. San Diego Gas & Electric – Fuels Mapping Project (2016-17)
12. USDA Forest Service, Cleveland National Forest – WUI Wildfire Risk Analysis (2016-17)
13. USDA Missoula Fire Lab – WFAS Next Generation Web & Mobile Applications (2017-on-going)
14. USDA Missoula Fire Lab – WindNinja Mobile Application Development (2018)
15. fiResponse™ - State of Texas Wildfire Incident Management, Dispatching & Resource Tracking System (2015 – 2018)
16. fiResponse™ - British Columbia Wildfire Service - Wildfire Incident Management, Dispatching & Resource Tracking System (2015 – 2018)
17. fiResponse™ - State of Virginia Wildfire Incident Management, Dispatching & Resource Tracking System (2015-2018)
18. fiResponse™ - State of Georgia Wildfire Incident Management, Dispatching & Resource Tracking System (2016 – 2018)
19. USFS Missoula Fire Lab – Firefighter Safety Distance Mobile Application (2015-on-going)

20. San Diego Gas & Electric Company – Wildfire Risk Modeling Operational System (2016 – 2017)
21. San Diego Gas & Electric Company – Wildfire Risk Reduction Model Desktop Application (2014-15)
22. Marine Corps Base Camp Pendleton – High Resolution Fuels Map and Wildfire Risk Assessment (2015)

Publications:

- Ramírez J, Monedero S, Buckley D. (2011). New approaches in fire simulations analysis with Wildfire Analyst. The 5th International Wildland Fire Conference, Sun City, South Africa. https://doi.org/10.13140/2.1.2045.7766
- Ramirez, J., Mendes, M., & Monedero, S. (2015). Enhanced forest fire risk assessment through the use of fire simulation models. In *ISCRAM 2015 Conference Proceedings - 12th International Conference on Information Systems for Crisis Response and Management* (Vol. 2015–Janua).
- Cardil, A., Monedero, S., Silva, C. A., & Ramirez, J. (2019). Adjusting the rate of spread of fire simulations in real-time. *Ecological Modelling*, *395*, 39–44. https://doi.org/10.1016/j.ecolmodel.2019.01.017
- Cardil A, Ramirez J, Monedero S, Silva CA (2019) Assessing and reinitializing wildland fire simulations through satellite active fire data. *Journal Of Environmental Management* 231, 996-1003
- Artès, T., Cardil, A., Cortés, A., Margalef, T., Molina, D., Pelegrín, L., & Ramirez, J. (2015). Forest fire propagation prediction based on overlapping DDDAS forecasts. In *Procedia Computer Science* (Vol. 51). https://doi.org/10.1016/j.procs.2015.05.294
- Ferragut, M.L. Asensio, S. Monedero, J. Ramirez (2008) Scientific Advances in fire modelling and its integration in a Forest Fire Decision System. Modelling, Monitoring and Management on Forest Fire I. WIT *Transactions on Ecology and the Environment.* .Clave: CL, 119, pp. 31-38, WIT Press
- Monedero S, Ramirez J, Cardil A (2019) Predicting fire spread and behaviour on the fireline. Wildfire Analyst Pocket: a mobile App for wildland fire prediction. *Ecological modelling* 392, 103-107. https://doi.org/10.1016/j.ecolmodel.2018.11.016
- Monedero, S.; Ramirez, J.; Molina-Terrén, Domingo M.; Cardil, Adrián. (2017. Simulating wildfires backwards in time from the final fire perimeter in point-functional fire models. *Environmental Modelling & Software* 92:163-168.
- Ferragut, L., Asensio, M. I., Cascón, J. M., Prieto, D., & Ramirez, J. (2013). An efficient algorithm for solving a multi-layer convection-diffusion problem applied to air pollution problems. *Advances in Engineering Software*, *65*. https://doi.org/10.1016/j.advengsoft.2013.06.010
- Valcarce, F., Gonzalo, J., Ramirez, J., Montes, A. C., & Chuvieco, E. (2006). The new generation of remote sensing services for operational forest fire-fighting within GMES. In *AIAA 57th International Astronautical Congress, IAC 2006* (Vol. 3).

UNIVERSITY OF CALIFORNIA, SAN DIEGO UCSD

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

Geosciences Research Division
SCRIPPS INSTITUTION OF OCEANOGRAPHY

9500 GILMAN DRIVE
LA JOLLA, CALIFORNIA 92093-0207

NEAL WILLIAM DRISCOLL

Professor of Geology and Geophysics

PROFESSIONAL PREPARATION

1992 Ph.D. Marine Geology and Geophysics. Lamont-Doherty Geological Observatory of Columbia University, New York, N.Y. Thesis Title: Tectonic and Depositional Processes inferred from Stratal Relationships, 464 pgs. J.K. Weissel and N. Christie-Blick, Advisors.

1987 M.S. Geological Oceanography. Graduate School of Oceanography, University of Rhode Island, Narragansett, R.I. Thesis Title: Abyssal Circulation Influence on the Southwest Bermuda Rise, 127 pgs. G.S. Mountain and E.P. Laine, Advisors.

1981 B.S. Geology. University of New Hampshire, Durham, N.H.

APPOINTMENTS

2012 – Present, Director of the Geosciences Program, Scripps Institution of Oceanography, University of California, San Diego

2004 – Present. Founder and President of Environmental and Marine Solutions

2001- Present. Professor of Geology and Geophysics, Scripps Institution of Oceanography, University of California, San Diego

2000 – 2001 (July). Associate Professor, Scripps Institution of Oceanography

1999 - February 2000. Associate Scientist, Woods Hole Oceanographic Institution

1995 - 1999 Assistant Scientist, Woods Hole Oceanographic Institution, *Adjunct Associate Research Scientist Lamont*-Doherty Earth Observatory/Columbia University

1994 - 1995 (September) Storke-Doherty Lecturer, Lamont-Doherty Earth Observatory/Columbia

1993 - 1994 (January). Associate Research Scientist, Lamont-Doherty Earth Observatory

1992 - 1993 (March). Post-Doctoral Research Scientist, Lamont-Doherty Earth Observatory

1987 - 1992 Graduate Research Assistant, Lamont-Doherty Geological Observatory; Columbia University Faculty Fellow

1985 - 1987 Graduate Research Assistant, Graduate School of Oceanography, University of Rhode Island; awarded Argonne National Laboratories Fellowship.

1983 - 1985 Graduate Research Assistant, Graduate School of Oceanography, University of Rhode Island; Curator of Deep-sea cores and dredges

1981 - 1983 Research Assistant, Woods Hole Oceanographic Institution, Brian Tucholke, Supervisor, Digitization and interpretation of seismic reflection data.

*SELECTED PUBLICATIONS AND PRODUCTS

Driscoll, N.W., Weissel, J.K., and Goff, J., (2000). Potential for Large-Scale Submarine Slope Failure and Tsunami Generation along the Mid-Atlantic Coast, Geology, v. 28: 407-410.

Hill, J.C., Driscoll, N.W., Weissel, J.K. and Goff, J.A. (2004). Large-scale elongated gas blowouts along the U.S. Atlantic margin. J. Geophys. Res. 109: B09101, 1-14.
Brothers, D.S., Driscoll, N.W., Kent, G.M., Harding, A.J., Babcock, J.M., and Baskin, R.L., (2009). Tectonic evolution of the Salton Sea inferred from seismic reflection data. Nature Geoscience 2, 581-584
Le Dantec, N., Hogarth, L., Driscoll, N., Babcock, J., Barnhardt, W., and Schwab, W., (2010). Tectonic Controls on Nearshore Sediment Accumulation and Submarine Canyon Morphology Offshore La Jolla, Southern California. Marine Geology, V.268:115-128.
Driscoll, N.W. and G.D. Karner (1998). Lower crustal extension across the Northern Carnarvon Basin, Australia: Evidence for an eastward dipping detachment. Journal of Geophysical Research, v. 103: 4975-4992
Donnelly, J.P., Driscoll, N.W., Uchupi, E., Keigwin, L.D., Schwab, W.C., Thieler, E.R., and Swift, S.A., (2005). Catastrophic meltwater discharge down the Hudson Valley: A potential trigger for the Intra-Allerød cold period Geology V.33, 2: 89–92 DOI: 10.1130/G21043.1
Hogarth, L.J., Babcock, J., Driscoll, N.W., Le Dantec, N., Haas, J.K., Inman, D.L., and Masters, P.M., (2007). Long-term tectonic control on Holocene shelf sedimentation offshore La Jolla, California. Geology, V. 35, 3: 275–278 doi: 10.1130/G23234A.1
Hill, J.C. and N. W. Driscoll (2008). Paleodrainage on the Chukchi shelf reveals sea level history and meltwater discharge. Marine Geology 254: 129–151
Malloney, J.M., Noble, P.J., Driscoll, N.W., Kent, G.M., Smith, S.B., Schauder, G.C, Babcock, J.M, Baskin, R.L., Karlin, R., Kell, Seitz, G.G., Zimmerman, S., and Kleppe, J.A. (2013). Paleoseismic History of the Fallen Leaf Segment of the West Tahoe-Dollar Point Fault Reconstructed from Slide Deposits in the Lake Tahoe Basin, California-Nevada. Geosphere 26 June 2013; doi:10.1130/GES00877.1
Driscoll, N.W. and G.H. Haug (1998). A short circuit in the ocean's thermohaline circulation: A potential cause for northern hemisphere glaciation. Science, v. 282: 436-43

