

Final Independent Evaluator Annual Report
on Compliance
Bureau Veritas North America, Inc.
Pacific Gas & Electric Company



Bureau Veritas North America, Inc.
C2 Group
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Disclaimer

This report has been compiled through the process of observation and the review of provided documents. The report is intended to serve only as a guide to assist with achieving compliance with regulatory requirements instituted by the California Public Utilities Commissions (CPUC) Wildfire Safety Division (WSD) for an independent evaluation of electric utility providers Wildfire Mitigation Practices. Bureau Veritas North America, Inc. (BVNA) is not the designer, implementer or owner of the Wildfire Mitigation Plan (WMP) and is not responsible for its content, implementation and/or any liabilities, obligations or responsibilities arising therein.

The report reflects only those conditions and practices which could be ascertained through observation at the time of evaluation. This report is limited to those items specifically identified herein or as may be further required by CPUC at the time of the evaluation. The report does not represent that dangers, hazards and/or exposures do not in fact exist. BVNA shall only be responsible for the performance of the services identified or defined in our specific scope of services.

BVNA does not assume any responsibility for inaccurate, erroneous or false information, expressed or implied, that is given to the BVNA as the Independent Evaluator (IE). In addition, BVNA shall have no responsibility to any third party or for any other matters not directly caused by BVNA or that is beyond the reasonable control of BVNA. BVNA's liability is limited to the cost of the services expressed herein or as otherwise agreed to by BVNA by separate written contract.

1 EXECUTIVE SUMMARY

BACKGROUND

Pursuant to P.U. Section 8386.3(c)(2)(B)(i), Bureau Veritas North America, Inc. (BVNA) has been selected as an Independent Evaluator (IE) to review and assess Pacific Gas and Electric Corporation (PG&E) 2020 Wildfire Mitigation Plan (WMP). In carrying out the stipulations of Resolution WSD-012 and WSD's Final Independent Evaluator Scope of Work for the Review of Compliance with 2020 WMP, dated April 21, 2021 (See Appendix B, Item 56), BVNA has evaluated PG&E's compliance with its 2020 WMP, validated PG&E's quality assurance and quality control (QA/QC) programs outlined for support of WMP initiatives and reviewed its WMP funding activities.

SCOPE

Pursuant to the WSD's Final IE Scope of Work (SOW) for the Review of Compliance with 2020 WMP issued on April 21, 2021, Bureau Veritas North America, Inc., in partnership with C2 Group, have reviewed PG&E's 2020 WMP and supplemental documents (See Appendix A) for verification of compliance, validation of Quality Assurance (QA)/Quality Control (QC) programs and assessment of the utility funding activities related to WMP.

Pacific Gas and Electric Company (PG&E) provides natural gas and electric service to approximately 16 million people throughout a 70,000-square-mile service area in northern and central California. PG&E service area stretches from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada in the east and includes:

- 141,700 (approximate) circuit miles of electric distribution lines and 18,100 circuit miles of interconnected transmission lines.
- 42,141 miles of natural gas distribution pipelines and 6,438 miles of transmission pipelines.
- 5.5 million electric customer accounts.

California has experienced an unprecedented number of catastrophic wildfires due to climate change over the past few years. With PG&E's vast territory, many of the fires in California over the past six years have presented themselves in PG&E's service areas. Recognizing the urgent need to reduce the risk of fire resulting from or directly impacting PG&E's infrastructure, PG&E has taken measures to address this challenge and aims for initiatives to protect the safety of the customers and communities they serve.

Early on, PG&E implemented enhanced wildfire safety programs in response to the 2017 North Bay Fires and 2018 Camp Fire. PG&E's efforts include significant expansions in its PSPS program and its situational awareness capabilities, vegetation management, inspections of electric distribution and transmission facilities, system hardening, enhanced controls, and other programs designed to make PG&E's customers and the communities that are served safer.

PG&E's programs are evolving as their understanding of the wildfire threat improves. PG&E has developed working relationships with regulators, communities, other utilities, and industry experts to understand the wildfire problem better and has urgently explored ways to address and limit wildfire risk. In expanding their efforts based on PG&E's work and experience in 2019, PG&E implemented continued VM activities, enhanced inspection practices, more strategic system hardening, increased situational awareness tools,

and additional system automation devices in 2020. With continued improvement from lessons learned and input from customers, communities, and governments they serve, PG&E initiatives demonstrated in their 2020 Wildfire Mitigation Plan (WMP) illustrate the effectiveness and impact of these efforts.

Over half of PG&E's service territory, approximately 5,500 line-miles of electric transmission and 25,500 line-miles of distribution assets, lie within these High Fire Threat District (HFTD)'s as identified by the California Public Utilities Commission (CPUC) in 2018.

Table 1: HFTD Tier Definitions

Tier Level	Definition	Distinctions
HFTD Tier 3 – Extreme Risk	Extreme risk (including likelihood and potential impacts of occurrence) for utility associated wildfires.	Tier 3 is distinguished from Tier 2 by having highest likelihood of fire initiation and growth that would impact people or property from utility-associated fires, and where the most restrictive utility regulations are necessary to reduce utility-fire risk.
HFTD Tier 2 – Elevated Risk	Elevated risk (including likelihood and potential impacts of occurrence) for utility associated wildfires.	Tier 2 is distinguished from Zone 1 and other areas outside the HFTD by having greater likelihood of fire initiation and growth that would impact people or property, from utility-associated wildfires, and where enhanced utility regulation could be expected to reduce utility-fire risk.
HFTD Zone 1 – High Hazard Zones	HHZ on the USFS-CAL FIRE joint map of Tree Mortality HHZs, excluding areas in Tier 3 or Tier 2. These are areas where tree mortality directly coincides with critical infrastructure. They represent direct threats.	Zone 1 is defined as a Tree Mortality HHZ (as determined by California's Tree Mortality Task Force), a subset of Tier 1 of the CPUC HFTD Map. Zone 1 excludes areas in the Elevated Risk of Tier Level 2, and the Extreme Risk of Tier Level 3 risk areas but is included in the HFTD due to specific hazards to utilities. Tree mortality areas are identified by the USFS, CAL FIRE, and other State and Regulatory Agencies as determined by published district maps and are subject to updates.

Many of these line miles are long lines that serve low-density, non-urban customers and communities located within the wildland-urban interface known as the WUI. WUI is defined as the geographical area where structures and other "human development" meet or intermingles with the wildland. Generally, WUI areas due to vegetation type, density, moisture content face an increased fire risk. This contributed to the CPUC significantly increasing the size of the HFTDs within PG&E's service territory, effective January 2018.

