SAN DIEGO GAS & ELECTRIC COMPANY

FIRE PREVENTION PLAN

OCTOBER 31, 2014

TABLE OF CONTENTS

I. Executive Summary 4

II. Minimizing Sources of Ignition 8

A. Mapping the High-Risk Fire Areas in the SDG&E Service Territory 8

1. Mapping the Fire Threat Zone 8

2. Mapping the Highest Risk Fire Area 9

B. Fire-Hardening the SDG&E System 10

1. Design and Construction Standards 12

2. Wood-to-Steel Program 12

3. Undergrounding Line Segments and Facilities 13

4. Automated Reclosers 14

5. Fire Detection and Fire Alerts 14

6. Testing and Deploying Emerging Technologies 15

7. Facility Inspection and Repair Program 16

8. Oversight of Activities in the Rural Areas 17

9. Fire Risk Mitigation (FiRM) Program 19

III. Operational Practices for Reducing the Risk of Ignition 19

A. System Management: Quality Assurance and Quality Control 19

B. Enhanced Vegetation Management and Clearance Program 21

C. Coordination with Communications Infrastructure Providers 22

D. Workforce Training and Field Practices 22

IV. Mitigating the Threat of Fire: Awareness and Readiness 23

A. Situational Awareness 23

B. The Fire Potential Index 26

C. The SDG&E Emergency Operations Center 26

D. Crew Mobilization and Deployment Strategy 30

E. Field Patrols 30

V. Fire Suppression and Recovery 30

A. Fire Coordination Personnel 31

B. Firefighting Assets and Resources 31

1. Utility Wildfire Prevention Team 31

2. **Aviation Services Department** 32
3. **The Industrial Fire Brigade** 32
4. **Miscellaneous Assets** 33

C. Recovery Activities **33**

D. Fire Incident Data Collection Plan **34**

VI. Community Outreach and Public Awareness **35**

A. Fire Safety Stakeholder Council 35

B. Partnering with Firefighting Agencies 35

C. Community Partnerships 36

D. Fire Preparedness Website 38

E. Fire Mitigation Funds 38

Appendix A - 2014 Map of SDG&E FTZ, HRFA, and Meteorologist Network **40**

I. Executive Summary

San Diego Gas & Electric Company ("SDG&E") provides this Fire Prevention Plan in compliance with Ordering Paragraphs 2, 4 and 5 of Commission Decision 12-01-032 (the "*Fire Safety Order*"), and Standard 1.E of General Order (GO)166. Those Ordering Paragraphs in Decision 12-01-032 provided the following directions:

2. Each investor-owned electric utility in Southern California shall (i) prepare a fire-prevention plan, and (ii) file and serve a copy of its fire-prevention plan by December 31, 2012, via a Tier 1 compliance advice letter.

4. The fire-prevention plans required by today's decision shall address situations where all three of the following conditions occur simultaneously: (i) three-second wind gusts exceed the structural or mechanical design standard for the affected overhead power-line facilities, (ii) these three-second gusts occur during a period of high fire danger, and (iii) the affected facilities are located in a high fire-threat area.

5. The fire-prevention plans required by today's decision shall specify (i) how the investor-owned electric utility will identify the occurrence of three-second wind gusts that exceed the structural or mechanical design standards for overhead power-line facilities; and (ii) the countermeasures the utility will implement to mitigate the threat of power-line fire ignitions.

A. Standard 1.E was added to GO 166 in January 2012 and was modified by Decision 14-05-020 (May 15, 2014). Standard 1.E requires SDG&E to prepare and submit plans to prevent power-line fires during extreme fire-weather events. As ordered by D.12-01-032, SDG&E submitted its first Fire Prevention Plan (FPP) by Advice Letter 2429-E on 12/31/2012. Resolution E-4576 (issued May 23, 2013) required SDG&E to make minor modifications to its FPP; these modifications were incorporated by SDG&E's supplemental Advice Letter filing 2429-E-A. The supplemental AL 2429-E-A was approved by a disposition letter from the Director of the CPUC's Energy Division on June 18, 2013, with an effective date of May 23, 2013. Consistent with General Order 166, D.12-01-032, and D.14-05-020, SDG&E's updated 2104 FPP is attached to this report as Appendix 1.

The SDG&E Fire Prevention Plan provides a comprehensive inventory of the organizational and operational activities SDG&E undertakes in order to address the risk of fire in the SDG&E service territory. The catastrophic wildfires which devastated San Diego County in 2007, unprecedented in their sheer magnitude, resulted in an enduring culture change reflected throughout SDG&E's' utility operations, system and facilities, organization, and corporate goals and objectives. As evidenced in this Fire Prevention Plan, SDG&E has a company-wide, single-minded focus on addressing and minimizing wildfire-related risks to public health, safety and welfare. SDG&E's commitment to fire safety, prevention, mitigation, control, and recovery is a central tenet of our corporate culture. SDG&E takes a leadership role in addressing fire threats in the communities we serve and shares our personnel, resources, information, communications facilities, and/or fire-defense assets so as to enhance the capabilities of our local communities to defend against any repeats of catastrophic wildfire events experienced in southern California.

The SDG&E Fire Prevention Plan reflects a broad range of activities performed throughout the SDG&E organization. The Fire Prevention Plan is subject to the direct supervision of senior management, and its effectiveness is a performance measure for many SDG&E employees, some of whom are directly or indirectly responsible for contributing to and/or performing the activities described in the Fire Prevention Plan. The SDG&E Fire Prevention Plan begins with system design, construction, operation, maintenance, inspection, and repair activities aimed at significantly reducing the potential for SDG&E facilities to become the source of ignition for a fire. Nevertheless, the ubiquity of our facilities and the range of operating conditions faced in the SDG&E service territory present some risk that our facilities, no matter how diligent or conservative our practices, might become the original or contributing source of ignition for a fire. To address this risk, SDG&E has implemented extensive operational programs designed to monitor the system closely whenever and wherever the threat of fire is elevated so that, in the event of an ignition, the threats to public safety from fire are quickly abated or mitigated as fully and quickly as possible. These programs include gathering and analyzing the data from SDG&E's 149 weather stations, the third-largest private meteorological network in the country, to determine where and when the threat of a wildland fire will present itself, which in turn facilitates the immediate organization and implementation of the SDG&E response appropriate to the threat.

SDG&E monitors all wildland fires in its service territory. These are fires that burn vegetation and are capable of propagation and may also threaten SDG&E facilities or may involve an SDG&E asset.

SDG&E's Fire Prevention Plan also includes firefighting and fire–recovery activities. In the event fire conditions threaten public safety or SDG&E facilities or may involve an SDG&E asset, SDG&E will mobilize an appropriate range of resources including trained firefighting assets, communications capabilities, data and information collection, and command facilities, to address fire threats and assure the earliest possible recovery from a fire event in the affected communities.

Finally, the SDG&E Fire Prevention Plan is a "living document". In coordination with our many stakeholders, community leaders and the public, SDG&E shares and vets the Fire Prevention Plan so as to assure its continuous improvement and maximum effectiveness. Community outreach and communications are also important aspects of the fire prevention, mitigation and recovery activities included in the Fire Prevention Plan. As SDG&E has shared and vetted the Fire Prevention Plan with stakeholders and the public, the process has created a natural audience for disseminating information before, during and after conditions related to fires and the threat of fire. This audience is an important part of the communications chain used to broadcast threat and event information.

The activities described in SDG&E's Fire Prevention Plan have earned SDG&E various accolades for planning and performance. Beginning in 2005, SDG&E has been ranked "Best in the West" in reliability by PA Consulting Group, earning their regional ReliabilityOne award for eight consecutive years. SDG&E also received PA Consulting Group's National Award for Outstanding Reliability Performance in 2010.[1] In 2008, SDG&E received PA Consulting Group's award for Outstanding Response to a Major Outage Event for our response to the 2007 wildfires. SDG&E has also been designated as a Tree Line USA utility by the National Arbor Day Foundation in recognition of our "best practices in utility arboriculture".[2] More recently, SDG&E received the Fire Safe Council Partner of the Year award for

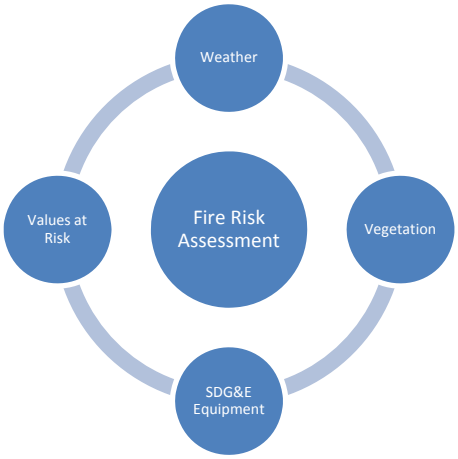
[1] Information regarding PA Consulting Group's international consulting practice and best practices awards program for the electric utility industry can be found at the firm's public website and the following address: http://www.paconsulting.com/industries/energy/merchant-utility/improving-performance-of-utility-through-benchmarking/polaris/r1-and-s1-awards/.

[2] Information regarding the National Arbor Day Foundation and The Tree Line USA program, operated in conjunction with the National Association of State Foresters, can be found at the Foundation's public website and the following address: http://www.arborday.org/programs/treelineusa/summary.cfm.

demonstrated leadership with community defensible space funding.[3] These awards validate our efforts to assure our Fire Prevention Plan is best in class and grounded in the purposes we share with the communities we serve.