*I have over 100 peer-reviewed manuscripts and have been Chief Scientist on over 80 cruises

SYNERGISTIC ACTIVITIES

2013 US Coast Guard Arctic Service Medal

I have graduated 21 graduate students from 2000 – 2018

I have also supervised 7 post-doctoral scholars; 5 at UCSD

2005 NSF Margins Distinguished Lecturer

2003 Scripps Institution of Oceanography Outstanding Undergraduate Teacher Award

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE

STATE OF CALIFORNIA

Order Instituting Rulemaking to Implement Electric Utility Wildfire Mitigation Plans Pursuant to Senate Bill 901 (2018).	R.18-10-007

CERTIFICATE OF SERVICE

I hereby certify that, pursuant to the Commission's Rules of Practice and Procedure, I have this day served a true copy of **SOUTHERN CALIFORNIA EDISON COMPANY'S (U338-E) REPORT ON DATA COLLECTION FOR WILDFIRE MITIGATION PLANS REPORT** on all parties identified on the attached service list(s) **R.18-10-007**. Service was effected by one or more means indicated below:

☒ Transmitting the copies via e-mail to all parties who have provided an e-mail address.

☒ Placing the copies in sealed envelopes and causing such envelopes to be delivered by U.S. Mail to the offices of the Assigned ALJ(s) or other addressee(s).

ALJ Peter V. Allen
ALJ Sarah R. Thomas
California Public Utilities Commission
Division of Administrative Law Judges
505 Van Ness Avenue
San Francisco, CA 94102

Executed on **July 30, 2019,** at Rosemead, California.

/s/ Edith Leon
Edith Leon
Legal Administrative Assistant
SOUTHERN CALIFORNIA EDISON COMPANY
2244 Walnut Grove Avenue
Post Office Box 800
Rosemead, California 91770

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Parties

PETER SMITH
CITIZENS TRANSMISSION LLC
88 BLACK FALCON AVENUE, SUITE 342
BOSTON, MA 02210
FOR: CITIZENS TRANSMISSION LLC

ALI AMIRALI
STARTRANS IO, LLC
591 W. PUTNAM AVENUE
GREENWICH, CT 06830
FOR: STARTRANS IO, LLC

ROBERT L. MITCHELL
TRANS-ELECT NTD PATH 15, LLC
1850 CENTENNIAL PARK DRIVE, SUITE 480
RESTON, VA 20191
FOR: TRANS-ELECT NTD PATH 15, LLC

J. SCOTT KUHN
COUNTY OF LOS ANGELES
OFFICE OF THE COUNTY COUNSEL
500 WEST TEMPLE STREET, STE 652
LOS ANGELES, CA 90012-2713
FOR: COUNTY OF LOS ANGELES

HANS LAETZ
GENERAL MGR.
ZUMA BEACH FM BROADCASTERS
RADIO MALIBU 99.1 FM KBUU
6402 SURFSIDE WAY
MALIBU, CA 90265
FOR: ZUMA BEACH FM EMERGENCY AND
COMMUNITY BROADCASTERS, INC.

CHRISTI HOGIN
COUNSEL
BEST BEST & KRIEGER LLP
1230 ROSECRANS AVE., STE. 110
MANHATTAN BEACH, CA 90266
FOR: CITY OF MALIBU

RUSSELL A. ARCHER
SR. ATTORNEY
SOUTHERN CALIFORNIA EDISON COMPANY
2244 WALNUT GROVE AVE. / PO BOX 800
ROSEMEAD, CA 91770
FOR: SOUTHERN CALIFORNIA EDISON COMPANY

KEITH SWITZER
BEAR VALLEY ELECTRIC SERVICE
630 EAST FOOTHILL BLVD.
SAN DIMAS, CA 91773
FOR: BEAR VALLEY ELECTRIC SERVICE, DIV
OF GOLDEN STATE WATER COMPANY

DIANE CONKLIN
SPOKESPERSON
MUSSEY GRADE ROAD ALLIANCE
PO BOX 683
RAMONA, CA 92065
FOR: MUSSEY GRADE ROAD ALLIANCE

MICHAEL J. AGURRE, ESQ.
AGUIRRE & SEVERSON LLP
501 WEST BROADWAY, SUITE 1050
SAN DIEGO, CA 92101
FOR: RUTH HENRICKS

KIRSTIE C. RAAGAS
REGULATORY COUNSEL
SAN DIEGO GAS & ELECTRIC COMPANY
8330 CENTURY PARK COURT, CP32F
SAN DIEGO, CA 92123
FOR: SAN DIEGO GAS & ELECTRIC COMPANY

KELLEY WILLIAMS
COUNTY OF INYO
PO DRAWER N
INDEPENDENCE, CA 93526
FOR: COUNTY OF INYO

MATTHEW J. SANDERS
DEPUTY COUNTY COUNSEL
SAN MATEO COUNTY COUNSELâ€™S OFFICE
400 COUNTY CENTER, 6TH FL
REDWOOD CITY, CA 94063
FOR: PENINSULA CLEAN ENERGY AUTHORITY

RACHAEL E. KOSS
ATTORNEY
ADAMS BROADWELL JOSEPH & CARDOZO
601 GATEWAY BLVD., SUITE 1000
SOUTH SAN FRANCISCO, CA 94080
FOR: COALITION OF CALIFORNIA UTILITY EMPLOYEES (CUE)

CHARLYN A. HOOK
CALIF PUBLIC UTILITIES COMMISSION
LEGAL DIVISION
ROOM 5123
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
FOR: PUBLIC ADVOCATES OFFICE

CHRISTOPHER CLAY
CALIF PUBLIC UTILITIES COMMISSION
LEGAL DIVISION
ROOM 4300
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
FOR: OFFICE OF THE SAFETY ADVOCATE (OSA)

WILLIAM ROSTOV
DEPUTY CITY ATTORNEY
CITY AND COUNTY OF SAN FRANCISCO
CITY HALL
1 DR CARLTON B. GOODLET PL. RM 234
SAN FRANCISCO, CA 94102-4682
FOR: CITY AND COUNTY OF SAN FRANCSICO

THOMAS LONG
LEGAL DIRECTOR
THE UTILITY REFORM NETWORK
785 MARKET ST., STE. 1400
SAN FRANCISCO, CA 94103
FOR: TURN

IVAN R. JIMENEZ
REGULATORY ATTORNEY
SMALL BUSINESS UTILITY ADVOCATES
548 MARKET STREET, STE. 11200
SAN FRANCISCO, CA 94104
FOR: SMALL BUSINESS UTILITY ADVOCATES (SBUA)

ALYSSA KOO
ATTORNEY
PACIFIC GAS AND ELECTRIC COMPANY
77 BEALE STREET, B30A
SAN FRANCISCO, CA 94105
FOR: PACIFIC GAS AND ELECTRIC COMPANY (PG&E)

NORA SHERIFF, ESQ.
COUNSEL
BUCHALTER, A PROFESSIONAL CORPORATION
55 SECOND STREET, STE. 1700
SAN FRANCISCO, CA 94105
FOR: CALIFORNIA LARGE ENERGY CONSUMERS ASSOCIATION (CLECA)