KEY FINDINGS

As described in further detail within Section 3, the IE conducted a compliance review of PG&E's 2020 WMP by examining the information provided through data requests and document reviews, field assessment techniques, and SME interviews. As a result, the IE found that PG&E conducted work aligned with strategies demonstrated in their 2020 WMP.

Assessments of the WMP activities that were completed were made in accordance with the Final Independent Evaluator Scope of Work for the Review of compliance with 2020 WMP dated April 21, 2021, by the State of California Public Utilities Commission (CPUC). For completion of this report an analysis of initiatives within PG&E's 2020 WMP incorporated a combination of document reviews and field assessment techniques using pre-defined sampling methodologies, data requests for process standards, data requests for reports, requests for summarization of bulk data, requests for verification of funding, and various SME interviews.

The majority of initiative activities appeared to be in compliance with 2020 WMP stated targets. Noted exceptions are demonstrated below:

- Areas of elevated non-compliance related to vegetation management at distribution poles were observed in the field, with matching levels of non-compliance noted based upon a review of the utility-provided distribution pole inspection reports. Other qualitative analyses indicated that the utility has planned for future WMP activities and seems to be compliant with stated initiatives.
- In most cases targets for 2020 were achieved with a few exceptions. Non-compliance issues were observed at 2% of sectionalizing structures, 2% of weather stations, and 3.1% of HD cameras that were randomly sampled and then observed by independent evaluator staff in the field. In contrast, activities associated with surge arrester replacement, system protection deploy DCD (reclosers), and expulsion fuse replacement were exceeded as further described within Section 3.1.2 Large Volume Quantifiable Goal/Target – Field Verifiable.
- Large volume quantifiable goals for vegetation management were assessed by crews in the field spread over six regions encompassing nearly the entire PG&E service territory, who then sampled 1,381 locations spread over 149 line miles. Of the locations sampled, 7.6% were found to have some form of non-compliance by independent evaluator certified forestry professionals.
- Reports procured from PG&E were also reviewed for these large volume quantifiable goals and were assessed as part of the non-field verifiable scope. The analysis performed for the 313 HFTD distribution pole inspection reports sampled indicates an 8% rate of non-compliance.
- PG&E spent \$80.81 million in 2020, \$129.55 million less than the \$210.36 million budgeted under "PSPS events and mitigation of PSPS impacts," Section 5.3.6.5-1, Section 5.3.6.5-2, and Section 5.3.6.5-3 of the 2020 WMP. According to a reconciliation spreadsheet provided on June 9th (IE Analysis 2020 Actual vs. 2020 Plan v2) Appendix I, PG&E reduced its overall budget from \$210.36 million to \$153.61 million, resulting in an underspent amount of \$72.80 million. However, the actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet provided on June 9th.
- Funding reserved for "Vegetation Management and Inspections," Section 5.3.5.20 of the 2020 WMP initiative/activity to achieve clearances around electric lines and equipment, indicated an unused budget of \$438.31 million, which equates to 100% of the total budget allocated. PG&E did not spend or record any allocation of costs spent for this \$438.31 million as budgeted originally.



- Funding for “Vegetation Management and Inspections,” Section 5.3.5.11 of the 2020 WMP initiative/activity, for the patrol inspections of vegetation around distribution electric lines and equipment, indicated an unused budget of \$105.35 million equates to 100% of the total budget allocated. PG&E did not spend or record any allocation of costs spent for this \$105.35 million as budgeted originally.
- Funds allocated for “Mitigation of impact on customers and other residents affected during PSPS event,” Section 5.3.3.11-1 of the 2020 WMP initiative/activity, according to a reconciliation spreadsheet provided on June 9th (IE Analysis 2020 Actual vs. 2020 Plan v2) Appendix I, were shown to have underspent by \$259.26 million, 60% of the total budget planned. PG&E spent \$174.40 million in 2020, which is less than the reported budget of \$433.66 million. PG&E cited strategic shifts to several initiatives and partial 2020 costs recorded in 2021 as part of the underspend.
- PG&E employs a wide range of inspectors and contractors whose qualifications and rigorous training are critical to the effectiveness of the Wildfire Mitigation Plan’s Vegetation Management aspects. Field data show that enhanced vegetation management (EVM) activities had effectively occurred on 92% of sites visited by IE through the evaluations conducted. The other sites varied, including no evidence of work having occurred (including three instances of partial completion) on 7.5% of sites. Finally, two sites (0.1%) were classified as null as they could not be accessed.

2 INTRODUCTION

A review of all documents supporting the implementation of the 2020 WMP strategic initiatives has been conducted. As a result, BVNA has provided the following IE evaluation report (Report) describing the technical review and findings.

PG&E Corporation, Incorporated in 1905, is an energy-based holding company whose primary operating subsidiary is Pacific Gas and Electric Company, an investor-owned public utility with Corporate Offices in San Francisco, CA.

PG&E service area covers approximately 70,000 square miles of geography in Northern and Central California, with a large geographical coverage area from Eureka in the north to Bakersfield in the south and from the Pacific Ocean in the west to the Sierra Nevada in the east.



Figure 0: Map of PG&E's Service Territory

PG&E electrical network is comprised of approximately:

- 7,684 MW of owned hydroelectric, nuclear, natural gas, solar and fuel cell generation.
- Approximately 141,700 circuit miles of electric distribution lines (about 20 percent underground and 80 percent overhead) and approximately 18,100 circuit miles of electric transmission lines.

PG&E services areas include a variety of topographies that include rural, semi-rural, residential, high-density residential in both private and federal open lands, and it is the extensiveness of PR&E infrastructure that directly impacts the surrounding communities. Therefore, those items outlined in PUC section §8386 and the WMP Guidelines apply and have been reviewed as part of this report.