Although SDG&E measures and records data such as the "three second gusts" this specific information is not used as the single data point upon which to develop and put in place the many programs that SDG&E employs in the overall prevention of fire within its service territory as described in this plan.

The goals and activities included in the SDG&E Fire Prevention Plan focus on a comprehensive and integrated assessment of the risks of fire posed by SDG&E's overhead electric system. This assessment involves an assessment of SDG&E's equipment and facilities, weather conditions, the density and condition of potential fuels such as vegetation, and the potential threat to public safety, health and welfare using value at-risk measures, all as depicted in the graphic below.



SDG&E's commitment to fire safety, prevention, mitigation, control, and recovery is a central tenet of our corporate culture. With this overarching view of fire risk assessment in mind, SDG&E presents the activities comprising its Fire Prevention Plan.

[3] Information regarding the Fire Safe Council (California Chapter), its extensive membership and Partner of the Year Award can be found at the Council's public website and the following address: http://www.firesafecouncil.org/about/index.cfm.

II. Minimizing Sources of Ignition

The SDG&E Fire Prevention Plan is founded upon the goal of minimizing the probability that the various components of its sixty nine kilovolt transmission and twelve kilovolt distribution system might become the original or contributing source of ignition for a fire. SDG&E evaluated the prudent, cost-effective changes and improvements to its physical assets that could and should be made in order to meet this objective and implemented a preventative operations, construction and maintenance plan consistent with these evaluations.

A. Mapping the High-Risk Fire Areas in the SDG&E Service Territory

SDG&E has performed and completed extensive mapping of its service territory to identify those areas at greatest risk to the occurrence of uncontrolled fires. Through these efforts, SDG&E identified two sets of geographic areas based on the potential risk of fire in the area and the threat to the public safety posed by fire. These two areas are known as the "Fire Threat Zone" (FTZ) and the "Highest Risk Fire Area"(HRFA). Generally, the FTZ includes the geographic areas most prone to wildfire due to local environmental conditions and features, and the HRFA includes areas within the FTZ where the risk of fire is the greatest.

1. Mapping the FTZ

As part of its response to Commission Rulemaking 08-11-005, SDG&E mapped its service territory to identify those areas where, due to local environmental conditions and features, the potential for wildfire was relatively high. This FTZ would be used to identify the areas where enhancements to rules, regulations and standards could reduce the potential for electric systems and facilities to ignite fires and thereby increase public safety and system reliability.

The FTZ mapping effort followed several key, objective principles. First, the FTZ was defined using parameters that would result in relatively constant boundaries not subject to continuous change and revision. This resulted in the use of criteria that tended to be conservative, *i.e*., more inclusive than exclusive, so that the FTZ would describe the complete domain where the potential for wildfire was relatively high. Additionally, the FTZ map would need to be easily understood by key personnel and users, whether utility or other public officials, who might rely upon it in performing their job responsibilities.

In performing the mapping task, SDG&E began with the vegetation data developed and maintained by the California Department of Forestry and Fire Protection ("CAL FIRE"). These data were available on the CAL FIRE Fire and

Resource Assessment Program ("FRAP") website. Using this data, SDG&E mapped the FTZ in its service territory. This zone encompasses most of the vegetated rural areas in the Counties of San Diego and Orange. Compared to the HRFA described below, the FTZ includes areas where the density of vegetation is relatively low. The FRAP maps describe the fire risks in certain areas as "low", "moderate", "high", "very high", and "extreme". Generally, the FTZ include all of the areas described in the FRAP maps as "extreme" and "very high" risk, and some portion of the areas described as "high" risk. In shaping the FTZ, SDG&E also applied its knowledge of its service area and internally developed high-resolution weather data and histories.

Because SDG&E personnel will use the FTZ map for various purposes, it was important to make the FTZ map easy to use and understand. One particular adjustment made by SDG&E to the raw data upon which the map was based was to create a contiguous FTZ, rather than create a multitude of "pockets" of high risk. The original data created a mosaic of areas of varying degrees of risk – such a map would have been difficult to interpret and use. As an example, based purely on the raw weather and vegetation data, there would have been areas where the risk of fire would have been designated as "low", "very high", and "low" again along a one-mile stretch of road. Rather than include and parse anomalies, SDG&E adjusted the shape of the FTZ to normalize the design, construction, operations, maintenance, and inspection activities across larger areas. This resulted in the inclusion of some lower-risk areas in the FTZ and, in a few cases, the exclusion of some isolated higher-risk areas from the Threat Zone. The resulting color-coded FTZ map is attached to this Fire Prevention Plan as Appendix A.

The Commission has authorized SDG&E to use its FTZ map until such time as the Commission issues its final rules and regulations governing the development and maintenance of fire-threat maps as part of Phase 3 of Rulemaking 08-11-005. SDG&E is participating in that proceeding and will update its FTZ map pursuant to the further direction of the Commission.

2. Mapping the HRFA

The HRFA represents those areas within the FTZ where local environmental conditions and features combine to create the highest risk of fire in the SDG&E service territory. SDG&E's Fire Coordinators, a team of in-house experts trained and experienced in fire behavior, fire prevention and firefighting, drafted the initial HRFA map in 2008. Using Geographic Information System software, SDG&E's experts identified areas where the combination of relatively dense vegetation,

relatively high winds, and development (*e.g.*, homes, hospitals, schools, and other community assets) presented the highest risks of fire, property losses and injury from fire. Thus, the HRFA map identifies the areas marked by an overlap of (1) the "highest risk vegetation", *i.e.*, where the vegetation was relatively dense and in close proximity to housing, business and/or community development,[4] and (2) locations prone to high winds.

As with the FTZ map, SDG&E utilized the FRAP data and maps available from CAL FIRE to determine the level of vegetation likely to exist in specific areas of the FTZ. Areas prone to high winds were identified using historical data from weather stations located throughout the SDG&E service territory. This included the use of data from SDG&E's private network of weather stations. The data were used to identify locations where there was a reasonable probability that wind speeds would exceed fifty miles-per-hour (50 mph) under the "Santa Ana" wind conditions usually experienced during the late summer and fall in southern California. Finally, SDG&E adjusted the HRFA map to reflect our own knowledge and information regarding conditions in our service territory.

The HRFA maps are reviewed annually and adjusted to reflect environmental conditions expected to be present during the coming year's fire season, typically the late summer and fall seasons of each year. For example, fire perimeters and other fire protection measures are updated annually and reflected in the HRFA maps. In addition, the methodologies used to develop the HRFA map are reviewed and modified to ensure that lessons learned are incorporated into the map. As an example, SDG&E assures that the HRFA includes areas where there are data indicating a coincidence of high winds and dense vegetation. As noted above, the Commission has authorized SDG&E to use its FTZ map until such time as the Commission issues its final rules and regulations governing the development and maintenance of fire-threat maps as part of Phase 3 of Rulemaking 08-11-005. SDG&E continues to participate in that proceeding and will update its HRFA map pursuant to the further direction of the Commission.

B. Fire-Hardening the SDG&E System

In providing this Fire Prevention Plan, SDG&E takes note that the Commission's order focuses specifically on the measures taken by SDG&E related to the occurrence of "three-second wind gusts…that may exceed the structural or

[4] In assessing fire risks and prioritizing fire prevention activities, SDG&E considers the potential that an uncontrolled fire will threaten members of the public and/or property. Based on expert analyses provided by the Fire Coordinator team, SDG&E considers the potential path a wildfire is likely to take and prioritizes its activities along those corridors where the risk to life and property are greatest.

mechanical design standards for overhead power-line facilities." In reviewing the SDG&E Fire Prevention Plan, the Commission should be aware that SDG&E organizes its activities around addressing the threat of fire posed by various conditions and, in particular, on reducing the potential that SDG&E's facilities or operations might provide an original or contributing source of ignition for a fire. As the *Fire Safety Order* correctly anticipates, forecasted and ambient wind conditions, especially when high winds combine with the hot, dry conditions typically experienced during the late summer and fall seasons in southern California, are an important factor in assessing and addressing fire threats.

Three-second gusts represent a "measurement standard" rather than an independent "fire condition". That is, the weather instruments relied upon by SDG&E for measuring wind conditions are designed and calibrated to measure, record and report wind speeds across ten-minute periods – the average of the wind speeds recorded across any single ten-minute period is reported as the "sustained wind". In computing wind data for each ten-minute period, wind speeds are measured across three-second intervals and the highest wind speed reached during any three-second interval within any ten-minute period is separately recorded as the highest "gust" for the period. With respect to assessing and responding to the potential threat of fires, SDG&E takes potential and actual wind speeds into account, both as to sustained winds and gusts. Although both sustained wind speeds and gusts are considered, SDG&E's Fire Prevention Plan programs and activities are not designed around either wind measure. Rather, both are considered within a full range of inputs related to Fire Prevention Plan programs and activities.[5] The three-second interval by which "gusts" are measured is not, then, an independent operational planning standard or the focus of facility design and construction standards. Thus, SDG&E closely monitors the current weather situation and adjusts its operation to take into account current wind speeds "that may exceed the structural or mechanical design standards for overhead power-line facilities", however SDG&E's safety-related activities cannot be said to address the potential for strong wind *gusts* as a stand-alone criterion.