EVELYN KAHL
ATTORNEY
BUCHALTER, A PROFESSIONAL CORPORATION
55 SECOND STREET, SUITE 1700
SAN FRANCISCO, CA 94105-3493
FOR: ENERGY PRODUCERS AND USERS COALITION

DAVID J. MILLER
AVP - SR. LEGAL COUNSEL
AT&T SERVICES, INC.
430 BUSH STREET, ROOM 310
SAN FRANCISCO, CA 94108
FOR: AT&T

LISA A. COTTLE
ATTORNEY / PARTNER
WINSTON & STRAWN LLP
101 CALIFORNIA STREET, 34TH FL.
SAN FRANCISCO, CA 94111
FOR: HORIZON WEST TRANSMISSION, LLC (FORMERLY NEXTERA ENERGY TRANSMISSION WEST, LLC - NEET WEST)

MEGAN SOMOGYI
ATTORNEY
GOODIN, MACBRIDE, SQUERI & DAY, LLP
505 SANSOME STREET, STE 900
SAN FRANCISCO, CA 94111
FOR: CITY OF SANTA ROSA

MEGAN SOMOGYI
ATTORNEY
GOODIN, MACBRIDE, SQUERI, & DAY, LLP
505 SANSOME ST., STE. 900
SAN FRANCISCO, CA 94111
FOR: COUNTY OF SONOMA

MEGAN SOMOGYI
ATTORNEY
GOODIN, MACBRIDE, SQUERI & DAY, LLP
505 SANSOME STREET, STE. 900
SAN FRANCISCO, CA 94111
FOR: COUNTY OF MENDOCINO

MEGAN SOMOGYI
ATTORNEY
GOODIN, MACBRIDE, SQUERI & DAY, LLP
505 SANSOME STREET, STE. 900
SAN FRANCISCO, CA 94111
FOR: CITY OF PLACERVILLE

DAVID L. HUARD
ATTORNEY
MANATT, PHELPS & PHILLIPS, LLP
ONE EMBARCADERO CENTER, 30TH FL.
SAN FRANCISCO, CA 94111-3736
FOR: CITY OF LAGUNA BEACH

IRENE K. MOOSEN
ATTORNEY AT LAW
LAW OFFICE OF IRENE K. MOOSEN
53 SANTA YNEZ STREET
SAN FRANCISCO, CA 94112
FOR: LOCAL GOVERNMENT SUSTAINABLE ENERGY COALITION (LGSEC)

LENNEAL K. GARDNER
TRANS BAY CABLE LLC
ONE LETTERMAN DRIVE, C5-100
SAN FRANCISCO, CA 94129
FOR: TRANS BAY CABLE LLC

VALERIE PRYOR
GEN. MGR.
ALAMEDA COUNTY FLOOD CONTROL AND WATER
100 NORTH CANYONS PARKWAY
LIVERMORE, CA 94551
FOR: ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

JEFFERY RICHARD
CHIEF DEPUTY COUNTY COUNSEL
OFFICE OF THE NAPA COUNTY COUNSEL
1195 THIRD ST, SUITE 301
NAPA, CA 94559
FOR: COUNTY OF NAPA

DOUGLAS E. COTY
ATTORNEY
BOLD, POLISNER, MADDOW, NELSON & JUDSON
2125 OAK GROVE ROAD, SUITE 210
WALNUT CREEK, CA 94598
FOR: CONTRA COSTA WATER DISTRICT

ELIZABETH TAYLOR
COUNSEL
PROTECT OUR COMMUNITIES FOUNDATION
1547 PALOS VERDES MALL, NO. 196
WALNUT CREEK, CA 94598
FOR: PROTECT OUR COMMUNITIES FOUNDATION

TIM LINDL
PARTNER
KEYES & FOX LLP
436 14TH STREET, SUITE 1305
OAKLAND, CA 94612
FOR: SUNRUN INC.

GREGG MORRIS

SHANA LAZEROW

DIRECTOR
THE GREEN POWER INSTITUTE
2039 SHATTUCK AVE., SUTE. 402
BERKELEY, CA 94704
FOR: THE GREEN POWER INSTITUTE (GPI)

ATTORNEY
COMMUNITIES FOR A BETTER ENVIRONMENT
120 BROADWAY, SUITE 2
RICHMOND, CA 94804
FOR: CALIFORNIA ENVIRONMENTAL JUSTICE ALLIANCE (CEJA)

JASON HOPPIN
COUNTY OF SANTA CRUZ
ADMIN. OFFICE
701 OCEAN STREET
SANTA CRUZ, CA 95060
FOR: COUNTY OF SANTA CRUZ

WILLIAM B. ABRAMS
COMMUNITY ADVOCATE
1519 BRANCH OWL PLACE
SANTA ROSA, CA 95409
FOR: WILLIAM B. ABRAMS

JUSTIN WYNNE
ATTORNEY
BRAUN BLAISING SMITH WYNNE, P.C.
915 L STREET, STE. 1480
SACRAMENTO, CA 95814
FOR: CALIFORNIA MUNICIPAL UTILITIES ASSOCIATION (CMUA)

STACI HEATON
REGULATORY AFFAIRS ADVOCATE
RURAL COUNTY REPRESENTATIVES OF CALIF.
1215 K ST., STE. 1650
SACRAMENTO, CA 95814
FOR: RURAL COUNTY REPRESENTATIVES OF CALIFORNIA

JEROME F. CANDELARIA
VP & COUNSEL, REGULATORY AFFAIRS
CALIFORNIA CABLE AND TELECOMM. ASSN.
1001 K STREET, 2ND FL.
SACRAMENTO, CA 95814-3832
FOR: CALIFORNIA CABLE AND TELECOMMUNICATIONS ASSOCIATION

LYNN HAUG
ATTORNEY
ELLISON SCHNEIDER HARRIS & DONLAN LLP
2600 CAPITOL AVE., STE. 400
SACRAMENTO, CA 95816
FOR: EAST BAY MUNICIPAL UTILITY DISTRICT

RONALD LIEBERT
ATTORNEY AT LAW
ELLISON SCHNEIDER HARRIS & DONLAN LLP
2600 CAPITOL AVENUE, STE. 400
SACRAMENTO, CA 95816
FOR: CALIFORNIA MANUFACTURERS & TECHNOLOGY ASSN. (CMTA)

JEDEDIAH J. GIBSON
ATTORNEY
ELLISON SCHNEIDER HARRIS & DONLAN LLP
2600 CAPITOL AVENUE, SUITE 400
SACRAMENTO, CA 95816-5931
FOR: BEAR VALLEY ELECTRIC SERVICE (BVES) / LIBERTY UTILITIES (CALPECO ELECTRIC)

JOHN LARREA
DIR - GOVN'T AFFAIRS
CALIFORNIA LEAGUE OF FOOD PRODUCERS
2485 NATOMAS PARK DRIVE, STE. 550
SACRAMENTO, CA 95833
FOR: CALIFORNIA LEAGUE OF FOOD PRODUCERS

KAREN NOREEN MILLS
SR. ATTORNEY
CALIFORNIA FARM BUREAU FEDERATION
2600 RIVER PLAZA DRIVE
SACRAMENTO, CA 95833
FOR: CALIFORNIA FARM BUREAU FEDERATION

LAUREN GILL
TOWN MGR.
TOWN OF PARADISE
5555 SKYWAY
PARADISE, CA 95969
FOR: TOWN OF PARADISE

DANIEL MARSH
MGR - RATES & REGULATORY AFFAIRS
LIBERTY UTILITIES (CALPECO ELECTRIC) LLC
933 ELOISE AVENUE
SOUTH LAKE TAHOE, CA 96150
FOR: LIBERTY UTILITIES (CALPECOELECTRIC)

CYNTHIA HANSEN MIFSUD
ASSIST. GEN. COUNSEL

PACIFICORP
825 NE MULTNOMAH ST., STE. 1800
PORTLAND, OR 97232
FOR: PACIFIC POWER, A DIV OF PACIFICORP

Information Only

CURT BARRY
SR WRITER / EDITOR
INSIDE WASHINGTON PUBLISHERS
EMAIL ONLY
EMAIL ONLY, CA 00000

KAVYA BALARAMAN
STAFF WRITER / REPORTER
CALIFORNIA ENERGY MARKETS
EMAIL ONLY
EMAIL ONLY, CA 00000

MEGHAN DEWEY
MGR - EE POLICY / STRATEGY
PACIFIC GAS AND ELECTRIC COMPANY
EMAIL ONLY
EMAIL ONLY, CA 00000

MICHAEL BROWN
CONSULTANT
LAW OFFICE OF MICHAEL BROWN
EMAIL ONLY
EMAIL ONLY, CA 00000
FOR: SMALL BUSINESS UTILITY ADVOCATES (SBUA)