Expertise in the elements making up the WMP facilitated BVNA's team's review as the IE. In order to determine PG&E's fulfillment of their WMP strategies, an organized approach and methodology were conducted. BVNA's understanding of collected utility strategies demonstrated throughout the state are summarized below:

1. **Inspection and maintenance of distribution transmission and substation assets** including conducting system patrols and ground inspections using technological inspection tools, managing predictive and electrical preventative maintenance, conducting vegetation inspections and management, vulnerability detection such as Light Detection and Ranging (LiDAR) inspection, and geospatial and topography identification and geographic information system (GIS) mapping data. A key component is identifying collected data elements through each program and understanding how that data is used and shared to improve utility practices.
2. **Vegetation management** including routine preventative vegetation maintenance, corrective vegetation management, and off-cycle tree work; emergency vegetation clearance, prioritized for portions of the service territory that lie in Tier 2 and 3 HFTD; quality control processes; and resource protection plan, including animal and avian mitigation programs.
3. **System hardening** that includes pole replacement, non-expulsion equipment, advanced fuses, tree attachment removal, less flammable transformer oil, covered wire and wire wrap, and undergrounding, where cost beneficial.
4. **Operational practices** including communications and mustering plans under varying degrees of wildfire risk. Plans to deactivate automatic reclosers, de-energization of "at-risk" area powerlines based on the type of facility (overhead bare conduction, high voltage, etc.), tree and vegetation density, available dry fuel, and other factors that make specific locations vulnerable to wildfire risk.
5. **Situational awareness** including obtaining information from devices and sensors on the actual system, weather, and other wildfire conductivity conditions and two-way communication with agencies and key personnel. Programs such as online feeds and websites such as the National Fire Danger Rating System are utilized. Situational awareness should help achieve a shared understanding of actual conditions and serve to improve collaborative planning and decision-making.
6. **De-Energization actions** triggered and prioritized by forecasted extreme fire weather conditions: imminent extreme fire weather conditions; validated extreme fire weather conditions, and plans for re-energization when weather subsides to safe levels. Manual or automatic capabilities exist for implementation.

7. **Advanced Technologies** including Distribution Fault Anticipation technology, tree growth regulators, pulse control fault interrupters, oblique and hyperspectral imagery, advanced transformer fluids, advanced LiDAR, and advanced Supervisory Control and Data Acquisition (SCADA) to reduce electrical ignition while also helping to mitigate power outages and equipment damage.
8. **Emergency Preparedness, Outreach and Response communications** before, during, and after emergencies, including but not limited to engaging with key stakeholders that include critical facilities and served customers, local governments, necessary agencies such as the California Department of Forestry and Fire Protection (CAL FIRE), local law enforcement agencies and other first responders, hospitals, local emergency planning committees, other utility providers, California Independent System Operator and the utility's respective Board. Coordination agreements such as Mutual Aid or Assistance should be leveraged. A community outreach plan should inform and engage first responders, local leaders, land managers, business owners and others.

3 INDEPENDENT EVALUATOR REVIEW OF COMPLIANCE

With an accelerated timeframe for the evaluation of PG&E's compliance with the 2020 WMP, the overall approach to verify compliance included the review and assessment of the multiple WMP activities through data requests, SME interviews, review of publicly available documents and conducting field assessments within PG&E's service area to documented and validated aspects detailed and outlined in PG&E's 2020 WMP.

At time of commencement of the evaluation, the IE initiated a review of PG&E's 2020 WMP along with publicly available documents as listed in Appendix B to identify PG&E's statements detailed within the 2020 WMP goals.

For activities described in the WMP but not available within the publicly available records, IE submitted data requests and conducted SME interviews to verify activities stated within the 2020 WMP (See Appendix C for Data Requests Submitted and Responses). Along with the document analysis, data requests, SME interviews, the IE conducted field assessments within HFTP Tier 2 and Tier 3 areas to collect images and evaluate compliance with the 2020 WMP activities or initiatives identified during the IE initial review. The analysis and key findings for each respective section are detailed further within Section 3 Independent Evaluator Review of Compliance section within this report.

3.1 WMP ACTIVITY COMPLETION

WMP activities set forth in PG&E's 2020 WMP are in alignment with compliance metrics developed by CPUC – WSD as referenced in the April 21, 2021 Public Utility Commission, Final Independent Evaluator Scope of Work for Review of Compliance with 2020 WMP document. Due to the extensive nature of PG&E's territory and limited time frame, not all aspects of the depicted metrics have been assessed. Given the extensive nature of PG&E's asset inventory, the IE assessment of activity completion is itemized within the following sections of this report.

3.1.1 Sampling Methodology and Discussion

The IE assessed the following 8 items provided as part of PG&E's 2020 WMP initiatives with quantifiable goals/targets that are field verifiable. These initiatives include:

- B.10 Weather Stations
- B.9 HD Cameras Deployment
- C.12 Expulsion Fuse Replacement (non-exempt equipment)
- C.2 Distribution Sectionalizing (automated devices)
- C.10 System Hardening (line miles)
- C.6 Non-Exempt Surge Arrester Replacement Program
- C.7 System Protection deploy DCD (reclosers)
- F.3 Removal of TripSaver Auto-Reclosing Functionality

The following sampling methodologies were applied in consideration of the geographical areas covered by the field assessment teams within the provided schedule durations. For items comprising less than 400 locations, per the 2020 WMP initiative targets, the sample sizes were determined using Mil-Std-105E

“Sampling Procedures and Tables for Inspection by Attributes” using a general inspection level of III or greater discrimination. For initiatives comprising 400 or greater target locations for the 2020 WMP target goal, the sample targets were determined using a percentage basis. The target minimum percentage sample target was established at 10% for all goals with the exception of target C.6 System Protection (Surge Arresters), which was established at 2.5% of the 8,850 sample locations. In all cases, the IE met or exceeded the Wildfire Safety Division (WSD) approved sample sizes. See table 2: Large Volume Quantifiable Goal/Target - Field Verifiable Summary Table, under 3.1.2.2 Trends and Themes for proposed vs. actual sample sizes achieved.

The original sample sizes were established by delineating 6 regional subsets of PG&E’s High Fire-Threat District (HFTD), Tiers 2, and 3. Sampling standards, crew sizes, production rates, schedule durations, individual initiative types, distribution throughout PG&E’s HFTD, and respective county population densities were incorporated into the 6 regional area planning efforts. Population data with location information for the completed work for each of the large volume quantifiable goal/target initiatives was provided by PG&E. The IE conducted an independent site selection process without consulting PG&E to determine sample locations for field verification taken from the population data for each initiative. Random sampling was applied to all 8 initiatives, with a subset of random samples of clusters of the C.6 non-exempt surge arresters. The non-exempt surge arresters were comprised of 8,850 targeted locations and 10,263 actual replacement locations. These locations report heavily to a few select regions. This item’s method differed from the others, by developing a subset of clusters selected at random.