Using the FTZ and HRFA maps, SDG&E evaluated the prudent and cost-effective system improvements it could make to its transmission and distribution system

[5] As an example, among the non-environmental factors taken into account as SDG&E evaluates the threat of fire is whether firefighting assets are available or unavailable. Where local firefighting assets might have been previously deployed to a distant locale to fight an existing fire, SDG&E would be more conservative in assessing the actions it might take to abate or mitigate the potential threats within its service area. Winds would be a factor, but not the single determining factor under this circumstance, in deciding SDG&E's response to the local threat of fire.

which would reduce the potential for SDG&E's facilities in the FTZ and HRFA to provide the source of ignition for a fire. In part, this evaluation was performed in conjunction with the Commission's Rulemaking 08-11-005 – during Phase 1 of the proceeding, the Commission modified, with SDG&E's full support, various design, construction, maintenance, and inspection standards consistent with reducing the threat of fire posed by overhead electric and communications facilities.

1. Design and Construction Standards

To reflect the more stringent design and construction standards adopted by the Commission and so as to improve the performance of the SDG&E system in terms of meeting fire-prevention goals, the SDG&E Facilities Design Manual was modified to include an entirely new section aimed at providing guidance for hardening circuits against the risk of fire. These modifications include both proactive measures designed to reduce the incidence of ignitions and reactive measures by which SDG&E can respond to the threat of fires and mitigate the spread of fires.

SDG&E is also an aggressive advocate for modernizing those portions of the Commission's General Order 95 which provide the rules and regulations governing the design and construction of overhead electric and communications facilities. SDG&E continues to participate in the discussions regarding Load and Resistance Factor Design (LRFD) and a new "High Fire Risk District" with stakeholders in Phase 3 of the Commission's Rulemaking 08-11-005, with the objective of improving General Order 95's focus on fire-safety and system-reliability objectives. Fire safety begins with the design and construction standards pursuant to which utility facilities are designed, built and operated, so improving these regulations will provide the foundation for assuring that facilities built in the future will be stronger and safer than those built under prior versions of the rules.

2. Wood-to-Steel Program

Of major significance is SDG&E's program to undertake a large-scale replacement of wood poles used in those portions of the SDG&E sixty-nine (69) kilovolt transmission and twelve (12) kilovolt distribution system located in the FTZ and HRFA, substituting steel poles in their place. These poles are designed to withstand working loads under the stress of eighty-five mile-per-hour (85 mph) wind speeds. To date, SDG&E has installed over 3,900 new steel poles in the FTZ, and plans on further investment to aggressively continue to replace wood distribution and transmission poles with steel poles. These new steel pole facilities

are being installed in conjunction with the application of heavier conductors which allow SDG&E to increase the spacing between lines beyond the requirements of Commission General Order 95, resulting in a decrease in the likelihood live lines will come into contact with one another or arc after being struck by flying debris. In addition, SDG&E's current design standards now reflect the use of steel poles over wood poles in the FTZ.

3. Undergrounding Line Segments and Facilities

In 2011, SDG&E formed a technical team with expertise in the undergrounding of distribution systems and facilities. The team evaluated the undergrounding of various circuits, segments, elements, and equipment located in the HRFA. These experts provided senior management with an understanding of the potential for undergrounding portions of the overhead system in order to mitigate the risk of fire. The team's initial analysis identified ten (10) undergrounding projects where the potential for mitigating fire risks was promising. These projects were studied as test cases so that the team could identify and possibly resolve complexities associated with undergrounding SDG&E's facilities in the FTZ and HRFA.

Following completion of 4 these projects in 2013, undergrounding, although more costly and complex than rebuilding/hardening the overhead structures, has been determined to be a viable hardening option in the HRFA. With the CPUC's approval of Rule 20D and the criteria approved therein, SDG&E is now re-examining use of undergrounding in the HRFA required to meet the new Rule 20D guidelines. This Fire Prevention Plan will be updated later in 2014 to reflect the future scope of undergrounding upon completion of the scoping sessions.

Special Case: The Cleveland National Forest Master Special Use Permit (MSUP) and Permit to Construct (PTC) for Power Line Replacement Projects. SDG&E currently operates and maintains a network of electric facilities located within the Cleveland National Forest (CNF). In September of 2012 SDG&E filed an application for a "Master Special Use Permit" (MSUP) to operate and maintain facilities within CNF. In addition to the MSUP SDG&E worked closely with the U.S. Forest Service (USFS) to develop a series of projects and activities aimed at increasing safety and reliability of existing electric facilities within and near the CNF. Preliminary approval for these projects and associated permits have been obtained with final approval expected in May of 2015.

These projects will increase safety and reliability by replacing existing electric infrastructure that currently serves the USFS, emergency service facilities (fire,

communication and other), campgrounds, homes, businesses, and other customers within the CNF and surrounding areas. The proposed projects include replacement of several existing 12 and 69 kilovolt electric facilities spread throughout an approximately 880 square mile area in Eastern San Diego County. The existing electric lines located within CNF also extend outside of CNF boundaries. The overall project includes operational components complementing SDG&E's Community Fire Safety Program, which in turn includes community outreach, new fire prevention measures, and enhanced emergency response.

The project design was based on various recommendations addressing fire prevention and the Forest's environmental and visual values. Using an analytical matrix reflecting elements of fire risks and environmental concerns, SDG&E and the Forest Service collaborated to determine which sections of the system should be upgraded. Each segment required a custom solution based on many factors, including the location of the customer being served by the distribution system, the topography of the land, and various biological, cultural and environmental factors.

4. Automated Reclosers

As part of its Community Fire Safety Program, SDG&E has undertaken one of the nation's largest deployments of state-of-the-art pulse reclosers, focusing heavily on the FTZ and HRFA. This equipment allows SDG&E to operate its system with significantly reduced energy flows during reclosing operations and be able to sectionalize various elements of its distribution system to better manage system operations and reliability. These pulse reclosers and other Supervisory Controlled and Data Acquisition ("SCADA") controlled reclosers are managed remotely by SDG&E Distribution System Operators via the SDG&E Smart Grid Network. In addition, SDG&E has implemented more sensitive relay settings to all SCADA reclosers in the HRFA. These sensitive relay settings provide very fast clearing of faults on distribution circuits and are implemented via SCADA, allowing for real-time adjustments triggered by adverse weather conditions. Importantly, these reclosers are tied to the fire-related programs described later in this Fire Prevention Plan.

5. Fire Detection and Fire Alerts

In addition to improving the SDG&E system, SDG&E is leveraging its assets to address fire threats. Along these lines, SDG&E has placed high-visibility, high-resolution rotating cameras on twenty-nine (29) key towers along those portions of

the newly constructed Sunrise Power Link located in the FTZ and HRFA.[6] The cameras were activated in September 2012, can be controlled remotely and can rotate a full 360 degrees, and are coupled with an advanced centralized smoke-detection algorithm, which allows for early fire-detection and -warning capabilities.

SDG&E is also collaborating with the staff at the University of California, San Diego, responsible for the operation of the San Diego High-Performance Wireless Research and Education Network. This high-speed wireless data network is designed to connect hard-to-reach areas in remote environments and provide real-time data; the network includes earthquake sensors and mountaintop cameras, the latter having become a part of the emerging early fire-detection and fire-warning system being deployed in the San Diego backcountry. At this point there are a total of 19 camera locations with 4 cameras per location and two views per camera in the system, 8 of which are SDG&E installed and more are being planned. SDG&E has also engaged multiple vendors specializing in early fire detection systems, and will continue to work with these vendors to develop new and improved ways of spotting fires before they become uncontrolled wildfires.

6. Testing and Deploying Emerging Technologies

SDG&E is evaluating and incorporating new technologies and equipment into its overhead electric system. SDG&E's Electric Distribution Engineering Department is responsible for evaluating and creating new equipment and use standards for emerging and pre-commercial technologies. Using equipment failure data, the department determines which technologies should be incorporated into the SDG&E system and which could be improved prior to application. This department continually evaluates the many new types of technologies which may improve electric reliability and public safety, and gives special attention to technologies that may contribute to SDG&E's fire-safety goals and objectives. As an example, SDG&E is beginning to apply and analyze more advanced fault-clearing equipment that contain algorithms to improve the ability of the system to clear "wire-down" faults more quickly and which will serve to reduce the potential such faults might provide an ignition source.

[6] SDG&E plans to install another seven (7) cameras on towers located in Cleveland National Forest; installation of these cameras is pending approval by the United States Forest Service.

7. Facility Inspection and Repair Program

In addition to adding, redesigning and replacing facilities and elements as described above, SDG&E has implemented more stringent monitoring and inspection programs in the FTZ and HRFA, which will intensify our efforts to identify potential substandard system facilities and elements. As an example of these efforts, SDG&E is developing the use of pole-loading algorithms which more accurately calculate working loads and stresses. This area of study and change is undergoing continuous improvement to address new information, knowledge and situations. SDG&E coordinates these activities with communications infrastructure providers which jointly use SDG&E's poles and facilities.

SDG&E also maintains a comprehensive outage database which is used for reliability measurement and reporting purposes. Correlations between outages and locations are analyzed to determine whether certain equipment is prone to outage or has the potential to be an ignition source. This analysis is then matched to weather and other environmental conditions. Where it is determined that certain types of hardware have higher incidents of failure and potentially a higher incidence rate for ignition, they are replaced or prioritized for replacement. Vegetation Management also maintains a comprehensive outage database. Outages related to trees and or vegetation are investigated, documented, and results analyzed to determine if additional pruning or removal measures are warranted to prevent any reoccurrence.

SDG&E is in the process of conducting facility testing using three-dimensional light detection and ranging ("LiDAR") surveys in the HRFA. This technology is being used to perform aerial scans of the sixty-nine kilovolt transmission system in the HRFA on a three-year cycle. These surveys provide detailed depictions of terrain, vegetation and other obstacles in the vicinity of SDG&E's facilities. This data is processed and modeled by the SDG&E Power Line System Computer-Aided Design and Drafting technology to depict actual field conditions. The information produced is used to ensure safe and proper clearances are met so as to reduce the potential for line faults occurring in the HRFA. Where potential issues are discovered, SDG&E will address them by September 1st, the calendar start of the peak fire season, subject to permitting requirements and other exigencies and conditions.