MICHAEL CALLAHAN
MARIN CLEAN ENERGY
EMAIL ONLY
EMAIL ONLY, CA 00000

NICK WILLIAMS
SENIOR DISTRESSED DEBT ANALYST
REORG RESEARCH INC.
EMAIL ONLY
EMAIL ONLY, NY 00000

RACHEL A. GOLD, ESQ.
CLIMATE CHG PROGRAM
CALIFORNIA AIR RESOURCES BOARD
EMAIL ONLY
EMAIL ONLY, CA 00000

SHANNON EDDY
LARGE-SCALE SOLAR ASSOCIATION
EMAIL ONLY
EMAIL ONLY, CA 00000

STEPHEN R. CIESLEWICZ
UVM CONSULTANT
EMAIL ONLY
EMAIL ONLY, CA 00000

WADE A. GREENACRE
CASE MGR.
PACIFIC GAS AND ELECTRIC COMPANY
EMAIL ONLY
EMAIL ONLY, CA 00000

MRW & ASSOCIATES, LLC
EMAIL ONLY
EMAIL ONLY, CA 00000

CAMERON-DANIEL, P.C.
EMAIL ONLY
EMAIL ONLY, CA 00000

CRAIG JUDSON MCBETH
JUDSON INVESTMENTS LLC
84 WEST PARK PLACE, 3RD FL.
STAMFORD, CT 06901

CAROLINE V. BONE
DEUTSCHE BANK SECURITIES, INC.
60 WALL STREET
NEW YORK, NY 10005

JONATHAN ARNOLD
DEUTSCHE BANK
60 WALL STREET
NEW YORK, NY 10005

CONOR SKELDING
REORG
11 E 26TH STREET, 12TH FL.
NEW YORK, NY 10010

JESSIE CROZIER
LUMINUS MANAGEMENT
1700 BROADWAY, 26TH FL.
NEW YORK, NY 10019

DAVID NGUYEN
ANALYST
JEFFERIES LLC
520 MADISON AVENUE
NEW YORK, NY 10022

EDWIN GUYANDI
ANALYST
NEWTYN MANAGEMENT
405 PARK AVENUE, SUITE 1104
NEW YORK, NY 10022

GREGORY REISS
CENTENUS GLOBAL MANAGEMENT, LP
437 MADISON AVENUE, SUITE 19B
NEW YORK, NY 10022

MICHAEL KRAMER
DUCERA PARTNERS LLC
499 PARK AVENUE, 16TH FLOOR
NEW YORK, NY 10022

ALEJANDRO MENDEZ
MADISON AVENUE PARTNERS
150 EAST 58TH STREET, 14TH FLOOR
NEW YORK, NY 10155

ELI SAMAHA
MADISON AVENUE PARTNERS
150 E 58TH STREET, 14TH FLOOR
NEW YORK, NY 10155

DONALD R. ALLEN
FOUNDING PARTNER, COUNSEL
DUNCAN & ALLEN
1730 RHODE ISLAND AVENUE, NW, SUITE 700
WASHINGTON, DC 20036
FOR: CITIZENS TRANSMISSION LLC

AMANDA VANEGA
EQ RESEARCH LLC
1155 KILDAIRE FARM ROAD, SUITE 203
CARY, NC 27511

BLAKE ELDER
POLICY RESEARCH ANALYST
EQ RESEARCH LLC
1155 KILDAIRE FARM ROAD, SUITE 203
CARY, NC 27511

CORKY WHIPPLE
SOUTHWIRE COMPANY, LLC
1 SOUTHWIRE DRIVE
CARROLLTON, GA 30119

JEAN HAWLEY
TELECOMMUNICATIONS PARALEGAL
FRIEND, HUDAK & HARRIS, LLP
THREE RAVINIA DRIVE, STE. 1700
ATLANTA, GA 30346-2131

STEVEN GRECO
REGULATORY AFFAIRS ANALYST
HORIZON WEST TRANSMISSION, LLC
700 UNIVERSE BLVD
JUNO BEACH, FL 33407
FOR: (FORMERLY NEXTERA ENERGY TRANSMISSION, LLC)

JIM ROSS
RCS, INC.
266 PENNINGTON LANE
CHESTERFIELD, MO 63005

TRACY C. DAVIS
SR. ATTORNEY
HORIZON WEST TRANSMISSION, LLC
5920 W. WILLIAM CANNON DR., BLDG. 2
AUSTIN, TX 78749
FOR: (FORMERLY NEXTERA ENERGY TRANSMISSION, LLC)

SCOTT DUNBAR
ATTORNEY
KEYES & FOX LLP
1580 LINCOLN STREET, STE. 880
DENVER, CO 80203

TIMOTHY K. CLARK

LON W. HOUSE, PH.D

PACIFICORP (ROCKY MOUNTAIN POWER)
1407 WEST NORTH TEMPLE, SUITE 320
SALT LAKE CITY, UT 84116

WATER & ENERGY CONSULTING
10645 N. ORACLE RD., STE 121-216
ORO VALLEY, AZ 85737

JEFFERY A. WILLIAMS
SUPERINTENDENT - CODES & ORDINANCES
L.A. DEPT OF WATER & POWER
111 NORTH HOPE STREET, RM. 856
LOS ANGELES, CA 90012

BRYAN PENA
CALIF PUBLIC UTILITIES COMMISSION
ELECTRIC SAFETY AND RELIABILITY BRANCH
320 West 4th Street Suite 500
Los Angeles, CA 90013

CHRISTOPHER MOORE
CALIF PUBLIC UTILITIES COMMISSION
BUSINESS AND COMMUNITY OUTREACH
320 West 4th Street Suite 500
Los Angeles, CA 90013

FADI DAYE
CALIF PUBLIC UTILITIES COMMISSION
ELECTRIC SAFETY AND RELIABILITY BRANCH
320 West 4th Street Suite 500
Los Angeles, CA 90013
FOR: SED

JOAN WEBER
CALIF PUBLIC UTILITIES COMMISSION
OFFICE OF THE SAFETY ADVOCATE
320 West 4th Street Suite 500
Los Angeles, CA 90013
FOR: OSA

JOCELINE PEREIRA
CALIF PUBLIC UTILITIES COMMISSION
ELECTRIC SAFETY AND RELIABILITY BRANCH
320 West 4th Street Suite 500
Los Angeles, CA 90013

KOKO M. TOMASSIAN
CALIF PUBLIC UTILITIES COMMISSION
ELECTRIC SAFETY AND RELIABILITY BRANCH
320 West 4th Street Suite 500
Los Angeles, CA 90013
FOR: SED

JOHN R. TODD
DEP. CHIEF-PREVENTION SVCS. BUREAU
COUNTY OF LOS ANGELES FIRE DEPT.
1320 N. EASTERN AVENUE, RM. 254
LOS ANGLELES, CA 90063-3294
FOR: COUNTY OF LOS ANGELES

ANNMARIE LETT
COORDINATOR - RATES & REG AFFAIRS
LIBERTY UTILITIES (CALIFORNIA)
9750 WASHBURN ROAD
DOWNEY, CA 90241

SHARON YANG
DIR - LEGAL SERVICES
LIBERTY UTILITIES (CALPECO ELECTRIC) LLC
9750 WASHBURN ROAD
DOWNEY, CA 90241
FOR: LIBERTY UTILITIES (CALIFORNIA)