Due to schedule duration constraints and sizeable geographical area coverages, the sample sizes were adequate for a general understanding of the items being reviewed. These include the actual installation of the item (work completion), general work quality, and adherence to protocols and procedures, along with item location or operational outputs. The sample sizes are not substantial to provide a definite accounting of item quantities or miles stated within PG&E’s 2020 WMP targets. However, as required in the Final IE Scope of Work document Dated April 21, 2021, general and linear extrapolations and deductions were made from the sample size results due to time and sample quantity constraints for the items within this section’s assessment.

Figure 1: Overview of Areas Sampled provides a general overview of the locations sampled within Section 3.1.2 Large Volume Quantifiable Goal/Target – Field Verifiable, and Appendix J includes the specific sites sampled by the IE.

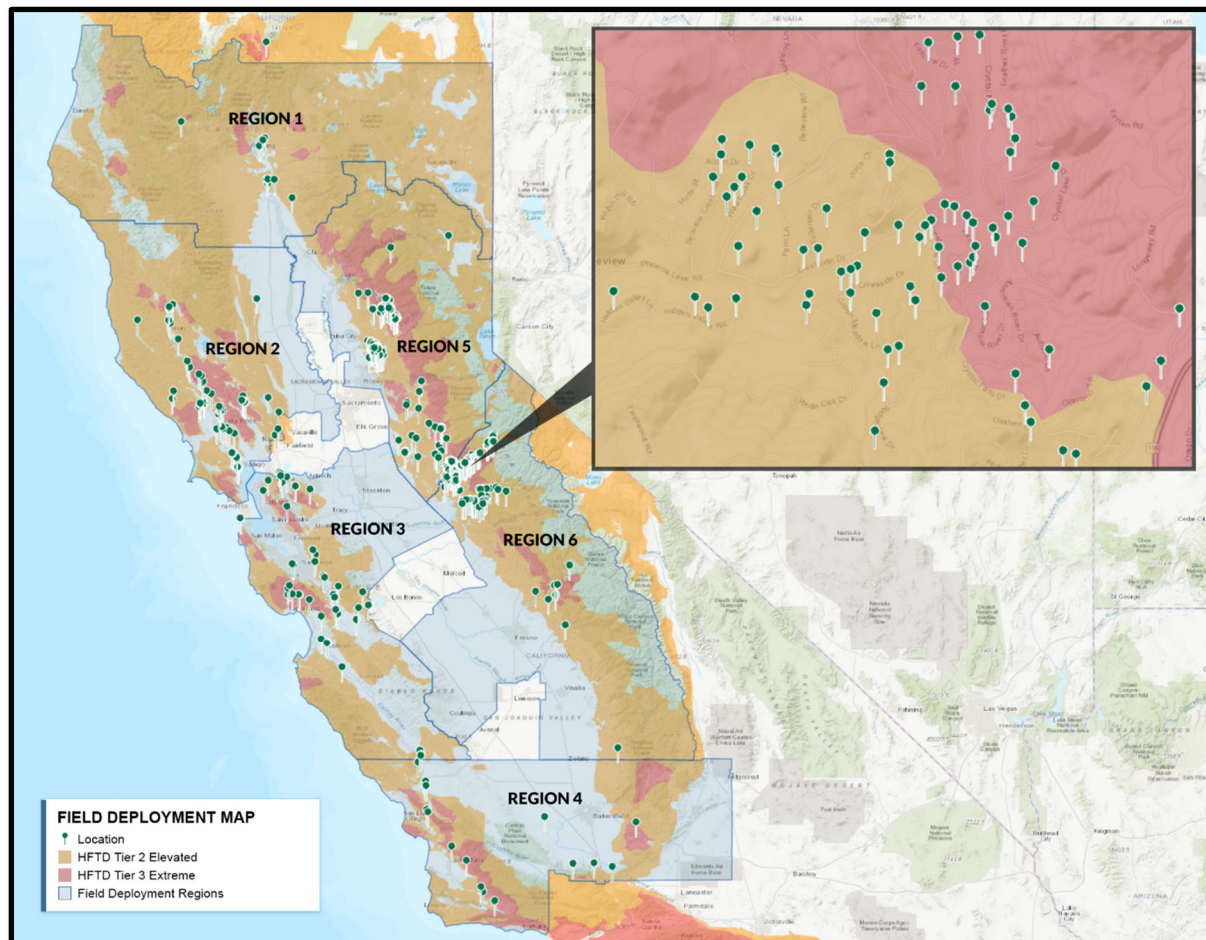


Figure 1: Overview of Areas Sampled

3.1.2 Large Volume Quantifiable Goal/Target – Field Verifiable

3.1.2.1 REVIEW OF INITIATIVES

2020 WMP - 5.3.2 SITUATIONAL AWARENESS & FORECASTING

5.3.2.1.3 - B.10 - Weather Stations

Information gathered from PG&E's weather stations located throughout their territory help forecast and monitor for high fire-risk weather conditions. PG&E committed to installing 400 weather stations on a pole, tower, or other assets in HFTD areas during 2020, per the 2020 WMP Executive Summary, Table 1 - Summary of 2019 and 2020 Wildfire Mitigation Activities. PG&E reported 404 weather stations installed during 2020 per the 2021 WMP Executive Summary, Table PG&E-Executive Summary-1, exceeding the target goal by 4. However, on June 1, 2021, PG&E reported a self-identifying error which corrected the 2020 completed weather station actuals from 404 to 378. PG&E's goal to install 400 weather stations during 2020 was not met by 22 weather stations.



Figure 2: Example Weather Station Field Images

A sample of 51 weather stations was field verified by the IE. All 51 were found to be at the location coordinates identified by PG&E. In addition, the IE reviewed the weather station data output to confirm they were operational on PG&E's third-party validation website provided in the 2020 WMP, Table 4: List and Description of Program Targets, Last 5 Years. Based on the field verification by the IE, data suggests PG&E installed the restated quantity of 378 weather stations.

Weather station installations were compared to "PG&E weather station and associated installation detail" provided as figure PG&E 5-9 in the 2020 WMP. No workmanship issues were identified in the review of the weather station installations. Based on this review, it appears that the work to install the weather stations was completed in accordance with the quality standards created by PG&E.

Weather station operation was verified by downloading the most recent data for each field verifiable weather station from MesoWest, PG&E's third-party validation website provided in the 2020 WMP. From the 51 weather station samples, one weather station did not have current data

available and its operational status remains unconfirmed. The data of the last metadata update was listed as 2020-11-16; see "Weather Stations Graphic 1-2" shown below. 1 out of 51 sampled weather stations, or 2.0%, were identified as potentially non-operational.

