BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of SAN DIEGO GAS & ELECTRIC COMPANY (U 902 M) for Review of its Safety Model Assessment Proceeding Pursuant to Decision 14-12-025.	Application No. 15-05-___ (Filed May 1, 2015)

PREPARED DIRECT TESTIMONY OF

MASON WITHERS

ON BEHALF OF SAN DIEGO GAS & ELECTRIC COMPANY

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I. OVERVIEW AND PURPOSE

The purpose of my testimony is to discuss the on-going evolution of San Diego Gas & Electric Company's ("SDG&E") risk management of wildfires,[1] which will include discussion of Fire Risk Mitigation ("FiRM"), Reliability Improvements in Rural Areas Team ("RIRAT") and a computer model known as the SDG&E Wildfire Risk Reduction Model ("WRRM"). Each of these efforts is inter-connected and will help to illustrate past progress and point to future developments of wildfire risk management. WRRM will be a tool that will lend support to future utility rate cases and the Risk Assessment Mitigation Phase ("RAMP").

SDG&E has identified wildfire risk as a key risk on its enterprise risk registry.[2,3] My testimony explains how SDG&E derives risk levels, and how SDG&E creates mitigation plans. SDG&E's wildfire mitigation uses a risk management framework that is aligned with the SDG&E's risk management six-step model presented in the prepared direct testimony of Jorge Da Silva. The six-step model applies to wildfire risk management practices as follows:

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[1] A wildfire is defined as "an undesirable fire that burns native vegetation". Wildfires, can range from 1 square foot to over 100,000 thousand acres. The term "utility associated wildfire" is defined as a wildfire whose ignition occurred in conjunction with an electric utility incident or asset. This term distinguishes between a wildfire that subsequently affects a utility - such as when a fire that was started by a barbecue spreads and burns down a wood utility pole. The term "utility associated wildfire" is not specific as to cause. For example, utility associated wildfires have occurred due to utility equipment failing, while other utility associated wildfires were caused by a non-utility entity contacting a utility asset - such as a vehicle colliding with a utility pole.

[2] A risk registry is a log that captures in one place a description of risks, an assessment of the probability and consequence of occurrence, the controls employed and an assessment of the inherent, residual and target risks. Both SDG&E and SoCalGas have developed risk registries, which identify and prioritize top risks within each organization.

[3] Direct Testimony of John E. Jenkins, A.14-11-003, submitted on November, 2014, at p.JDJ-6 lines 15-17.

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In my testimony, I will present an overview of steps 1 through 4 of SDG&E’s wildfire risk management framework.

Wildfire risk management can be viewed as a continuous loop that includes the following steps:

1. Planning;
2. Analyzing data;
3. Creating and funding risk mitigation projects; and
4. Evaluating outcomes.

After evaluating outcomes, the SDG&E FiRM team starts the process over.

As noted above, wildfire is one of SDG&E’s highest risks. Addressing this risk requires a multi-faceted systematic approach. For example, over the last few years, SDG&E has, through root cause analysis, considered the following: specific geographic conditions, weather patterns, ignitions and their causes, and electric operations practices.

As part of the design and implementation of the FiRM program, SDG&E has developed and is implementing one of the most comprehensive wildfire risk management programs. Because SDG&E’s approach is evolving, there may be additional risk mitigation actions required to further mitigate our wildfire risk. SDG&E will continue to use the process described above and in Mr. Da Silva’s testimony to evolve our wildfire risk mitigation processes.

Additionally, because FiRM addresses one of SDG&E's top priority risks to its electric system, the tools and models that were developed are sophisticated and costly. SDG&E recognizes that there needs to be a balance between the amount of risk mitigated and costs. The same magnitude of the investment in FiRM may not be feasible for other risks.

II. BACKGROUND AND RISK DEVELOPMENTS LEADING TO FIRM

Wildfires are a significant risk in SDG&E's service territory. Wildfires in 2003 and 2007 had devastating impacts on San Diego County. This section provides an overview of the steps SDG&E has taken since the devastating fires of 2007 to identify, evaluate and mitigate wildfire risk.

A. Subject Matter Experts ("SME")

After the October 2007 wildfires, SDG&E created a multi-discipline team, referred to as the Fire Prep team, to begin to identify the root causes of wildfire risk. Today, in addition to continuing to identify and evaluate wildfire risk, the Fire Prep team members manage specific wildfire risk mitigation projects. Such projects include communication strategies with customers and communities during fire weather, creating training materials for company field employees on how to perform jobs during fire weather, and prioritizing hardening of transmission lines in fire prone areas.

Later, the Fire Preparedness Steering Committee was formed to strategize and coordinate fire mitigation initiatives. The Fire Prep team and the Fire Preparedness Steering Committee call upon various experts including meteorology, Fire Coordination, Electric Reliability, and various engineering and operations personnel. The use of SME's has continued to expand since the creation of the Fire Prep team.