JANE E. TERJUNG
COMMUNITY ADVOCATES
TOPANGA COMMUNITY ALLIANCE
1639 OAK DRIVE
TOPANGA, CA 90290

FRED G. YANNEY
ATTORNEY
YANNEY LAW OFFICE
17409 MARQUARDT AVE. UNIT C-4
CERRITOS, CA 90703

DANIEL W. DOUGLASS
ATTORNEY AT LAW
DOUGLASS & LIDDELL
4766 PARK GRANADA, SUITE 209
CALABASAS, CA 91302

CASE ADMINISTRATION
SOUTHERN CALIFORNIA EDISON COMPANY
8631 RUSH STREET
ROSEMEAD, CA 91770

CONNOR FLANNIGAN
SOUTHERN CALIFORNIA EDISON COMPANY
2244 WALNUT GROVE AVE.
ROSEMEAD, CA 91770

GARY STERN
MANAGING DIR.
SOUTHERN CALIFORNIA EDISON COMPANY
8631 RUSH STREET

ROSEMEAD, CA 91770
FOR: SOUTHERN CALIFORNIA EDISON COMPANY

MARGARITA GEVONDYAN
SR. ATTORNEY
SOUTHERN CALIFORNIA EDISON COMPANY
2244 WALNUT GROVE AVE / PO BOX 800
ROSEMEAD, CA 91770
FOR: SOUTHERN CALIFORNIA EDISON COMPANY

RYAN STEVENSON
PRINCIPAL ADVISOR / REG - POLICY
SOUTHERN CALIFORNIA EDISON COMPANY
8631 RUSH ST., GEN. OFFICE 4
ROSEMEAD, CA 91770

NGUYEN QUAN
REGULATORY AFFAIRS MGR.
BEAR VALLEY ELECTRIC SERVICE
630 EAST FOOTHILL BLVD.
SAN DIMAS, CA 91773

JOSEPH W. MITCHELL, PH.D
M-BAR TECHNOLOGIES AND CONSULTING, LLC
19412 KIMBALL VALLEY RD.
RAMONA, CA 92065

MARIA BYRNES
LEGAL ASSISTANT
AGUIRRE & SEVERSON LLP
501 WEST BROADWAY, STE. 1050
SAN DIEGO, CA 92101
FOR: RUTH HENRICKS

MARIA C. SEVERSON, ESQ.
ATTORNEY
AGUIRRE & SEVERSON LLP
501 WEST BROADWAY, STE. 1050
SAN DIEGO, CA 92101-3591
FOR: RUTH HENRICKS

ESTHER NORTHRUP
STATE REGULATORY AFFAIRS
COX CALIFORNIA TELCOM, LLC
5887 COPLEY DRIVE, STE. 300
SAN DIEGO, CA 92111

JOHN W. LESLIE, ESQ
ATTORNEY
DENTONS US LLP
EMAIL ONLY
EMAIL ONLY, CA 92121

CHUCK MANZUK
DIR - GRC & REVENUE REQUIREMENTS
SAN DIEGO GAS & ELECTRIC COMPANY
8330 CENTURY PARK COURT
SAN DIEGO, CA 92123

JAMIE K. YORK
GRC PROGRAM MGR.
SAN DIEGO GAS & ELECTRIC COMPANY
8330 CENTURY PARK COURT, CP32D
SAN DIEGO, CA 92123

KEITH MELVILLE
SR. COUNSEL
SAN DIEGO GAS & ELECTIRIC COMPANY
8330 CENTURY PARK CT., CP-32D
SAN DIEGO, CA 92123
FOR: SAN DIEGO GAS & ELECTRIC COMPANY

NORMA G. JASSO
MGR - REGULATORY
SAN DIEGO GAS & ELECTRIC COMPANY
8330 CENTURY PARK CT, CP31E
SAN DIEGO, CA 92123

CENTRAL FILES
SAN DIEGO GAS & ELECTRIC COMPANY
8330 CENTURY PARK CT, CP31-E
SAN DIEGO, CA 92123-1530

SAN DIEGO GAS AND ELECTRIC COMPANY
8330 CENTURY PARK COURT (CP31E)
SAN DIEGO, CA 92123-1548

BRITT K. STROTTMAN
BARON & BUDD, P.C.
11440 WEST BERNARD COURT
SAN DIEGO, CA 92127
FOR: COUNTIES OF SONOMA, NAPA, MENDOCINO, LAKE, YUBA, NEVADA. CITIES OF SANTA ROSA, AND CLEARLAKE.

ERIC CARDELLA
SUPERVISOR, ENGINEERING & PLANNING
BEAR VALLEY ELECTRIC SERVICE
42020 GARSTIN DRIVE / PO BOX 1547
BIG BEAR LAKE, CA 92315

PAUL MARCONI
DIRECTOR
BEAR VALLEY ELECTRIC SERVICE
42020 GRASTIN DRIVE / PO BOX 1547
BIG BEAR LAKE, CA 92315

WILLIAM R. SMITH
CITY MGR
CITY OF COLTON
650 N. LA CADENA DRIVE
COLTON, CA 92324
FOR: CITY OF COLTON

JESUS G. ROMAN
ASSIST. GEN. COUNSEL
VERIZON
15505 SAND CANYON AVE. D201
IRVINE, CA 92618

STEPHEN KEEHN
MGR OF ENERGY REG & LEGISLATIVE AFFAIRS
MONTEREY BAY COMMUNITY POWER
70 GARDEN COURT, SUITE 300
MONTEREY, CA 93940

DOUG KARPA
PENINSULA CLEAN ENERGY
2075 WOODSIDE ROAD
REDWOOD CITY, CA 94061

JOSEPH F. WIEDMAN
DIR - REGULATORY & LEGISLATIVE AFFAIRS
PENINSULA CLEAN ENERGY AUTHORITY
2075 WOODSIDE ROAD
REDWOOD CITY, CA 94061

SUE MARA
CONSULTANT
RTO ADVISORS, L.L.C.
164 SPRINGDALE WAY
REDWOOD CITY, CA 94062

MARC D. JOSEPH
ATTORNEY AT LAW
ADAMS BROADWELL JOSEPH & CARDOZO
601 GATEWAY BLVD., STE. 1000
SOUTH SAN FRANCISCO, CA 94080

MILES F. MAURINO
ADAMS BROADWELL JOSEPH & CARDOZO
601 GATEWAY BLVD., SUITE 1000
SOUTH SAN FRANCISCO, CA 94080
FOR: COALITION OF CALIFORNIA UTILITY EMPLOYEES (CUE)

ROSS NAKASONE
PLANNING & REGULATORY COMPLIANCE
SAN FRANCISCO PUBLIC UTILITES COMMISSION
525 GOLDEN GATE AVE., 7TH FL.
SAN FRANCISCO, CA 94102

ADENIKE ADEYEYE
CALIF PUBLIC UTILITIES COMMISSION
COMMISSIONER GUZMAN ACEVES
ROOM 5214
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

AMY C. CHAMARTY
CALIF PUBLIC UTILITIES COMMISSION
COMMISSIONER RECHTSCHAFFEN
ROOM 5210
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

AMY C. YIP-KIKUGAWA
CALIF PUBLIC UTILITIES COMMISSION
LEGAL DIVISION
ROOM 4107
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

ANAND DURVASULA
CALIF PUBLIC UTILITIES COMMISSION
COMMISSIONER RANDOLPH
ROOM 5130
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

ANDIE BIGGS
CALIF PUBLIC UTILITIES COMMISSION
ELECTRIC SAFETY AND RELIABILITY BRANCH AREA
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

ANNA WRIGHT
CALIF PUBLIC UTILITIES COMMISSION
ELECTRICITY PLANNING & POLICY BRANCH AREA
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

BILLIE C. BLANCHARD
CALIF PUBLIC UTILITIES COMMISSION
INFRASTRUCTURE PLANNING AND PERMITTING B
AREA 4-A
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

BRIAN STEVENS
CALIF PUBLIC UTILITIES COMMISSION
ADMINISTRATIVE LAW JUDGE DIVISION
ROOM 5023
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

CANDACE MOREY
CALIF PUBLIC UTILITIES COMMISSION
LEGAL DIVISION
ROOM 5031
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

CAROLINA CONTRERAS
CALIF PUBLIC UTILITIES COMMISSION
OFFICE OF THE SAFETY ADVOCATE
AREA
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

CHARLOTTE TERKEURST
CALIF PUBLIC UTILITIES COMMISSION
ELECTRIC SAFETY AND RELIABILITY BRANCH
ROOM 2201
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
FOR: SED

CHLOE LUKINS
CALIF PUBLIC UTILITIES COMMISSION
ENERGY INFRASTRUCTURE BRANCH
ROOM 4102
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