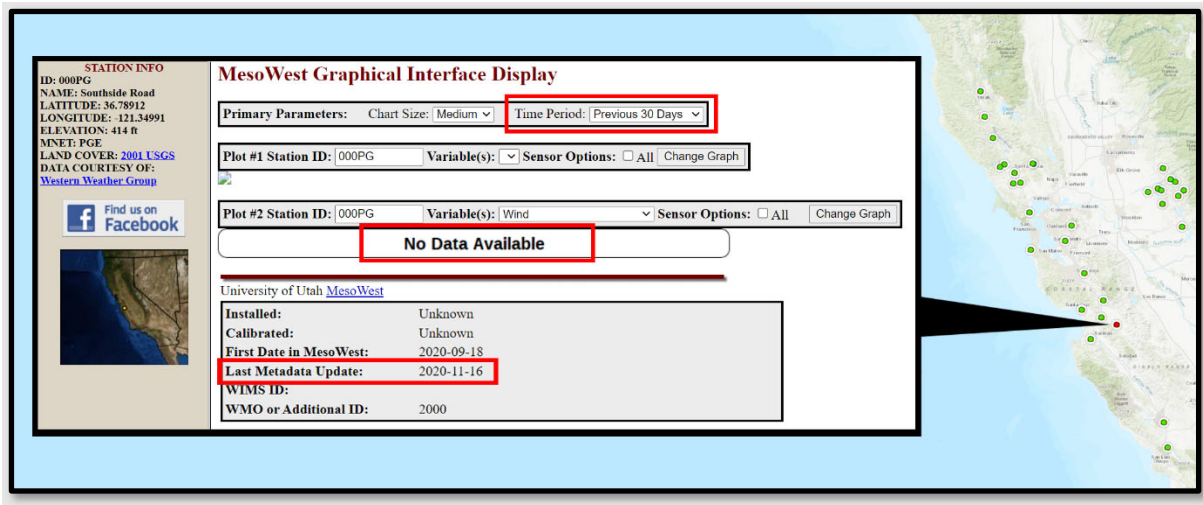


Figure 3: Weather Station Deployment – Inset of Data From Non-Operational Station PGE2000

5.3.2.1.4 - B.9 - HD Cameras Deployment

High-definition (HD) wildfire cameras installed are used to identify, confirm, and track wildfires by PG&E and California state agencies. PG&E committed to operationalizing and installing 200 additional HD cameras during 2020, per the 2020 WMP Executive Summary, Table 1 - Summary of 2019 and 2020 Wildfire Mitigation Activities. PG&E reported the installation of 216 HD cameras per Table PG&E-7.2.1 "2020 WMP Commitments and Performance" included in the 2021 WMP. PG&E's goal to install 200 HD cameras was met and exceeded by an additional 16 HD cameras, installing a total of 216 HD cameras per PG&E's reporting.



Figure 4: Example Images from the HD Cameras

The IE verified a sample of 32 HD cameras, and all 32 were found to be at the location coordinates identified by PG&E. Based on the IE's verification sample and results, data suggests that PG&E met the commitment to install HD cameras as reported.

The camera's operation was verified by reviewing the most recent imagery available from alertwildfire.org and identifying the difference between the time stamp and the time that the image was collected. From the 32 HD camera samples, one camera was identified as non-operational when accessed on 2021/06/04, with imagery that was dated: 2021/05/09. 1 out of 32 sampled cameras, or 3.1%, were identified as being non-operational. See "HD Camera Deployment=" shown below for confirmation of the non-operational camera.

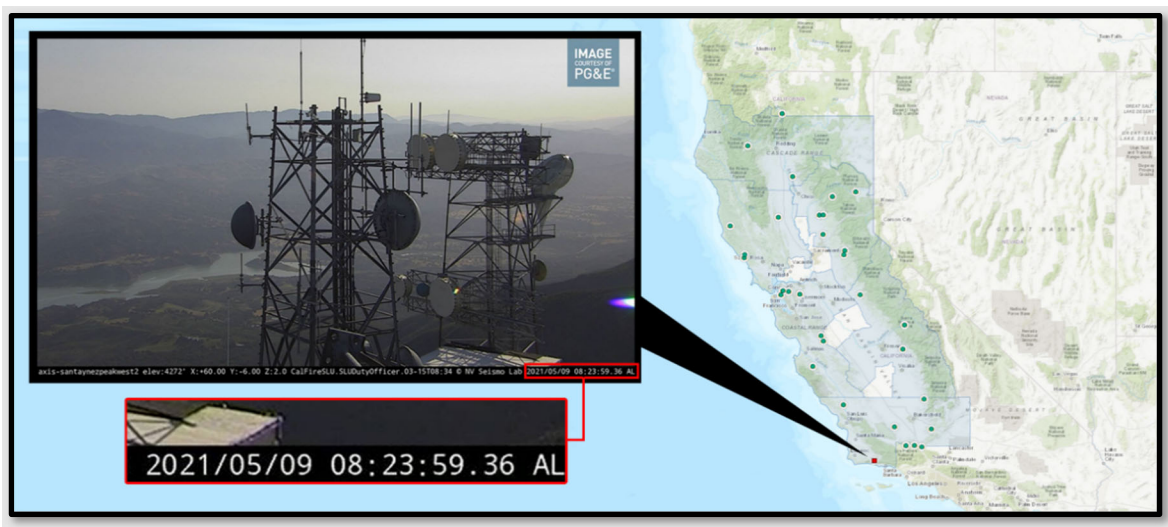


Figure 5: HD Camera Deployment – Inset of Imagery with Timestamp from Non-Operational Camera Santa Ynez Peak West 2

2020 WMP - 5.3.3 GRID DESIGN & SYSTEM HARDENING

5.3.3.7 - C.12 - Expulsion Fuse Replacement (non-exempt equipment)

The replacement of non-exempt expulsion fuses with exempt fuses that operate without creating arcs or sparks contributes to the overall goal of minimizing the risk of ignition in HFTD areas. PG&E committed to replacing 625 non-exempt fuses in 2020 per Table PG&E-7.2-1 2020 WMP Commitments and Performance included in the 2021 WMP. PG&E reported 643 expulsion fuse replacements during 2020 per the 2021 WMP, Table 5.3-1 List and Description of Program Targets, Last 5 Years. PG&E's goal to replace 625 expulsion fuses was met and exceeded by an additional 18 replacements for a total of 643 expulsion fuse replacements per PG&E's reporting.