8. Oversight of Activities in the Rural Areas

Early in 2010, a multi-disciplinary technical team of subject matter experts within SDG&E, named the "Reliability Improvements in Rural Areas Team" ("RIRAT"), was formed and tasked with (a) developing a multi-dimensional understanding of the complex fire-risk issue within the SDG&E service territory, (b) assessing the conditions which pose the greatest risks related to fire, (c) determining the level of risk mitigation that could be provided by various proposed projects, and (d) assigning priorities to capital and operating programs and projects that could address fire-related risks in the FTZ. As is evident from the FTZ map that is attached to this Fire Prevention Plan, it is in these areas where the potential for uncontrolled wildfires, and potentially the greatest losses, is the highest. The RIRAT focused its attention on facilities and activities in these areas so as to assure cost-effective fire-prevention measures are promptly evaluated and implemented.

The RIRAT was led by SDG&E'S Asset Management and Smart Grid Department and included managers and engineers from the Asset Management and Smart Grid Projects Department the Electric Transmission and Distribution Engineering Department, the Electric Regional Operations Department, and the Electric Finance and Operations Management Department.

The RIRAT, among other things, oversaw the evaluation and implementation of the various fire-hardening activities described above.[7] Its work was guided by the following specific goals and objectives:

- Improve the distribution system in the FTZ and HRFA;
- Develop statistical measures for assessing distribution-system performance relevant to fire-related risks so as to provide an understanding of the scope of the risks that must be addressed and develop metrics for measuring improvement;
- Identify and prioritize areas posing the greatest fire-related risks;
- Develop guidelines and a portfolio of solutions to minimize fire-related risks;
- Develop a multi-year plan for the rebuilding of circuits creating the greatest and/or most probable fire-related risks;
- Review and analyze all reports of "wire-down" occurrences; and,

[7] The Rural Area Team also oversaw the design and implementation of operations, maintenance and inspection programs and activities in the San Diego backcountry. Those activities and programs are discussed in further detail later in this Fire Prevention Plan.

- Use the “wire-down” analysis to identify causes and best solutions so as to minimize future occurrences and fire-related risks.

In order to meet their goals, the RIRAT adopted the following guiding principles:

- Utilize risk-based prioritizations to maximize risk-mitigation;
- Improve design specifications to reduce the potential for igniting fires;
- Consider and, to the extent prudent and cost-effective, employ technology-based solutions to reduce fire risks and improve overall system reliability;
- Prioritize system-rebuild efforts based on a matrix of available projects, considering the most important input factors such as the recent occurrence of a “wire-down”, wind and weather conditions, fire risks, values at risk, outage history, conductor type, condition of equipment, environmental conditions, and critical customers;
- Systematically consider and evaluate the following options:
    - Fire-hardening sections of circuits or individual circuit branches;
    - Undergrounding by traditional undergrounding or cable-in-conduit;
    - Adjusting protective equipment by revising settings, balancing loads, adding reclosers, replacing expulsion fuses with fault tamers, and/or reducing fuse size; and,
    - Employing new methods and/or technologies, such as spacer cables, wireless fault indicators, “off-grid” solutions, and Smart Grid technologies;
- Replace high-risk equipment based upon statistical analytics;
- Realign circuit routings to avoid trees and dense vegetation or use tree guards and/or insulated aerial cables; and,
- Assess the costs and benefits of optional solutions for reasonableness.

The RIRAT oversaw the evaluation and approval processes for the various system improvements and capital projects described above, and specifically addressed system design and facilities from the perspective of minimizing fire-related risks in the rural areas included in the FTZ and Highest Risk Area. Recently, the RIRAT and associated processes were incorporated into a new program called the Fire Risk Mitigation (FiRM) program. This new effort is discussed in greater detail below.

9. Fire Risk Mitigation (FiRM) Program

In 2013, SDG&E combined the fire hardening efforts with a program designed to address pole loading issues, creating a program called the Fire Risk Mitigation (FiRM) Program. FiRM is aggressively addressing fire risk by hardening critical areas by replacing aged line elements, utilizing advanced technology, and safeguarding facilities from known local weather conditions. FiRM is being broken into multiple phases, with the scope of work varying within each phase. Also, the data analysis that has been done by RIRAT since 2010, will now be done by the FiRM Analysis Team.

In order to effectively manage the program, the overhead electric facilities in the FTZ have been segmented into smaller & more manageable groupings and prioritized based on fire risk. Statistics from the RIRAT will be coupled with information about "known local conditions" to proactively address fire risk. There is also a subset of overhead facilities (poles, wire, and equipment) that will be replaced/hardened to improve system preparedness for known local conditions. SDG&E has far more information about known local conditions than ever before, and is now using that information to upgrade areas where conditions could exceed the thresholds that were used for the original system design.

III. Operational Practices for Reducing the Risk of Ignition

Despite all the efforts SDG&E might take in designing, redesigning, improving, replacing, and fire-hardening various elements of its overhead electric system, there will be some remaining potential risk that SDG&E's facilities might be the source of ignition for a fire. To address these risks, SDG&E has designed and implemented a number of operations, maintenance and inspection programs directly addressing fire prevention and the mitigation of effects from fires.

A. System Management: Quality Assurance and Quality Control

SDG&E has enhanced its system-management programs so as to assure that, to the extent possible, SDG&E's overhead system, facilities and equipment are unlikely to become the source of ignition for a fire. These programs generally encompass inspection and maintenance functions, and have been modified to focus on minimizing the probability that substandard, damaged or aging facilities will provide the ignition source for a fire. Inspection and repair of the SDG&E transmission and distribution systems have particularly intensified in the FTZ and HRFA. To that end, SDG&E performs a G.O. 165-type system maintenance

patrol of the entire overhead electric system in the FTZ on an annual basis. Safety related non-conformances identified in those patrols are scheduled for follow up repair. These patrols are twice as frequent as that required of the overhead system in general. In addition, SDG&E has implemented Quality Assurance and Quality Control standards and programs throughout its service territory, with a special focus in the HRFA during fire season.[8] These proactive programs are designed to identify potential structural and mechanical issues before they become actual problems. Distribution facilities within the HRFA are now inspected in detail, at minimum, on a three-year cycle, and substandard facilities (*e.g.*, damaged equipment, missing equipment or hardware, overgrown vegetation, *etc.*) are noted during these inspections and trigger the issuance of a repair work-order. Where the facility in need of repair is owned by a party other than SDG&E, *e.g.*, by a communication infrastructure provider, SDG&E will issue a notice to repair to the facility owner and work with the facility owner to ensure necessary repairs are completed promptly. SDG&E's operational goal, subject to permitting requirements and other exigencies and conditions, is to complete all facility and equipment repairs before September 1st of each year. However for 2014, because in large part of the declared drought by the Governor of California, SDG&E completed repairs one month early[9]

Annual adjustments to the HRFA map, if any, are also reflected in the scope of the Quality Assurance and Quality Control program.

The SDG&E Transmission Quality Assurance and Quality Control program is similar in nature to its distribution counterpart. Transmission lines within the HRFA, subject to any annual adjustments to the HRFA boundaries that might be made based on updated data, are inspected on a three-year cycle.[10] Matters of concern are identified for repair, and SDG&E makes best efforts, subject to permitting requirements and other exigencies and conditions, to complete all repairs within the HRFA by September 1st.

[8] The Quality Assurance and Quality Control program augments the five-year inspection cycle imposed under the provisions of Commission General Order 165.
[9] September 1st marks the beginning of the "fire season", although the highest risks of and from fire in the SDG&E service territory typically peak in October and November.
[10] The three-year inspection cycle for transmission facilities coincides with the normal cycle specified in SDG&E's Transmission Maintenance Practice manual.

B. Enhanced Vegetation Management and Clearance Program

SDG&E currently maintains records for over 450,000 trees located near its power lines. Almost 100,000 of these trees are located within the SDG&E HRFA. All of the 450,000 trees in SDG&E's database are monitored using known species and specimen growth rates, with additional consideration given to the amount of rainfall occurring during periods affecting overall tree growth, and past pruning practices. Each tree is visited by a staff arborist on an annual cycle. The annual inspections are routine maintenance and hazard tree assessments to ensure that every tree remains fully compliant for the duration of the cycle and/or is trimmed according to accepted standards and clearances. A second inspection and corresponding tree-hazard evaluation is performed for each tree in the HRFA. To the extent unsafe clearances may exist, an order to clear vegetation is issued and trimming is completed prior to September 1st of each year. These activities ensure safe minimum vegetation clearances are achieved prior to the peak fire season.

In addition, SDG&E developed and implemented a system wide Tree Safety Program. This program assists customers in the selection of the tree species and planting locations which will minimize interference with nearby power lines and facilities. SDG&E also offers free tree replacements in the event that an existing tree cannot be maintained safely near power lines and should be removed rather than trimmed. Notably, SDG&E has, for the tenth consecutive year, been recognized by the National Arbor Day Foundation as a "Tree Line USA" utility company in recognition of our "best practices" combining worker education and training, public outreach, quality tree care, and system reliability.