CHRISTOPHER CHOW
CALIF PUBLIC UTILITIES COMMISSION
NEWS AND SOCIAL MEDIA
ROOM 5301
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

CHRISTOPHER HOGAN
CALIF PUBLIC UTILITIES COMMISSION
ELECTRICITY PRICING AND CUSTOMER PROGRAM
AREA
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

CHRISTOPHER PARKES
CALIF PUBLIC UTILITIES COMMISSION
OFFICE OF THE SAFETY ADVOCATE
AREA 2-D
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

COLIN RIZZO
CALIF PUBLIC UTILITIES COMMISSION
ADMINISTRATIVE LAW JUDGE DIVISION
ROOM 5042
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

DAPHNE GOLDBERG
CALIF PUBLIC UTILITIES COMMISSION
COMMUNICATIONS AND WATER POLICY BRANCH
ROOM 4208
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

DAVID LIEVANOS
CALIF PUBLIC UTILITIES COMMISSION
ENERGY SAFETY & INFRASTRUCTURE BRANCH
AREA
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

DAVID PECK
CALIF PUBLIC UTILITIES COMMISSION
PRESIDENT PICKER
ROOM 5215
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

ELAINE LAU
CALIF PUBLIC UTILITIES COMMISSION
ADMINISTRATIVE LAW JUDGE DIVISION
ROOM 5102
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

FRANZ CHENG
CALIF PUBLIC UTILITIES COMMISSION
MARKET STRUCTURE, COSTS AND NATURAL GAS
AREA 4-A

GARY C. ERMANN
CALIF PUBLIC UTILITIES COMMISSION
RISK ASSESSMENT & SAFETY ADVISORY
AREA

505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

JAMES RALPH
CALIF PUBLIC UTILITIES COMMISSION
PRESIDENT PICKER
ROOM 5037
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

JESSICA T. HECHT
CALIF PUBLIC UTILITIES COMMISSION
ADMINISTRATIVE LAW JUDGE DIVISION
ROOM 5116
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

JONATHAN J. REIGER
CALIF PUBLIC UTILITIES COMMISSION
LEGAL DIVISION
ROOM 4107
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

JOYCE STEINGASS
CALIF PUBLIC UTILITIES COMMISSION
INFRASTRUCTURE PLANNING AND PERMITTING B AREA
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

JULIA ENDE
CALIF PUBLIC UTILITIES COMMISSION
MARKET STRUCTURE, COSTS AND NATURAL GAS
ROOM 4011
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

JUNAID RAHMAN
CALIF PUBLIC UTILITIES COMMISSION
RISK ASSESSMENT & SAFETY ADVISORY AREA
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

LESLIE L. PALMER
CALIF PUBLIC UTILITIES COMMISSION
SAFETY AND ENFORCEMENT DIVISION
ROOM 2203
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214
FOR: SED

LEUWAM TESFAI
CALIF PUBLIC UTILITIES COMMISSION
COMMISSIONER SHIROMA
ROOM 5137
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

MARIANNE DIVINA
CALIF PUBLIC UTILITIES COMMISSION
ADMINISTRATIVE LAW JUDGE DIVISION
ROOM 5013
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

MARY F. MCKENZIE
CALIF PUBLIC UTILITIES COMMISSION
ADMINISTRATIVE LAW JUDGE DIVISION
ROOM 5109
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

MASOUD FOUDEH
CALIF PUBLIC UTILITIES COMMISSION
DEMAND RESPONSE, CUSTOMER GENERATION, AN AREA
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

MATTHEW YUNGE
CALIF PUBLIC UTILITIES COMMISSION
ELECTRIC SAFETY AND RELIABILITY BRANCH AREA
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

MONICA PALMEIRA
CALIF PUBLIC UTILITIES COMMISSION
EXECUTIVE DIVISION
ROOM 3-90
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

NATHAN POON
CALIF PUBLIC UTILITIES COMMISSION
ADMINISTRATIVE LAW JUDGE DIVISION
ROOM 5013
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

NATHANIEL SKINNER

PETER V. ALLEN

CALIF PUBLIC UTILITIES COMMISSION
SAFETY BRANCH
AREA 4-A
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

CALIF PUBLIC UTILITIES COMMISSION
ADMINISTRATIVE LAW JUDGE DIVISION
ROOM 5017
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

QUANG PHAM
CALIF PUBLIC UTILITIES COMMISSION
ELECTRIC SAFETY AND RELIABILITY BRANCH
AREA 2-D
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

RICK TSE
CALIF PUBLIC UTILITIES COMMISSION
ELECTRIC SAFETY AND RELIABILITY BRANCH
AREA 2-D
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

ROBERT HAGA
CALIF PUBLIC UTILITIES COMMISSION
ADMINISTRATIVE LAW JUDGE DIVISION
ROOM 5006
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

SARAH R. THOMAS
CALIF PUBLIC UTILITIES COMMISSION
ADMINISTRATIVE LAW JUDGE DIVISION
ROOM 5033
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

SEAN A. SIMON
CALIF PUBLIC UTILITIES COMMISSION
COMMISSIONER RECHTSCHAFFEN
ROOM 5201
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

SHELBY CHASE
CALIF PUBLIC UTILITIES COMMISSION
SAFETY BRANCH
AREA
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

SIMI ROSE GEORGE
CALIF PUBLIC UTILITIES COMMISSION
COMMISSIONER RECHTSCHAFFEN
ROOM 5119
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

TRUMAN L. BURNS
CALIF PUBLIC UTILITIES COMMISSION
ENERGY COST OF SERVICE & NATURAL GAS BRA
ROOM 4205
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

TYLER HOLZSCHUH
CALIF PUBLIC UTILITIES COMMISSION
SAFETY BRANCH
AREA
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

VALERIE KAO
CALIF PUBLIC UTILITIES COMMISSION
ADMINISTRATIVE LAW JUDGE DIVISION
ROOM 5005
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

WENDY AL-MUKDAD
CALIF PUBLIC UTILITIES COMMISSION
RISK ASSESSMENT & SAFETY ADVISORY
AREA 4-A
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214

WILLIAM K. SANDERS
DEPUTY CITY ATTORNEY
CITY AND COUNTY OF SAN FRANCISCO
CITY HALL RM 234
1 DR. CARLTON B. GOODLETT PLACE
SAN FRANCISCO, CA 94102-4682
FOR: CITY AND COUNTY OF SAN FRANCISCO

ERIC BORDEN
ENERGY POLICY ANALYST
THE UTILITY REFORM NETWORK
785 MARKET STREET, STE. 1400
SAN FRANCISCO, CA 94103

KATY MORSONY
GENERAL COUNSEL
THE UTILITY REFORM NETWORK
785 MARKET STREET, SUITE 1400
SAN FRANCISCO, CA 94103

MARCEL HAWIGER
STAFF ATTORNEY
THE UTILITY REFORM NETWORK
785 MARKET ST., STE. 1400
SAN FRANCISCO, CA 94103

JAMES M. BIRKELUND
PRESIDENT
SMALL BUSINESS UTILITY ADVOCATES
548 MARKET STREET, STE. 11200
SAN FRANCISCO, CA 94104

SCOTT CASTRO
HORIZON WEST TRANSMISSION, LLC
ONE POST STREET, SUITE 2550
SAN FRANCISCO, CA 94104
FOR: (FORMERLY NEXTERA ENERGY TRANSMISSION, LLC)

CHARLES R. MIDDLEKAUFF
PACIFIC GAS AND ELECTRIC COMPANY
77 BEALE STREET, B30A / BOX 7442
SAN FRANCISCO, CA 94105

GARETH STAMP
PACIFIC GAS AND ELECTRIC COMPANY
245 MARKET STREET, ROOM 914C
SAN FRANCISCO, CA 94105

JAMES W. MCTARNAGHAN
ATTORNEY
PERKINS COIE LLP
505 HOWARD STREET, STE. 1000
SAN FRANCISCO, CA 94105

JANE WHANG
STAFF COUNSEL
VERIZON
201 SPEAR STREET, 7TH FL.
SAN FRANCISCO, CA 94105

KARI CAMERON
LEGAL ADMINISTRATOR
BUCHALTER
EMAIL ONLY
EMAIL ONLY, CA 94105

LISE H. JORDAN
ATTORNEY AT LAW
PACIFIC GAS AND ELECTRIC COMPANY
77 BEALE STREET, B30A
SAN FRANCISCO, CA 94105

MEREDITH ALLEN
SR. DIRECTOR, REGULATORY RELATIONS
PACIFIC GAS AND ELECTRIC COMPANY
77 BEALE STREET, B10C
SAN FRANCISCO, CA 94105