Figure 6: Example Expulsion Fuse Replacement Field Images

The IE verified a sample of 88 expulsion fuse replacements, and 86 were found to be at the location coordinates identified by PG&E. There were two expulsion fuse replacements not located at the provided location coordinates and appeared to be on infrastructure within the general vicinity. It appears that the provided coordinates for the two not found at the provided locations may be related to data location/accuracy discrepancies. Based on the IE's verification sample, assessments, and results, data suggests that PG&E met and exceeded their 625 non-exempt fuse replacement goals.

Field inspections and accompanying image reviews of the fuse replacement installations were reviewed for workmanship quality. No issues were identified and based on the assessment of the fuse replacement installations, the work quality is satisfactory.

5.3.3.8-1 - C.2 - Distribution Sectionalizing (automated devices)

Distribution Sectionalizing (Automated Sectionalization) devices provide the ability to divide the grid into smaller sections for greater operational flexibility. In addition, distribution sectionalization makes it possible to focus Public Safety Power Shutoffs (PSPS) outages on smaller sections of the grid. PG&E committed to adding 592 automated sectionalizing devices during 2020, per the 2020 WMP Executive Summary, Table 1 - Summary of 2019 and 2020 Wildfire Mitigation Activities. PG&E reported commissioning 603 automated sectionalizing devices per Table PG&E 7.2-1 "2020 WMP Commitments and Performance" included in the 2021 WMP. PG&E's goal to install 592 devices was met and exceeded by 11 devices, installing a total of 603 devices per PG&E's reporting.

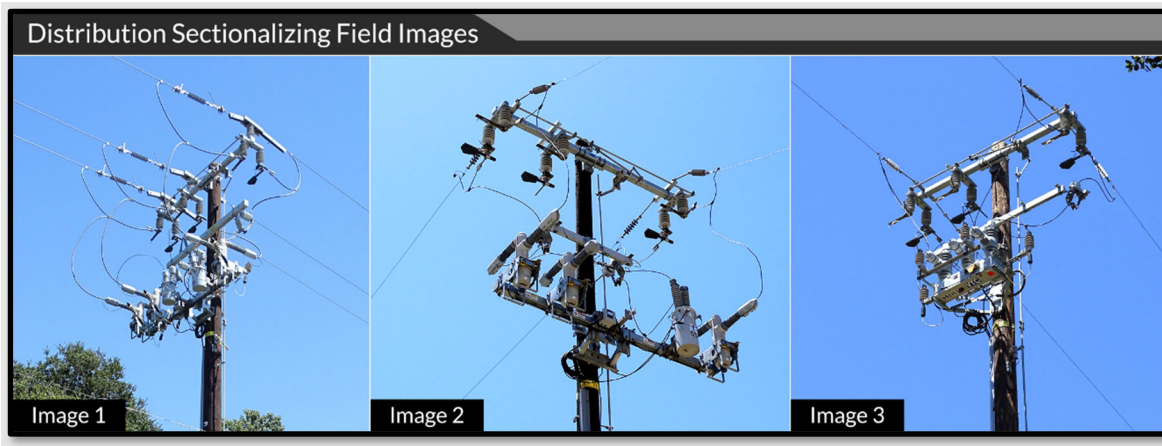


Figure 7: Example Distribution Sectionalizing Field Images

A sample of 100 distribution sectionalizing devices was field verified by the IE. 98 distribution sectionalization devices were found at location coordinates identified by PG&E. There were two out of 100 sampled locations or 2%, of the devices sampled were not found at the provided locations. Based on the IE's verification sample and results, it appears likely that PG&E met their stated commitment to install 592 distribution sectionalizing devices as reported. However, with 2% of sampled devices not found during field verification and extrapolating the 2% across the 603 devices equating to 12 devices, the IE cannot confirm PG&E exceeded the installation to 603 devices installed due to this discrepancy.

Field inspections and accompanying image reviews of the installations of the distribution sectionalizing devices were reviewed for workmanship quality. The study identified sixteen issues during the assessment of the installation of the devices. The study reported twelve fuse barrels as left on the structure or climbing steps, two bird guards were observed to be out of position, and two solid blade cutouts were not connected; the expulsion fuses were still connected. Fuse barrels left on a structure are often classified as poor workmanship and construction debris to be removed. The bird guards out of position can be associated with several factors, from normal wear and tear to high winds or were not adequately secured to the structure and under certain conditions can damage equipment directly underneath their location. The solid blade cutouts being in an open position can be due to various reasons, from environmental and wildlife impacts to an indicator of active work in the area.

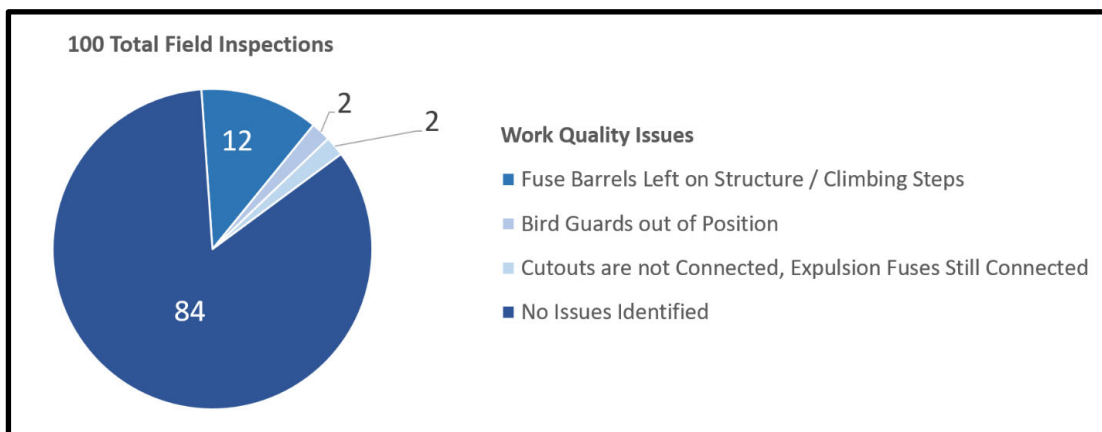


Figure 8: Distribution Sectionalizing Equipment Work Quality Issues

5.3.3.17.2-1 - C.10 System Hardening (line miles)

Distribution system hardening encompasses a collection of initiatives designed to reduce the risk of wildfire ignition caused by overhead distribution assets. The initiatives include fire rebuild, removal of idle facilities, primary and secondary covered conductor replacement, pole replacement, and relocation of overhead distribution to underground. PG&E committed to implementing 221 miles of system hardening in 2020, not including 20 miles for the Butte County rebuild, per the 2020 WMP, Table 5-1 - Major Investments and Implementation of Wildfire Mitigation - Initiatives Category. PG&E reported completing 342 miles of system hardening in the 2021 WMP, Executive Summary, Section C. 2020 WMP Outcomes. PG&E's goal to distribution system harden 221 miles was met and exceeded by 121 miles, system hardening a total of 342 miles per PG&E's reporting.