SDG&E also manages over 35,000 poles within the CAL FIRE jurisdictional areas that have been designated as bearing "non-exempt" attachments.[11] For poles within the CAL FIRE jurisdiction that bear these "non-exempt" attachments, SDG&E is required to perform "pole brushing", that is, clearing all vegetation within a ten-foot radius of the pole. To further reduce potential ignition sources, vegetation management works closely with the RIRAT team to reduce the number of non-exempt power line components by replacing such equipment, where feasible, with exempt equipment, which should also reduce the potential for pole attachments to become an ignition source.

[11] These attachments are designated as "non-exempt" by virtue of posing some potential risk for becoming an ignition source.

C. Coordination with Communications Infrastructure Providers

SDG&E has developed and rolled out a new web based communication conduit to simplify the recordkeeping for, and approval, inspection and repair of, pole attachments owned by Communications Infrastructure Providers. Named the "Telecommunication Equipment Attachment Management System" ("TEAMS"), the system was placed in operation in October 2012. TEAMS provides a direct communication link between SDG&E and Communications Infrastructure Providers and a shared-recordkeeping functionality. There are four key benefits provided by TEAMS. First, TEAMS enables Communications Infrastructure Providers to file pole attachment applications on-line – tracking of these applications and accompanying documents can now be performed electronically. This provides the baseline data necessary for SDG&E to monitor the equipment and resulting working loads placed on SDG&E facilities. Second, all attachment applications can be delivered and tracked by the applicant and SDG&E. Third, this system is also used for requesting and tracking requests for pole transfers and other transactions involving changes to equipment on jointly used poles with communications-related attachments. Finally, if during an inspection SDG&E discovers any pole attachment to be substandard and/or in need of repair, notices and the tracking of repairs will be done through TEAMS. This provides both SDG&E and the Communications Infrastructure Providers with electronic records of the actions taken by both to assure overhead facilities are in good repair and less likely to provide a source of ignition for a fire.

D. Workforce Training and Field Practices

SDG&E believes that an important line of defense against the ignition of fires is a well-trained and alert workforce. Internally, SDG&E has created a culture of fire prevention. To that end, SDG&E has adopted an extensive set of work rules and complementary training programs designed to minimize the likelihood that SDG&E's facilities or field work will provide the source of ignition for a fire. The rules and training programs are in large part embodied in SDG&E Electric Standard Practice No. 113.1 ("ESP 113.1"), which specifically addresses wildland fire prevention and fire safety. ESP 113.1 was developed by SDG&E's expert team of Fire Coordinators based on their experience in fire behavior, fire prevention and firefighting techniques. ESP 113.1 also incorporates principles and concepts drawn from various federal, state and local protocols and standards addressing wildland fire prevention and suppression.

ESP 113.1 describes the conditions under which the threat of fire is considered high, and the changes in field practices and resources which will be implemented as the threat increases. These changes affect work rules, equipment which will be made available to work crews under different conditions, and even worker attire. ESP 113.1 specifies minimum training requirements and annual refresher requirements for all SDG&E and contract personnel working in the FTZ and HRFA. The work rules and training also apply to personnel working in SDG&E's Electric Distribution Operations and Electric Grid Operations centers.

As an essential part of ESP 113.1, SDG&E has adopted and implemented the principles of the Incident Command System. This system provides a structure for disciplined communications and decision-making under the threat of fire as well as during fire emergencies. SDG&E field supervisors are assigned varying levels of on-scene command responsibilities in terms of coordinating and managing the SDG&E response to threat and emergency conditions. Training in the Incident Command System protocols and responsibilities is a key element of the annual training conducted by SDG&E. ESP 113.1 is also reviewed annually and any needed changes adopted and made known to all affected.

IV. Mitigating the Threat of Fire: Awareness and Readiness

A. Situational Awareness

Although the risk of fire is a year-round reality, there are certain recurring environmental and weather conditions, particularly during the late summer and early fall, when the risks of and from fire, particularly from uncontrolled wildfires, in the SDG&E service territory are abnormally high and the dangers most severe. SDG&E's fire-prevention and risk-mitigation activities begin with intensive data gathering and data analysis so that, if and when these abnormal and dangerous conditions are anticipated or occur, SDG&E is prepared to mobilize personnel and resources to abate, mitigate and respond to these conditions and any potential fire threats.

SDG&E has developed extensive, high-resolution weather databases which are used to identify those areas where the threat of and from uncontrolled wildfire is the highest and/or most dangerous. The areas which SDG&E monitors most closely are shown in the FTZ and HRFA maps – these areas are distinguished by the coincidence of high winds and flammable vegetation. SDG&E's weather databases are constantly updated using weather data provided by a number of sources, including the United States National Weather Service, local airports, and SDG&E's proprietary network of 149 weather stations located primarily in the

FTZ.[12] SDG&E's private meteorological network alone provides over 200,000 data points per day.[13]

SDG&E has two (2) full-time degreed and experienced meteorologists on staff. Their responsibilities include analyzing the historical databases and, importantly, monitoring incoming data in real-time. They also provide a detailed daily forecast of weather conditions relevant to SDG&E's operations. Their forecasts, a combination of heat, humidity, wind, and other conditions, are combined into an "Operating Condition" assessment, which tracks the potential for fires occurring in any region of the SDG&E service territory. There are four (4) Operating Conditions used for these purposes:

- **Normal Condition**: This condition is declared across the service territory when it has been determined by the SDG&E meteorologists and Fire Coordinator team that the burn environment is not conducive for wildfires within the SDG&E service territory;

- **Elevated Condition**: This condition is declared across the service territory when it has been determined by the SDG&E meteorologists and Fire Coordinator team that the burn environment has become conducive for wildfires within the SDG&E service territory;

- **Extreme Condition**: This condition is declared for specific operating districts and regions when it has been determined by the SDG&E meteorologists and Fire Coordinator team that a combination of high winds, low relative humidity, and the burn environment will create critical fire weather conditions; and,

- **Red Flag Warning (Red Flag) Condition**: Red Flag Condition is declared by the National Weather Service when high winds and low relative humidity are forecasted to occur for an extended period of time. In elevating the Operating Condition to this level, the SDG&E staff meteorologists would be echoing the declaration.

Depending on the condition reported and broadcast by the meteorological staff, various operational changes and rules appropriate to each condition will be triggered and implemented. A table summarizing the four conditions and the associated operational responses to each is shown immediately below:

---

[12] The location of SDG&E's weather stations is shown on the Fire Threat Zone and Highest Risk Fire Area map attached as an appendix to this Fire Prevention Plan.

[13] SDG&E makes its weather data available to public agencies and the general public free of charge through several popular media outlets, including the Internet.

Operating Chart for Normal through Red Flag Conditions

CONDITION	Normal Condition **Fire Potential Index 1-11** Fuel and weather conditions are no longer conducive to significant fire growth. Based on fire indices and Fire Coordinator / Meteorologist Recommendation		Elevated Condition **Fire Potential Index 12-14** The burn environment of a specific area or district has become conducive for a large wildfire within the SDG&E service territory.		Extreme Condition **Fire Potential Index 15 and above** An extreme operating condition will be declared when the burn environment of a specific area or district has become conducive for a catastrophic wildfire within the SDG&E service territory. .		Red Flag Condition (NWS) RFW: Relative Humidity ≤ 15%, with sustained winds ≥ 25 mph and/or frequent gusts ≥ 35 mph (duration ≥ 6 hours) Declared by NWS	
	Distribution	**Transmission**	**Distribution**	**Transmission**	**Distribution**	**Transmission**	**Distribution**	**Transmission**
Highest Risk Fire Area	No change to reclosing policy. Line will be tested by recloser action.	No change to reclosing policy. Line will be tested by recloser action.	All reclosers will be turned off.		All reclosers will be turned off. Enable Sensitive Relay Setting at direction of EDO.		All reclosers will be turned off. Enable Sensitive Relay Setting at direction of EDO.	
			TESTING		**TESTING**		**TESTING**	
			Distribution	**Transmission**	**Distribution**	**Transmission**	**Distribution**	**Transmission**
			SGF Targets: Patrol entire line or line segment before energizing. Non-SGF Targets: Patrol line segment to load-side sectionalizing device before energizing.	Patrol entire line or line segment before energizing.	SGF Targets: Patrol entire line or line segment before energizing. Non-SGF Targets: Patrol line segment to load-side sectionalizing device before energizing.	Patrol entire line or line segment before energizing.	SGF Targets: Patrol entire line or line segment before energizing. Non-SGF Targets: Patrol line segment to load-side sectionalizing device before energizing.	Patrol entire line or line segment before energizing.
			If Control Center Management, SDG&E FC and/or Meteorologist determine that weather conditions do not warrant special considerations (such as wind, relative humidity, etc.), the line may be tested once, before it is patrolled. If a Distribution outage is caused by a Transmission/Substation outage, Distribution may re-energize without a patrol, as directed by Control Center Management, SDG&E FC and/or Meteorologist.		If a Distribution outage is caused by a Transmission/Substation outage, Distribution will consult with Fire Coordinator / Meteorologist and evaluate re-energization without a patrol. Crew Deployment Plan Activated by District		Crew Deployment Plan Activated Staging Sites Include: All C&O Centers Viejas, Santa Ysabel, Jamul, Del Mar, Fallbrook At a > 56 mph wind gust forecast, EDO will stage field observers, close to affected areas.	
FIRE THREAT ZONE	No change to reclosing policy. Line will be tested by recloser action.		All reclosers will be turned off.		All reclosers will be turned off.		All reclosers will be turned off.	
			TESTING		**TESTING**		**TESTING**	
			Distribution	**Transmission**	**Distribution**	**Transmission**	**Distribution**	**Transmission**
			SGF Targets: Patrol entire line or line segment before energizing. Non-SGF Targets: Patrol line segment to load-side sectionalizing device before energizing.	Patrol entire line or line segment before energizing.	SGF Targets: Patrol entire line or line segment before energizing. Non-SGF Targets: Patrol line segment to load-side sectionalizing device before energizing.	Patrol entire line or line segment before energizing.	SGF Targets: Patrol entire line or line segment before energizing. Non-SGF Targets: Patrol line segment to load-side sectionalizing device before energizing.	Patrol entire line or line segment before energizing.
			If Control Center Management, SDG&E FC and/or Meteorologist determine that weather conditions do not warrant special considerations (such as wind, relative humidity, etc.), the line may be tested once, before it is patrolled. If a Distribution outage is caused by a Transmission/Substation outage, Distribution may re-energize without a patrol as directed by Control Center Management, SDG&E FC and/or Meteorologist.		If Control Center Management, SDG&E FC and/or Meteorologist determine that weather conditions do not warrant special considerations (such as wind, relative humidity, etc.), the line may be tested once, before it is patrolled. If a Distribution outage is caused by a Transmission/Substation outage, Distribution may re-energize without a patrol as directed by Control Center Management, SDG&E FC and/or Meteorologist.		*For Coastal Zone 243 ONLY (wildland):* If Control Center Management, SDG&E FC and/or Meteorologist determine that weather conditions do not warrant special considerations (such as wind, relative humidity, etc.), the line may be tested once, before it is patrolled.	