B. Identifying Controls to Mitigate the Wildfire Risks

Since 2008, SDG&E has had in place organizations and staff to determine how wildfire risks can be mitigated or controlled. The Reliability Improvements in Rural Areas ("RIRAT") team was a group of SMEs that was formed in 2009 to plan how wildfire risk could be mitigated through the creation of new cost effective distribution overhead standards and resiliency/system hardening strategies. An example of their work is the *Backcountry Design Guide* ("Guide"), which established construction standards for rural areas. The Guide, for example, recommends that new or replaced distribution pools and cross arms are, respectively to be made of steel.

Today, while RIRAT continues to capture information regarding the SDG&E system and wildfire risk, SDG&E has expanded the wildfire risk initiative under the Fire Risk Mitigation ("FiRM") program.

FiRM has utilized existing geographic based data - including Fire Threat Zones ("FTZ"),[4] Highest Risk Fire Areas ("HRFA"),[5] Potential Damage Zones ("PDZ")[6] – and has also developed the Wildfire Risk Reduction Model (WRRM). Together these reflect the probability and consequence of a wildfire within a particular geography.

III. FIRE RISK MITIGATION PROGRAM

In 2013, SDG&E used the fire hardening efforts from RIRAT and combined it with a program designed to address pole loading issues, creating the FiRM program. FiRM addresses fire risk by hardening critical areas, by replacing older line elements, by utilizing advanced technology, and by improving facilities to adequately handle known local weather conditions.

Based upon the intended role of FiRM, FiRM focuses on three inputs:

- Probability of failure.
- Age of the infrastructure.
- General fire risk and consequence of ignition.

A. Overview of FiRM Risk Management Process

As stated earlier, this section will provide an overview of steps 1 through 4 of the wildfire risk management process. The following is a brief discussion of the analytical breakdown of a wildfire risk assessment, beginning with an overview of how an ignition becomes a significant utility associated wildfire.

First, an ignition related to SDG&E occurs due to one of many various reasons. Combustion may occur but dissipate quickly, or may be limited to smoke, or could grow to include flame. If the event continues the initial ignition can ignite non-utility equipment – usually vegetation. From that point forward the ignition is considered a wildfire and will spread depending on the circumstances. Eventual damage from the wildfire is dependent on many conditions, including weather, vegetation, proximity and value of structures, proximity to fire suppression resources, and so forth.

Using the above steps of a utility associated wildfire, it is possible to analyze each step. Possible studies during this analysis are:

[4] The FTZ is the area where wildfires are most likely to start.
[5] The HRFA is a geographic area within SDG&E's service territory where there is the combination of high vegetation density and possibility of strong Santa Ana winds.
[6] The PDZ is an analysis to determine the estimated societal impact of an ignition on a near-worst case day (i.e. strong winds, dry vegetation).

- a study of ignitions and their probabilities;
- a study of the types of equipment that are involved in ignitions - along with where the analyzed equipment exists within the SDG&E service territory;
- a study of how weather impacts ignition rates and particular equipment;
- a study of how vegetation propagates fire depending on weather; and
- a study of how fire will spread assuming an ignition and particular weather patterns.

Furthermore, it is generally accepted that fire risk modeling cannot solely rely on deterministic approaches. For example, two ignitions that started at the exact same place but on separate days can create very different outcomes. Or consider the ability for the utility to know the course that a wildfire might take given a chosen scenario. Fire behavior cannot be modeled exactly because exact inputs cannot be determined. Wind speeds, vegetation fuel amounts, fire suppression efforts are all undeterminable, and can only be estimated on a broad scale. In the above list of steps of analysis, each study can only determine data to general statistical characteristics such as averages. No one can say with 100% certainty which conductor will be hit by a tree branch during a certain weather condition.

For the reasons stated above, SDG&E believes in a probabilistic methodology. The idea behind the probabilistic methodology is that likelihoods of events and likelihoods of consequences are used rather than rigid rules. Known uncertainties include, but are not limited to: the frequency of strong winds, the actual strength of the maximum wind at a particular location, the vegetation fuel characteristics during high winds; the likelihood that equipment will fail during certain environmental conditions, the likelihood that a non-utility object will contact the electrical system, the likelihood that an ignition will become a wildfire, the variation of consequences of a wildfire in terms of property loss and other social impacts.

Above are examples of data that SDG&E believe are important contributors to fire risk, but cannot be determined precisely for all scenarios. Additionally, there are likely contributors to fire risk that have not even been determined yet. As an example of the difficulties in identifying all wildfire risks, the Los Angeles Times had a news article in 2001 about a hawk that picked up a snake, and then later dropped it on power lines. The article states that a five acre fire ensued but that the progress of the fire was manageable due to how well the community had cleared their vegetation beforehand.[7] It is a truly difficult task to

[7] http://articles.latimes.com/2001/jun/27/local/me-15274.

brainstorm all types of ignition causes and how well each community has prepared itself when an ignition occurs..

SDG&E has not created formal probability distributions for each of the unknowns listed above. In some cases, broad ranges of input are used. In other cases, worst or near-worst case inputs are used. FiRM was created at a time when work on determining probabilities was beginning in more earnest. Eventually these efforts lead to a computer model called Wildfire Risk Reduction Model ("WRRM").