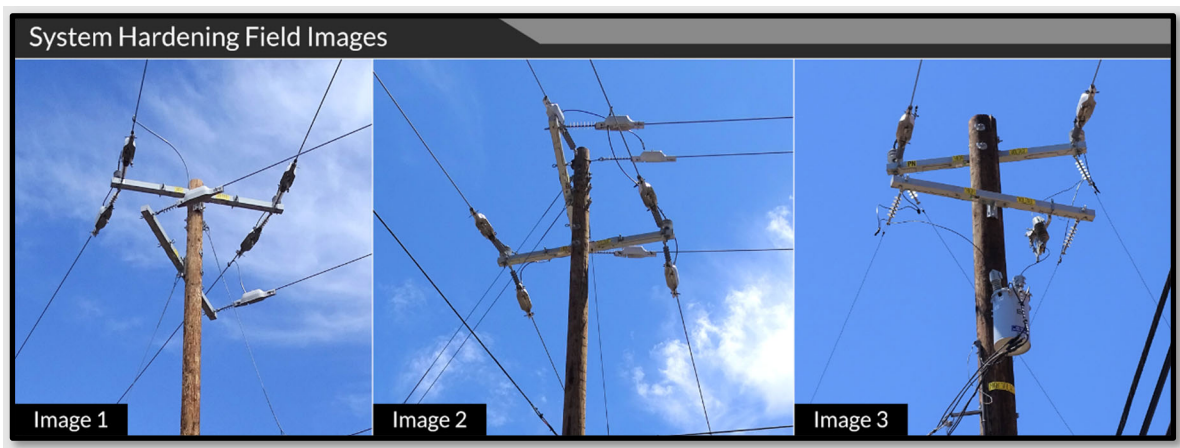


Figure 9: Example System Hardening Field Images

Distribution system hardening encompasses a collection of initiatives designed to reduce the risk of wildfire ignition caused by overhead distribution assets. The 2020 WMP initiatives include:

- Eliminating the line entirely
- Undergrounding
- Replacing bare overhead conductor with covered conductor
- Installing stronger poles

The IE verified a sample representing 52 miles of system hardening with location shown in Figure 12. The IE team reviewed linear data and as-built plans for the system hardening projects provided by PG&E to confirm the extent of the system hardening to correlate with field observations. Based on the IE's verification sample and results, data suggests that PG&E met and exceeded their distribution system hardening commitment as reported.

Field inspections and accompanying image reviews of the system hardening installations were reviewed for workmanship quality. No issues were identified and based on the assessment of the distribution system hardening, the work quality is satisfactory.

5.3.3.17.4 - C.6 Non-Exempt Surge Arrester Replacement Program

Replacement of non-exempt surge arresters with exempt surge arresters that operate without creating arcs or sparks during normal operation contributes to the overall goal of minimizing the

risk of ignition in HFTD areas. PG&E committed to replacing 8,850 non-exempt surge arresters with exempt surge arresters in Tier 2 and Tier 3 HFTD areas in 2020 per section 5.3.3.17.4 of the 2020 WMP. PG&E reported replacing 10,263 non-exempt surge arresters in Tier 2 and Tier 3 HFTD areas in 2020 per Table PG&E-7.2-1 “2020 WMP Commitments and Performance” included in the 2021 WMP. PG&E’s goal to install 8,850 non-exempt surge arresters was met and exceeded by 1,413 units, installing a total of 10,263 non-exempt surge arresters, per PG&E’s reporting.



Figure 10: Example Non-Exempt Surge Arrester Field Images

A sample of 457 non-exempt surge arresters was field verified by the IE. 457 were found to have non-exempt surge arresters installed at the locations identified by PG&E. Based on the IE’s verification sample and results; data suggests that PG&E met and exceeded their commitment to replace non-exempt surge arresters in Tier 2 and Tier 3 HFTD areas as reported.

Field inspections and accompanying image reviews of the replacement non-exempt surge arresters were reviewed for workmanship quality. No issues were identified and based on the assessment of the replacement surge arrester installations, the work quality is satisfactory.

5.3.3.18.1-1 - C.7 - System Protection deploy DCD (reclosers)

The deployment of downed conductor detection (DCD) functionality in reclosers to detect high impedance faults is part of PG&E’s evaluation of new protection technology to determine the effectiveness in reducing the risk of fire ignition due to system failure. PG&E committed to deploying DCD to 100 reclosers in Tier 2 and Tier 3 HFTD areas per section 5.3.3.18.1 Evaluating New Protection Technologies, of the 2020 Wildfire Mitigation Plan Report. PG&E reported enabling DCD protection on 126 reclosers by the end of June 2020 per Table PG&E-7.2-1 “2020 WMP Commitments and Performance” included in the 2021 WMP, exceeding the target by 26 units. In a supplemental response to a data request, DRU-3693.10_Supplemental, PG&E reported a self-identifying error that corrected the 2020 completed deployment of DCD from 126 to 402. PG&E’s goal to deploy DCD to 100 reclosers was exceeded by 302 units.