The daily weather forecast and Operating Condition are broadcast by electronic media to personnel whose activities are affected by the declaration of the Operating Condition – the forecast, particularly when the threat of fire is high or rising, will be updated and rebroadcast as conditions warrant and as the staff meteorologists determine is appropriate. The forecast is broadcast in real-time to a large audience of SDG&E employees, including but not limited to those responsible for system operations and control, district field operations, transmission and substation operations, and communications. Senior and middle management also receive these weather updates. Personnel receiving these weather forecasts are trained to adjust their activities, duties and priorities based upon the Operating Condition reported by the staff meteorologists.

Generally, as actual or forecasted wind speeds, measured in terms of both sustained winds (the average wind speed across ten-minute intervals) and wind

gusts (the highest wind speed occurring during a three-second period within a ten-minute interval), increase, the Operating Condition will change (or "be elevated"), from "Normal" to "Elevated Condition" or "Extreme Condition" or "Red Flag Condition", depending on environmental and weather conditions and the strength of the winds being experienced or forecasted. With each step-change in the Operating Condition, personnel are placed on appropriate levels of alert. In addition, the level of system monitoring and, ultimately, system operations and activities, are elevated according to the prevailing Operating Condition. Most importantly, as wind speeds increase, SDG&E deploys an increasing number of field crews, troubleshooters and Utility Wildfire Prevention Teams to areas with the highest winds and where the greatest threat of fire exists, so as to increase the probability that fires will be detected early and a response will occur as soon as possible.

B. The Fire Potential Index

SDG&E has developed a comprehensive assessment tool, known as the "Fire Potential Index" (FPI) that is used as a tool for making operational decisions which would reduce fire threats and risks. This tool converts environmental, statistical and scientific data into an easily understood forecast of the short-term fire threat which could exist for different geographical areas in the SDG&E service territory. The FPI is generated for a seven-day forecast period, and provides SDG&E personnel and threatened communities time during which they may plan and prepare accordingly.

The FPI reflects key variables such as the state of native grasses across the service territory ("green-up"), fuels (ratio of dead fuel moisture component to live fuel moisture component), and weather (sustained wind speed and dew point depression). Each of these variables is assigned a numeric value and those individual numeric values are summed to generate a Fire Potential value from zero (0) to seventeen (17) , each of which expresses the degree of fire threat expected for each of the seven days included in the forecast. The numeric values are classified as "Normal", "Elevated", and "Extreme".

The state of native grasses, or "Green-Up Component", of the FPI is determined using satellite data for various locations. This component is rated on a 0-to-5 scale ranging from very wet (or "lush") to very dry (or "cured"). The scale is tied to the NDVI, which ranges from 0 to 1,[14] as follows:

[14] The Normalized Difference Vegetation Index ("NDVI") is a simple graphical indicator that can be used to analyze remote sensing measurements, typically but not necessarily from a space

FPI Green-Up Component

Very Wet/Lush: 0.65 to 1.00	0.60 to 0.64	0.55 to 0.59	0.50 to 0.54	0.40 to 0.49	Very Dry/Cured 0 to 0.39
0	1	2	3	4	5

The Fuels Component of the FPI measures the overall state of potential fuels which could support a wildfire. Values are assigned based on the overall state of available fuels (dead or live) for a fire using the following equation:

FC = FD / LFM

Where FC represents "Fuels Component" in the scale below;

And FD represents Fuel Dryness Level (using a 1-to-3 scale);[15] and,

And LFM represents Live Fuel Moisture (percentage).

The product of this equation represents the fuels component that is reflected in the FPI as follows:

FPI Fuels Component

Very Wet					Very Dry
1	2	3	4	5	6

platform, to assess whether the target area under observation contains live green vegetation or not. More information on the NDVI scale is available at the following address: http://en.wikipedia.org/wiki/Normalized_Difference_Vegetation_Index.

[15] These values are taken from the Southern California Geographic Area Coordination Center, an interagency support center for fire protection and suppression. More information regarding this agency can be found at the following address: http://gacc.nifc.gov/oscc/ .

The weather component of the FPI represents a combination of sustained wind speeds and dew-point depression as determined using the following scale:

FPI Weather Component

Dewpoint/Wind	≤4 knots	5 to 9	10 to 14	15 to 19	20 to 24	>24 knots
>50ºF	2	3	3	4	5	6
40ºF to 49ºF	2	2	3	3	4	5
30ºF to 39ºF	1	2	2	3	3	4
20ºF to 29ºF	1	1	2	2	3	3
10ºF to 19ºF	0	0	1	1	1	1
<10ºF	0	0	0	0	0	0

The individual numeric values representing the three variables reflected in the FPI, shown above, are combined and placed on the following scale:

Fire Potential Index (FPI)

Normal	Elevated	Extreme
≤ 11	**12 to 14**	**≥ 15**

The FPI was developed by a team made up of SDG&E meteorologists, fire coordinator, and statistical analysts. The team has validated the FPI values and

their usefulness by recreating historical values for the past ten (10) years. The historical results bore a very strong correlation to actual fire events in terms of the severity of past fires and, in particular, provided very accurate information as to when the risks of uncontrolled and large-scale wintertime fires were high. SDG&E expects to tie proactive and reactive operational practices and measures to the FPI values, with the further expectation that SDG&E will be able to reduce the likelihood its facilities and operations will be the source of ignition for a fire during times when the risk of fire as measured by the FPI elevated or extreme.

C. The SDG&E Emergency Operations Center (SDG&E EOC)

In the event the National Weather Service declares a Red Flag, the SDG&E meteorologists will elevate the warning broadcast to SDG&E personnel to the highest level of alert. Red Flags are typically issued when relative humidity is at or below fifteen percent (15%) and sustained winds are expected to reach twenty-five miles-per-hour (25 mph) or higher and/or frequent wind gusts exceeding thirty-five miles-per-hour (35 mph) are expected for a duration of six or more hours. A Red Flag will also be issued under “dry lightning conditions”, where a lightning event is expected in the absence of enough precipitation to wet potential fuels which are considered critically dry. Upon the declaration of a Red Flag, SDG&E will activate the SDG&E EOC at the appropriate levels.

Because Red Flag Conditions present threats to the SDG&E electrical system and its component facilities and equipment, specific members of SDG&E management and operating departments are placed on alert when these conditions are present and the National Weather Service has issued a Red Flag. Upon such a declaration, these senior managers and operating personnel are called upon to appropriately staff the SDG&E EOC , a secure and dedicated facility which serves as a command center for SDG&E operations under high-threat conditions. The activation of the SDG&E EOC assures that appropriate decision makers and experts are assembled together, providing for the close monitoring of the electrical system and operations by all involved departments and disciplines. As the situation changes, the SDG&E EOC personnel will take appropriate and timely actions as necessary in order to protect the public safety and defend against the threat that SDG&E’s electrical facilities will become a source of ignition.[16]

[16] Such actions may include those authorized by statute and CPUC decisions, including D.09-09-030 as modified by D.12-02-024.

D. Crew Mobilization and Deployment Strategy

During an Extreme Operating Condition or Red Flag Condition, the management of the SDG&E Electric Distribution Operations and Electric Grid Operations centers work to coordinate the assignment of appropriate and needed resources to each of the affected regional operating districts. At minimum, Electric Troubleshooters and personnel from the Utility Wildfire Prevention Team are made available for immediate response to address fire threats or events. If the event is more severe, additional resources will be coordinated between and assigned from Electric Distribution Operations, Electric Grid Operations, Electric Regional Operations, Construction Services, and Kearny Substation and Transmission Operations Center to manage the event. Field personnel may be assigned to observe an area forecasted to experience the most adverse weather conditions – these personnel are under instructions to report flying debris, vegetation damage, or significant conductor movement. Based on these field observations, SDG&E deploys appropriate resources to address the fire threats posed by these conditions.