B. Database Information, Weather Networks and Models

In order to identify risks, SDG&E maintains databases which can be mined to identify potential root causes of wildfire risks. Examples include the electric reliability database that has data back to 1981, and a wildfire database that tracks information about certain fires in San Diego.

In addition to databases, SDG&E uses a network of weather stations and models to further evaluate the risk of a wildfire. Weather conditions are not only a cause of a fire, but also are a factor in the spreading of the fire. Therefore, weather conditions can be a leading indicator of wildfire risk. SDG&E has built a network of weather stations (160 locations) that capture weather data every 10 minutes. The weather network, together with historic low resolution data and a study of 50 years of California wildfire history, allows SDG&E to model the probability distribution of wind and to establish engineering standards that a specific to a geographic location.

The specific components of general fire risk are the analysis regarding the 50-year wind data and the PDZ. The 50 year wind study gave the ability to understand the areas that would experience significant winds. The FiRM team was compelled to expand the number of sections that met their topmost priority areas when it was understood how widespread the high winds were. Utilities build their overhead system to a certain strength based upon a few factors including wind and the potential for ice to be on the line. (Ice adds weight and also creates a larger cross-section for wind to affect.) The standard for construction is to build to the stronger between 1) a minimum strength requirement and 2) known local conditions. Prior to SDG&E's wind study, known local conditions were limited. Considering the availability of weather data in remote locations, it is likely that the poles built before the year 2000 did not have accurate weather data to work with. Consequently, the system was either built to the minimum standard or to the utility's estimate. The 50 years of wind data expanded SDG&E's knowledge of specific geographic areas and the effects of wind. This data has been used in WRRM.

WRRM uses the following inputs:

- vegetation and fuels data;
- weather and predictive services data;
- historical fire occurrence and outage history;
- fire behavior analysis and simulation models;
- SDG&E's electrical distribution network assets, conditions and characteristics;
- subjective values-at-risk parameters; and
- risk reduction projects.

WRRM is a computer based model that is being released in phases. Ultimately, the outputs from the WRRM model will replace existing information. For example, the model may generate high resolution fire growth information that could eventually confirm or modify the PDZ data that was created by the Fire Coordination group.

WRRM takes a probabilistic approach to each of the ignition-to-wildfire steps listed above. When complete it will create probability distributions for:

- Ignitions rates by equipment type and external causes
- Fire growth potentials
- Values at Risk

Once these probabilities are in place, SDG&E will run simulations of wildfire risk. Simulations can be configured for all weather types, or specific weather patterns. There are two important concepts that arise from the ability to model this information: 1) capability to calculate estimates of wildfire risk as the electrical system exists in time; 2) capability to model reductions in ignition rates – from a capital project, for example – to estimate the risk mitigation from the project. Monte Carlo simulations can be run to determine risk distributions.

C. Further Evolution of FiRM

An important notion is the idea of continuous improvement from a risk perspective. In general, it is unlikely SDG&E will ever know everything about wildfire risk. But it is possible for SDG&E to continue to increase its understanding of risk and to evolve the processes, tools, and models used to mitigate wildfire risk.

IV. SUMMARY AND CONCLUSION

SDG&E is on an evolving path of wildfire risk mitigation. The path is one of continuous improvement that will build upon previous analysis and knowledge. SDG&E is committed to finding cost effective solutions to wildfire risk mitigation using a combination of subject matter input, data sources of relevant information, probabilistic computer modeling, and lessons learned from engineering and construction projects. Using the principles of SDG&E's Enterprise Risk Management framework, the goal is to be able to identify the appropriate strategies and knowledge to determine the optimal risk mitigation.

Not all risks that SDG&E has in its registry can justify the time, resources, and money that will need to be used for wildfire risk mitigation. FiRM and its related wildfire risk programs are a good use of resources due to the importance to public safety.

Although WRRM was built to work with FiRM, for the purposes of identifying which pole sections to rebuild, the capabilities of WRRM will be used for many other initiatives as they arrive. The continuous cycle of improving risk assessment and mitigation efforts will advance with the best available tools and data, and may spawn new tools and data as needed.

This concludes my prepared direct testimony.

V. WITNESS QUALIFICATIONS

My name is Mason Withers. I am employed by San Diego Gas & Electric Company (“SDG&E”). My business address is 8316 Century Park Court, San Diego, CA 92123. Since April 2013, I have been the Electric Analysis and Solutions Manager where I oversee Electric Reliability reporting, analysis, and capital projects. I started my career with SDG&E in June 2006. During this time I have held various analytical and leadership positions. I have been involved in fire mitigation analysis and activities since 2007, including being a member of the team representing SDG&E in the CPUC Fire Safety Order Instituting Rulemaking (“OIR”).

Before joining SDG&E, I worked for the University of California, San Diego and The Salk Institute for Biological Studies. I hold a bachelor’s degree in Mathematics from the University of California, San Diego. I also hold a Master’s of Business Administration from San Diego State University.

I have not testified previously before the Commission.

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