MICHAEL ALCANTAR
ATTORNEY AT LAW
BUCHALTER, A PROFESSIONAL CORPORATION
55 SECOND STREET, SUITE 1700
SAN FRANCISCO, CA 94105

MICHAEL CADE
ANALYST - ENERGY & NAT'L RESOURCES
BUCHALTER, A PROFESSIONAL CORPORATION
55 SECOND STREET, SUITE 1700
SAN FRANCISCO, CA 94105

SPENCER OLINEK
PACIFIC GAS AND ELECTRIC COMPANY
77 BEALE STREET, ROOM 2333
SAN FRANCISCO, CA 94105

TRACY MARATUKULAM
PACIFIC GAS AND ELECTRIC COMPANY
245 MARKET STREET, ROOM 903
SAN FRANCISCO, CA 94105

VIKTORIYA MALKINA
COORDINATOR - REGULATORY
PACIFIC GAS AND ELECTRIC COMPANY
77 BEALE STREET, MC B23A
SAN FRANCISCO, CA 94105

LILLIAN RAFII
ATTORNEY
BUCHALTER, A PROFESSIONAL CORPORATION
55 SECOND STREET, STE. 1700
SAN FRANCISCO, CA 94105-3493
FOR: ENERGY PRODUCERS AND USERS COALITION

FASSIL FENIKILE
DIR - REGULATORY
AT&T SERVICES, INC.

GWEN JOHNSON
QUALITY TESTING
AT&T SERVICES, INC.

430 BUSH STREET, 5TH FL.
SAN FRANCISCO, CA 94108

430 BUSH STREET, 5TH FL.
SAN FRANCISCO, CA 94108

MICHELLE CHOO
ASSISTANT
AT&T SERVICES, INC.
430 BUSH STREET, 3ND FL.
SAN FRANCISCO, CA 94108

ANNA FERO
DAVIS WRIGHT TREMAINE LLP
505 MONTGOMERY STREET, SUITE 800
SAN FRANCISCO, CA 94111

BRIAN T. CRAGG
ATTORNEY
GOODIN, MACBRIDE, SQUERI & DAY, LLP
505 SANSOME STREET, SUITE 900
SAN FRANCISCO, CA 94111

BUCK B. ENDEMANN
PARTNER
K&L GATES LLP
4 EMBARCADERO CENTER, STE. 1200
SAN FRANCISCO, CA 94111

EMILY LIEBAN
HOLLAND & KNIGHT LLP
50 CALIFORNIA STREET, STE. 2800
SAN FRANCISCO, CA 94111

JIM TOMLINSON
DAVIS WRIGHT TREMAINE LLP
505 MONTGOMERY STREET, SUITE 800
SAN FRANCISCO, CA 94111

KATIE JORRIE
ATTORNEY
DAVIS WRIGHT TREMAINE, LLP
505 MONTGOMERY STREET, SUITE 800
SAN FRANCISCO, CA 94111

KEVIN J. ASHE
HOLLAND & KNIGHT LLP
50 CALIFORNIA STREET, STE. 2800
SAN FRANCISCO, CA 94111

MARK P. SCHREIBER
ATTORNEY
COOPER, WHITE & COOPER LLP
201 CALIFORNIA STREET, 17TH FL.
SAN FRANCISCO, CA 94111

MICHAEL B. DAY
ATTORNEY
GOODIN, MACBRIDE, SQUERI, DAY & LAMPREY,
505 SANSOME ST., STE. 900
SAN FRANCISCO, CA 94111
FOR: TRANS-ELECT NTD PATH 15, LLC

PATRICK FERGUSON
ATTORNEY
DAVIS WRIGHT TREMAINE LLP
505 MONTGOMERY STREET, SUITE 800
SAN FRANCISCO, CA 94111

TAHIYA SULTAN
ASSOCIATE
DAVIS WRIGHT TREMAINE LLP
505 MONTGOMERY STREET, STE. 800
SAN FRANCISCO, CA 94111

TARA KAUSHIK
PARTNER
HOLLAND & KNIGHT LLP
50 CALIFORNIA STREET, SUITE 2800
SAN FRANCISCO, CA 94111

TONY BRUNELLO
CALIFORNIA STRATEGIES & ADVOCACY, LLC
1 EMBARCADERO CENTER, STE. 1060
SAN FRANCISCO, CA 94111

TRINA HORNER
DIRECTOR
NAVIGANT CONSULTING
101 CALIFORNIA STREET, STE. 4100
SAN FRANCISCO, CA 94111

DAVIS WRIGHT TREMAINE LLP
505 MONTGOMERY STREET, STE. 800
SAN FRANCISCO, CA 94111

SUZANNE TOLLER
ATTORNEY

STEVEN MOSS
PARTNER

DAVIS WRIGHT TREMAINE LLP
505 MONTGOMERY STREET, SUITE 800
SAN FRANCISCO, CA 94111-6533

M.CUBED
296 LIBERTY STREET
SAN FRANCISCO, CA 94114
FOR: THE LOCAL GOVERNMENT SUSTAINABLE ENERGY COALITION

MAVIS SCANLON
EDITOR
CALIFORNIA ENERGY MARKETS
425 DIVISADERO ST., STE 303
SAN FRANCISCO, CA 94117

DEBORAH BEHLES
OF COUNSEL
2912 DIAMOND STREET, STE 162
SAN FRANCISCO, CA 94131
FOR: CALIFORNIA ENVIRONMENTAL JUSTICE ALLIANCE (CEJA)

DEBORAH BEHLES
OF COUNSEL
CALIFORNIA ENVIRONMENTAL JUSTICE ALLIANC
2912 DIAMOND STREET, NO. 162
SAN FRANCISCO, CA 94131

CASE COORDINATION
PACIFIC GAS AND ELECTRIC COMPANY
PO BOX 770000; MC B23A
SAN FRANCISCO, CA 94177

WILLIAM V. MANHEIM
ATTORNEY AT LAW
PACIFIC GAS AND ELECTRIC COMPANY
PO BOX 770000, MAIL CODE B30A
SAN FRANCISCO, CA 94177

PETRA BRUGGISSER
DEPUTY COUNTY COUNSEL
COUNTY OF SONOMA
575 ADMINISTRATION DRIVE, ROOM 105-A
SANTA ROSA, CA 94503

MARY NEHER
DISTRICT SECRETARY
CONTRA COSTA WATER DISTRICT
PO BOX H20
CONCORD, CA 94524

BRETT T. KAWAKAMI
EBMUD
375 11TH STREET, STE. 200
OAKLAND, CA 94541

AVIS KOWALEWSKI
VP - GOV'T & REGULATORY AFFAIRS
CALPINE CORPORATION
4160 DUBLIN BLVD, SUITE 100
DUBLIN, CA 94568

KATHERINE C. PIPER
REGIONAL MANAGING COUNSEL
CALPINE COPORATION
4160 DUBLIN BLVD., STE. 100
DUBLIN, CA 94568

MARK T. PRESTWICH
CITY MGR
CITY OF ST. HELENA
1480 MAIN STREET
ST. HELENA, CA 94574
FOR: CITY OF ST. HELENA

BENJAMIN BODELL
ATTORNEY
BEST BEST AND KRIEGER LLP
2001 N MAIN ST., STE. 390
WALNUT CREEK, CA 94596

JAMIE PANG
LEGAL FELLOW
PROTECT OUR COMMUNITIES FOUNDATION
1547 PALOS VERDES MALL SUITE 196
WALNUT CREEK, CA 94597

APRIL ROSE SOMMER
LEAD COUNSEL
PROTECT OUR COMMUNITIES FOUNDATION
1547 PALOS VERDES MALL, NO. 196
WALNUT CREEK, CA 94598
FOR: PROTECT OUR COMMUNITIES FOUNDATION