E. Field Patrols

Under Elevated, Extreme and Red Flag Conditions, SDG&E may perform an appropriate patrol of any circuit within the SDG&E Threat Zone suffering a forced outage. Qualified electrical workers are dispatched to inspect the circuit, determine the cause of the outage, and evaluate the physical integrity of the circuit. Upon the appropriate evaluation, restoration will commence when repairs are completed and/or there is no longer a threat to public safety or the electric system. In some cases, and weather permitting, field personnel may be positioned to observe and test the affected circuit.

Training and refresher drills for field patrols are conducted annually and are designed to exercise the assembly of Patrol Teams and the communication hierarchy of the SDG&E Incident Command System. These drills ensure effective management of the Restoration Patrols and disciplined communications between Patrol Teams, Patrol Leaders, Fire Coordinators, and Incident Commanders.

V. Fire Suppression and Recovery

When fire risk is high and a wildland fire occurs, SDG&E will mobilize its available resources (Utility Wildfire Prevention Team and Industrial Fire Brigade, see below) to assist in coordinating the suppression of the fire and in post-event recovery

activities. In many instances, these resources are also made available to the public agencies with responsibility for fire suppression and recovery.

A. Fire Coordination Personnel

SDG&E employs a full-time staff of Fire Coordinators and contracts for additional resources and personnel on an as-needed, project-by-project basis. The four Fire Coordinators currently on staff have over a century of firefighting experience and are experts in fire behavior, fire prevention and firefighting techniques. The Fire Coordinators serve as the direct link between SDG&E and emergency-response agencies. They also serve as the single point of contact for the fire agency Incident Command System, provide periodic updates to fire emergency personnel and SDG&E personnel, establish radio and communications assignments for every fire event, assist in the coordination of activities related to de-energizing and re-energizing power lines, and update on-scene personnel, control centers, service dispatch, and the SDG&E operations centers as to the status of each incident. The Fire Coordinators are active in professional forums, seminars and training throughout the service territory to ensure state-of-the-art fire practices are incorporated into SDG&E operations and practices. The Fire Coordinators also participate in engineering and operational meetings to advise SDG&E personnel regarding fire threats and prevention.

The Fire Coordinators also share information with the firefighting agencies within the SDG&E service territory and, on a rotating basis, provide those agencies with electrical and gas safety training.

B. Firefighting Assets and Resources

1. Utility Wildfire Prevention Team

SDG&E has contracted for wildland fire-suppression trucks and trained firefighting personnel. Up to eight (8) fire suppression trucks are provided to SDG&E throughout the fire season, and are available to SDG&E on an on-call basis for the other months of the year. These resources are dispatched with work crews during days on which the threat of fire is high. Prior to the commencement of the day's work, firefighting personnel provide instruction and advice specifically addressing fire risks and the potential mitigation and prevention measures the crews should observe in order to eliminate or reduce the likelihood of an ignition. The firefighting crews also pre-deploy hose lines and tools as a precautionary measure and monitor the work performed by the SDG&E crews.

In the event of an ignition, the firefighting personnel have the equipment, skills and ability to respond and extinguish fires quickly.

When the fire risk is very high, SDG&E deploys additional fire trucks as needed pursuant to a proactive staging plan triggered by the declaration of "Extreme Conditions" and "Red Flag Conditions". These resources are strategically placed throughout the service territory to be available as needed.

2. Aviation Services Department

This department is responsible for contracting aviation assets and personnel, planning, supporting and managing day-to-day aviation activities, measuring aerial job performance, and supporting fire-suppression activities. With respect to its fire-suppression responsibilities, the department coordinates the provision of SDG&E aerial resources to firefighting efforts. The department also oversees SDG&E's contributions to, and participation in, the local Aerial Firefighting Protection Fund in collaboration with the San Diego Fire Department and the San Diego County Office of Emergency Services.

SDG&E has also contracted with Erickson Air-Crane for the provision of a Type 1 firefighting helicopter from September 1st through November 30th through the year 2016. This contract is under the supervision of the Department.

3. The Industrial Fire Brigade

SDG&E has contracted a full-time Industrial Fire Brigade. The Brigade is on duty and available to SDG&E on an around-the-clock basis. The Brigade is made up of a Brigade Leader and three (3) shifts consisting of a Fire Captain, Fire Engineer, and two (2) firefighters. The Brigade is specially trained in fighting fires involving electrical equipment and flammable liquids. The Brigade members are housed in facilities located near the geographical center of the SDG&E service territory and are fully equipped to handle utility-related fire emergencies.

The Brigade has available four (4) portable trailers, each provisioned with 300 gallons of Class B Alcohol Resistant firefighting foam, 500 pounds of PKP Dry Chemical extinguishing agent, a 500 gallon-per-minute monitor, and two self-educting handlines designed to work with hydrants or other mobile fire apparatus. The newest of these trailers are located in Boulder City, Nevada, near the SDG&E

Desert Star Power Plant, and at an Imperial County Fire Station, close to the SDG&E Imperial Valley Substation.

The Brigade is also responsible for the development of comprehensive pre-emergency response plans for each SDG&E facility. These plans will be developed for SDG&E's high-value assets first, including SDG&E's power plants, peaker stations, and extra-high-voltage substations. These plans are designed to improve emergency response at each of these facilities significantly.

4. Miscellaneous Assets

SDG&E maintains a collection of portable emergency generators which may be deployed on an as-available basis to customer locations to provide temporary power during electrical outages. These generators will generally be made available to providers of essential services as a first priority but could be made available, if available, to other customers upon request and on a case-by-case basis.

SDG&E has been proactive in developing programs and partnerships which significantly improve emergency-event communications both internally and in cooperation with emergency-services agencies. In this regard, SDG&E has acquired Mobile Field Command Trailers and satellite phone booths for forward deployment and to assure uninterrupted essential communications during emergencies. SDG&E has also been integral in the creation of an Area Situational Awareness for Public Safety Network (or "ASAPnet"), which has been designed and deployed to provide internet connectivity to and between more than seventy (70) fire stations throughout the San Diego County backcountry.

C. Recovery Activities

At the end of emergency events, the SDG&E Emergency Operations Center conducts regular tabletop and functional training exercises and debriefs on potential issues ranging from cybersecurity to catastrophic fires. Debriefs are conducted following each exercise and activation of the Emergency Operations Center.

Also, SDG&E employees participate in a number of volunteer and charitable activities on an ongoing basis – this participation expands dramatically following local disasters. These activities include providing human, financial and other resources to the American Red Cross, San Diego County Recovery, the San Diego Burn Institute, and many other worthy organizations.

D. Fire Incident Data Collection Plan

Contained within Phase 3, Track 2 of the on-going Fire Safety OIR proceedings the parties jointly developed a plan for the IOU's to collect and report data to SED regarding power line fires, and for SED to use this data to (1) identify and assess systemic fire safety risks associated with overhead power line facilities and (2) formulate measures to reduce the number of fires ignited by power lines. SDG&E has adopted the plan developed by the parties within the proceeding and further has created a plan specific to SDG&E's initiation and implementation of these requirements to insure compliance.

The CPUC/SED requirements can be summarized by the following bullets:

- Any data collection and subsequent data reporting will be in addition to the incident reporting requirements currently required of the utilities.
- Data needs to be consistent using the default formats provided within the proceeding.
- New fire reporting requirements should not be limited to designated "fire threat" zones or districts but for all areas.
- Fire reporting shall meet the following criteria;
    - Self-propagating fire of material other than electrical and/or communication facilities.
    - The resulting fire traveled greater than (1) meter from the ignition point.
    - The utility has knowledge the fire occurred.
- Information shall be objective and factual.
- Utilities will report data in an annual report for the previous calendar year before April 1st of each year.
- The data collected is raw data that is correct to the best of the utility's knowledge at the time of submission.

The SDG&E Data Collection plan further specifies responsibilities and accountability for compliance with this plan;

- Fire Coordination: The Fire Coordination group will continue to manage the current fire database and continue to work with Emergency Services to move this process into the SDG&E Emergency Incident Reporting (EIR) system. The transition will occur without disruption or loss of data as well as be able to generate the required report. All qualifying fires will be reported to the On-duty Fire Coordinator.
- Compliance Management: As part of their annual calendar, Compliance Management will track and insure that this reporting requirement to the SED is met in the required timeframe.
- Claims, Legal, & Regulatory: Will continue their role and responsibilities for fires related to SDG&E facilities as well as review the annual report prior to submission.

- Control Centers: Both Distribution Operations and Grid Operations supervisors and operators will understand what denotes a reportable fire and assist in insuring qualifying fires are reported to the On-duty Fire Coordinator.
- Electric Regional Operations and Transmission Construction Maintenance: Troubleshooters, Construction Supervisors, and line personnel will understand what denotes a reportable fire and assist in insuring qualifying fires are reported to the On-duty Fire Coordinator.
- Training: An initial training and annual refresher training will be developed by the Fire Coordination group and delivered to the Control Center and District field personnel to insure compliance with these requirements.
- Root Cause Analysis: The data collected will continue to be shared internally with the T&D engineering group for further root cause analysis to help determine fire mitigation measures that make sense to implement in the future.

VI. Community Outreach and Public Awareness

SDG&E has created a multi-level approach to community education and outreach as our contribution to public awareness of fire threats, fire prevention and emergency preparedness. The key elements of this approach are described below.

A. Fire Safety Stakeholder Council

SDG&E frequently invites community leaders and the public at-large to participate in a collaborative fire-safety process. About forty (40) stakeholders, including representatives of local school districts, water districts, disability rights advocates, consumer groups, and fire agencies, have been working with SDG&E to develop a joint fire-prevention and emergency-action plan. This collaboration has produced more than 100 potential solutions aimed at preventing the occurrence of major fires. SDG&E is implementing many of the solutions identified by these stakeholders, including deactivating automated reclosers, hardening its overhead electrical system through the use of steel poles and larger conductors, and undergrounding portions of the backcountry electrical system, where feasible.