ALICE L. HARRON
CEO
HARRON, LLC

ALLIE DETRIO
POLICY MANAGER
ENGIE SERVICES

4016 EVERETT AVE.
OAKLAND, CA 94602

500 12TH STREET, SUITE 300
OAKLAND, CA 94607

RACHEL JONES
EAST BAY MUNICIPAL UTILITY DISTRICT
375 ELEVENTH STREET
OAKLAND, CA 94607

SAJI THOMAS PIERCE
EAST BAY MUNICIPAL UTILITY DISTRICT
375 11TH STREET
OAKLAND, CA 94607-4240

CATHERINE E. YAP
BARKOVICH & YAP, INC.
PO BOX 11031
OAKLAND, CA 94611

PAUL NELSON
CONSULTANT
BARKOVICH & YAP, INC.
PO BOX 11031
OAKLAND, CA 94611

LEON BLOOMFIELD
ATTORNEY
LAW OFFICES OF LEON BLOOMFIELD
1901 HARRISON STREET, SUITE 1400
OAKLAND, CA 94612

SHERIDAN PAUKER
PARTNER
KEYES & FOX LLP
436 14TH STREET, SUITE 1305
OAKLAND, CA 94612

ALEX J. MORRIS
VP - POLICY & OPERS
CALIFORNIA ENERGY STORAGE ALLIANCE
2150 ALLSTON WAY, STE.400
BERKELEY, CA 94709

PAUL SCHULMAN
SR RESEARCH FELLOW
CTR FOR CATASTROPHIC RISK MGNT
MILLS COLLEGE
UNIVERSITY OF CALIFORNIA
BERKELEY, CA 94720

FRANK LINDH
ATTORNEY
CITIZENS ENERGY CORPORATION
110 TAYLOR STREET
SAN RAFAEL, CA 94901
FOR: CITIZENS ENERGY CORPORATION

PHILLIP MULLER
PRESIDENT
SCD ENERGY SOLUTIONS
436 NOVA ALBION WAY
SAN RAFAEL, CA 94903

MARC KOLB
GRID DEL SOL CONSULTING
46 VISTA DEL SOL
MILL VALLEY, CA 94941

LUISA F. ELKINS
SR. DEPUTY CITY ATTORNEY
CITY OF SAN JOSE
200 EAST SANTA CLARA ST., 16TH FL TOWER
SAN JOSE, CA 95113-1905

SUSIE BERLIN
LAW OFFICES OF SUSIE BERLIN
1346 THE ALAMEDA, SUITE 7-141
SAN JOSE, CA 95126

BRUCE GOLDSTEIN
COUNTY COUNSEL
COUNTY OF SONOMA
575 ADMINISTRATION DRIVE, ROOM 105-A
SANTA ROSA, CA 95403

CORY Oâ€™DONNELL
CHIEF DEPUTY COUNTY COUNSEL
COUNTY OF SONOMA
575 ADMINISTRATION DRIVE, ROOM 105-A
SANTA ROSA, CA 95403

ADAM ABEL
ASSIST. CITY ATTORNEY
CITY OF SANTA ROSA
100 SANTA ROSA AVENUE, RM 8
SANTA ROSA, CA 95404

SUE A. GALLAGHER

KATHARINE L. ELLIOTT

CITY ATTORNEY
CITY OF SANTA ROSA
100 SANTA ROSA AVE., RM 8
SANTA ROSA, CA 95404

COUNTY COUNSEL
COUNTY OF MENDOCINO
501 LOW GAP ROAD, RM 1030
UKIAH, CA 95482
FOR: COUNTY OF MENDOCINO

JORDAN PINJUV
COUNSEL
CALIFORNIA INDEPENDENT SYSTEM OPERATOR
250 OUTCROPPING WAY
FOLSOM, CA 95630
FOR: CALIFORNIA ISO

LAURA J. MANZ
DIRECTOR
ENERGY NAVIGANT
35 IRON POINT CIRCLE, STE. 225
FOLSOM, CA 95630

JOHN DRISCOLL
CITY ATTORNEY
CITY OF PLACERVILLE
31001 CENTER STREET
PLACERVILLE, CA 95667
FOR: CITY OF PLACERVILLE

LANDIS MARTTILA
IBEW 1245
30 ORANGE TREE CIRCLE
VACAVILLE, CA 95687

AMY WARSHAUER
MGR - GOV'T & EXTERNAL AFFAIRS
FRONTIER COMMUNICATIONS
1201 K STREET, SUITE 1980
SACRAMENTO, CA 95814

ASISH GAUTAM
CALIF PUBLIC UTILITIES COMMISSION
OFFICE OF THE SAFETY ADVOCATE
300 Capitol Mall
Sacramento, CA 95814

AUDRA HARTMANN
PRINCIPAL
SMITH, WATTS & HARTMANN
925 L STREET, SUITE 220
SACRAMENTO, CA 95814

CHARLIE BORN
FRONTIER COMMUNICATIONS
1201 K STREET, STE. 1980
SACRAMENTO, CA 95814

CHERYL COX
CALIF PUBLIC UTILITIES COMMISSION
PROCUREMENT STRATEGY AND OVERSIGHT BRANC
300 Capitol Mall
Sacramento, CA 95814

DRUCILLA DUNTON
CALIF PUBLIC UTILITIES COMMISSION
ENTERPRISE RISK AND COMPLIANCE OFFICE
300 Capitol Mall
Sacramento, CA 95814

FILIBERTO A. PINEDA
CALIF PUBLIC UTILITIES COMMISSION
OFFICE OF THE SAFETY ADVOCATE
300 Capitol Mall
Sacramento, CA 95814

JOSHUA NELSON
ATTORNEY
BEST BEST AND KRIEGER LLP
500 CAPITOL MALL, STE. 1700
SACRAMENTO, CA 95814

LAURA FERNANDEZ
ATTORNEY
BRAUN BLAISING SMITH WYNNE, P.C.
915 L STREET, STE 1480
SACRAMENTO, CA 95814
FOR: CALIFORNIA MUNICIPAL UTILITIES
ASSOCIATION

LAURA MCWILLIAMS
STATE SENATOR JERRY HILL
STATE CAPITOL, ROOM 5035
SACRAMENTO, CA 95814

NICK CRONENWETT
LEGISLATIVE ANALYST

ANDREW B. BROWN
ELLISON SCHNEIDER HARRIS & DONLAN LLP

CALIFORNIA STATE ASSOC. OF COUNTIES
1100 K STREET, STE 101
SACRAMENTO, CA 95814

2600 CAPITOL AVENUE, STE. 400
SACRAMENTO, CA 95816

JEFFERY D. HARRIS
ATTORNEY
ELLISON SCHNEIDER HARRIS & DONLAN LLP
2600 CAPITOL AVENUE, STE. 400
SACRAMENTO, CA 95816

BRIAN S. BIERING
ATTORNEY
ELLISON SCHNEIDER HARRIS & DONAN LLP
2600 CAPITOL AVE., STE. 400
SACRAMENTO, CA 95816-5931
FOR: DATC PATH 15, LLC

JOY MASTACHE
SR. ATTORNEY - OFF. OF GEN. COUNSEL
SACRAMENTO MUNICIPAL UTILITY DISTRICT
6301 S STREET, MS A311
SACRAMENTO, CA 95817

TIM MASON
POLICY DIR
LARGE-SCALE SOLAR ASSOCIATION
2501 PORTOLA WAY
SACRAMENTO, CA 95818

SARBJIT BAGRI
CALIF PUBLIC UTILITIES COMMISSION
OFFICE OF THE SAFETY ADVOCATE
180 Promenade Circle, Suite 115
Sacramento, CA 95834

SULTAN BANU ACIMIS
CALIF PUBLIC UTILITIES COMMISSION
ELECTRIC SAFETY AND RELIABILITY BRANCH
180 Promenade Circle, Suite 115
Sacramento, CA 95834
FOR: SED

KERRI TIMMER
SIERRA BUISNESS COUNCIL
10183 TRUCKEE AIRPORT RD
TRUCKEE, CA 96161

CATHIE ALLEN
DIR - REGULATORY AFFAIRS
PACIFICORP
825 N. E. MULTNOMAH, SUITE 300
PORTLAND, OR 97232

HEIDE MARIE CASWELL
PACIFICORP
825 NE MULTNOMAH, STE. 1700
PORTLAND, OR 97232

JESSICA BUNO RALSTON
LEGAL COUNSEL
PACIFICORP
825 NE MULTNOMAH, SUITE 1800
PORTLAND, OR 97232

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