B. Partnering with Firefighting Agencies

SDG&E partners with the San Diego County Fire Chiefs' Association and fifty-three (53) other organizations to address a range of fire prevention and

emergency activities. These partners include; fire agencies, Fire-Safe councils, Community Emergency Response Teams (CERTs) and other community organizations. Among the activities addressed through these partnerships are, including but not limited to:

- Participation in coordinated multi-agency preparedness and emergency events;
- Support of the annual May County Wildland Drill;
- Participation in Fire Station Open Houses and Fire Safe Councils, prior to and through the fire season;
- Emergency preparedness radio spots with the San Diego County Fire Chiefs' Association and the American Red Cross; The provision and underwriting of grants by SDG&E to support Volunteer Fire Fighters, CAL FIRE Public Information Officer Command Vehicles, Burn Institute programs, and the San Diego Kids Fire Safety Program;
- Fire-safety media campaigns in conjunction with the American Red Cross and local television station KUSI-TV; and,
- The "Prepare San Diego Partnership" and Sheltering Memorandum-of-Understanding executed by and with the American Red Cross.

SDG&E also chairs the California Utilities Emergency Association, a collaboration between utilities, emergency services agencies and the California Emergency Management Agency.

C. Community Partnerships

SDG&E is proud to support non-profit organizations whose programs promote emergency preparedness and safety at home and in our communities. In 2012, SDG&E began providing funds to charitable organizations committed to regional and local emergency preparedness and fire safety, such as 2-1-1 San Diego, the American Red Cross, and the Burn Institute, plus dozens of volunteer fire departments, Community Emergency Response Teams, and Fire Safe Councils.

SDG&E provides regular communications to residents and businesses located in the FTZ and HRFA. These fire-safety and emergency communications include, but are not limited to;

- Customer education events, emergency preparedness symposiums for businesses, public participation meetings, and backup generator safety workshops;
- Informational and emergency preparedness mailings to customers in the HRFA;
- Educational advertising campaigns focusing on SDG&E's preparations for the fire season and the preparations SDG&E's customers should make for emergencies;
- Educational information disseminated through the Energy Notes newsletter distributed with customer billings;
- Distribution of a co-branded "newsletter" with the American Red Cross, the San Diego Office of Emergency Services, and the County Fire Chiefs Association;
- Distribution of the "Z-Card", which provides formatted emergency information that easily folds and fits in an automobile glove box or emergency kit;
- Distribution of "refrigerator magnets" bearing important emergency information;
- The provision of weather information and system-outage status on SDGE.com;
- Dissemination of information regarding emergency-preparedness events via social media, such as Twitter and Facebook;
- Opt-in campaign offering customers electronic-mail access to safety checklists and fire-safety videos;
- Publication of information for SAFE San Diego Education and Outreach events in the community following an emergency.

In addition to routine outreach and communications, SDG&E intensifies its effort to communicate with customers when fire-threat conditions are elevated or extreme. SDG&E has instituted an early warning system advising customers that a Red Flag has been declared by the National Weather Service and dangerously high winds are expected. SDG&E also opens communications with local water districts, telecommunications infrastructure providers, the San Diego County Office of Education, the San Diego County Office of Emergency Services, and the American Red Cross as soon as possible following the declaration of a Red Flag. SDG&E assembles a team, including members from Commercial and Industrial Services, SDG&E's Meteorological Department, and SDG&E's Electric Distributions Operations center, to provide updates on the status of the SDG&E system and weather conditions.

As alert conditions are elevated, SDG&E also contacts, directly and indirectly, disabled customers and Medical Baseline (MBL) customers. Under severe threats of emergencies, where SDG&E cannot make contact with these customers via our outbound-dialer system, SDG&E will send field personnel to make personal contact and, failing all else, to leave door hangers alerting the customer of the situation.

D. Fire Preparedness Website

SDG&E maintains a publicly accessible website focused on safety, including gas safety, electric safety, fire safety, tree safety, emergency preparedness, generator safety, and outage information. SDG&E Emergency Preparedness Brochures, Z-Cards, radio spots, print advertisements, and social media postings via Facebook and Twitter, have been utilized to distribute and provide links to SDG&E's emergency preparedness and safety website:

http://www.sdge.com/safety/fire-safety/proactive-approach-fire-prevention

Additional fire-related websites supported and maintained by SDG&E are accessible using the following addresses:

- Emergency Preparedness web pages: http://www.sdge.com/safety
- Weather and Outage web pages: http://www.sdge.com/tools/windspeed-dashboard

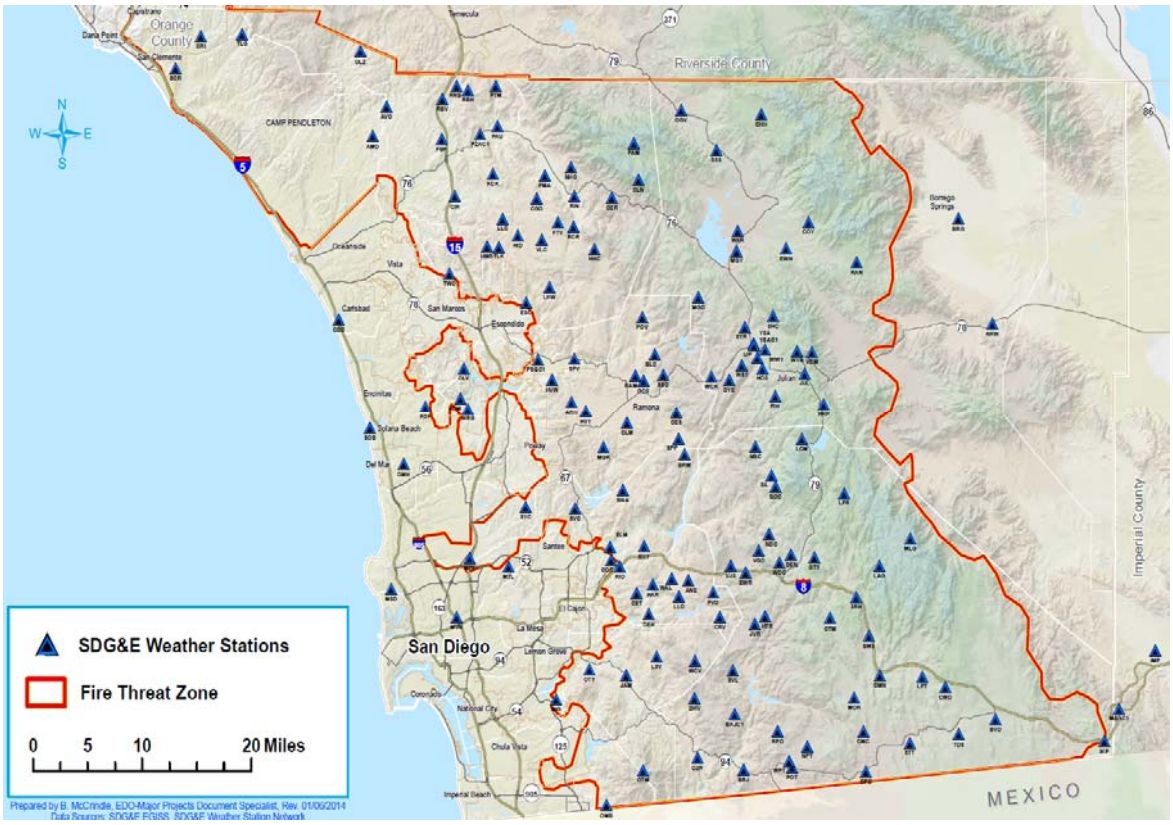
E. Fire Mitigation Funds

In addition to providing various fire-prevention and -preparedness grants as described above, SDG&E funds two fire-mitigation programs as a part of the Sunrise Power Link Project. These programs, known as the "Powerline Firefighting Mitigation Fund" and the "Defensible Space and Structure Hardening Grants Fund", are operated subject to agreements with various firefighting agencies whose jurisdictions include lands along the Sunrise Power Link transmission corridor.

The Powerline Firefighting Mitigation Fund was used to provide a lump sum to each of the seven fire agencies with jurisdiction along the transmission line route. Each agency received $556,524, for a total disbursement of $3.9 million – these funds were used to purchase new fire trucks and communications equipment, increase fire patrols, and fund additional personnel during the fire season. The agencies receiving these funds include CAL FIRE, Federal Bureau of Land Management, County of San Diego, City of San Diego Fire & Rescue Department,

Alpine Fire Protection District, Lakeside Fire Protection District, and the San Diego Rural Fire Protection District.

The Defensible Space & Structure Hardening Grants Program was implemented in 2012 and will remain in place as long as the Sunrise Power Link is in service. A grants contractor, Environmental Resource Solutions (ERS), has been hired and is implementing a Public Education and Outreach Program for eligible property owners, developing the grant application website and other program requirements. The program provides funding for the creation and maintenance of defensible space around homes in close proximity to the Sunrise Power Link. This defensible space will bring those homes into with compliance with various fire codes so as to assist firefighters in minimizing structure and property damage. These funds may also be used to fire-harden structures by retrofitting rooftops with fire-resistant materials, installing fire shutters and double-pane windows, cave boxing, and removing and/or replacing wood fencing and/or decks. SDG&E annually provides $2.8 million (2008$) to fund the program.

Appendix A

2014 Map of SDG&E FTZ, And Meteorological Network