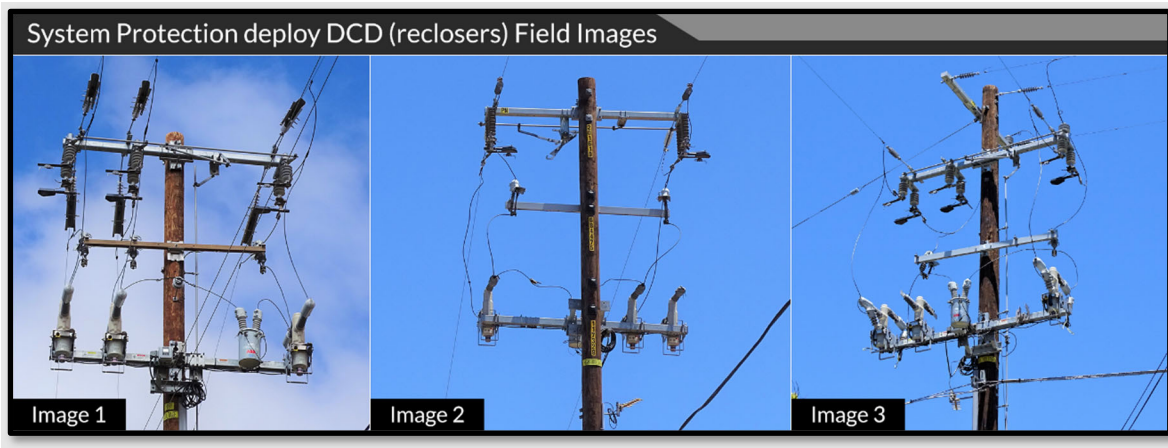


Figure 11: Example DCD Reclosers Field Images

A sample of 26 reclosers was field verified by the IE. Twenty-six reclosers were found installed at the locations identified by PG&E. Based on the verification, data suggests that PG&E met and exceeded the commitment to deploy DCD in 2020.

Field inspections and accompanying image reviews of the installations of the reclosers were reviewed for workmanship quality. No issues were identified and based on the review of the reclosers for the deployment of DCD, the work quality is satisfactory.

2020 WMP - 5.3.6 GRID OPERATIONS & OPERATING PROTOCOLS

5.3.6.1 - F.3 - Removal of TripSaver Auto-Reclosing Functionality

In accordance with PG&E Utility Procedure TD-1464P-01 "Fire Index Patrol and Non-Reclose Procedure," reclosing devices for all distribution lines will be disabled during the utility fire risk season for Tier 2 or Tier 3 HFTD areas. In section 5.3.6.1 of the 2020 WMP, PG&E identified that the majority of the automatic reclosing devices that were required to be manually disabled due to not being SCADA enabled were TripSavers which cannot be SCADA enabled, and committed to permanently disabling the automatic reclosing functionality of TripSavers serving Tier 2 and Tier 3 HFTD areas.

The IE submitted a data request requesting confirmation of the methods employed to remove automatic reclosing functionality. In the response to the request, PG&E identified that the automatic reclosing capability was removed for most devices utilizing a manual software update. In contrast, other devices were removed and replaced with a different type of device. The data request was accompanied with supporting documentation identifying 273 TripSavers in service as of 2019 year-end with information confirming when the software was updated or whether the devices were removed. The supporting documentation confirmed that 3 additional devices were identified as an "HFRA-Add" after the June 1 deadline. The software update disabling the automatic reclosing functionality was installed within 8 calendar days. Per Table PG&E-7.2-1: 2020 WMP Commitments and Performance in the 2021 WMP, PG&E reported the removal of automatic reclosing functionality or replacement of 273 devices. With data request documentation provided by PG&E, data suggests that PG&E met its goal of permanently removing the automatic reclosing functionality of the remaining TripSavers serving Tier 2 and Tier 3 HFTD areas.

3.1.2.2 TRENDS AND THEMES

The following is an overview of the themes and trends extrapolated from the review of Section 3.1.2 Large Volume Quantifiable Goal/Target - Field Verifiable items. The interpretation incorporates various categories, including work quality, adherence to applicable utility protocols, and standards for such work, along with assessments of the quality of the information provided to support our overall review. Concluding this section is a summary table of the category discussion conclusions, titled: 3.1.2 Large Volume Quantifiable Goal/Target - Field Verifiable Summary Table.

When reviewing the aggregate output associated with workmanship and quality, it was found to be satisfactory in the majority of outcomes. The IE did notice an outlier associated with Section 5.3.3.8-1-C.2 - Distribution Sectionalizing (automated devices). Fuse barrels were found on 12 structures, in most cases, left on the climbing steps. The 12 items are of a sample size of 100 and represent 12% of the sampled structures. The findings are not related to locating the distribution sectionalizing devices and the workmanship of the devices. Two out of the 100 sampled locations or 2%, of the devices sampled were not found at the provided locations. The remaining 98 distribution sectionalizing devices were found per the IE's random sampling without observable workmanship quality issues.

Per PG&E's 2021 WMP conclusion reporting on the various items within this report, PG&E met and in all cases exceeded the goals stated in their 2020 WMP commitments, included in the Executive Summary as Table 1 Summary of 2019 and 2020 Wildfire Mitigation Activities. During the process of the IE's audit, PG&E reported, on June 1, 2021, a self-identifying error that corrected the 2020 completed weather station actions from 404 to 378 and not meeting their stated goal of 400 weather station installations. Weather stations were the only item that did not meet its stated 2020 target. It appears that PG&E did meet and, in most cases, exceeded their 2020 targets for the remaining items within this section. The conclusion considers field assessments per pre-defined sampling methodologies, various data requests, and SME interviews, along with correlating to other relevant major report topics and sub-topics, such as qualitative, verification of funding, and verification of QA/QC programs.

The IE did observe 1 weather station and 1 HD camera that appeared to be non-operational for an extended period. Several distribution pole structures were not at the location coordinates provided by PG&E. During the IE's audit period, PG&E sent 1 self-identifying letter correcting actual item installation numbers downward (less than reported) and 1 response to a data request by the IE that corrects the actual item installations upward (greater than reported). The information provided for item 5.3.3.17.2-1 - C.10 System Hardening was not itemized per type of hardening initiative and instead represented as one item without its sub-categories, such as fire rebuild, removal of idle facilities, primary and secondary covered conductor replacement, pole replacement and relocation of overhead distribution to underground and required additional research and interpretation by the IE. Although these identified items listed above are not directly correlated,, they do represent a data management and quality assurance, and quality control opportunity for PG&E. The IE is aware that many of these data consolidation and quality assurance, and quality control activities are in progress as part of other related initiatives within this report.

Table 2: Large Volume Quantifiable Goal/Target – Field Verifiable Summary Table

Program Target	Units	Sections	Sample Methodology	PG&E Target	PG&E Actual	IE Sample Target	IE Field Sample	Summary
1. Weather Stations	EA	B.10 - 5.3.2.1.3	10% Min.	400	404 (378) Revised	40	51	Goal not met. (378) Revised PG&E actual, 1 weather station potentially non-operational.
2. HD Cameras	EA	B.9 - 5.3.2.1.4	Mil Std. 105E	200	216	32	32	Goal met/exceeded. 1 HD camera non-operational.
3. System Hardening	Mi	C.10 - 5.3.3.17.2-1	Mil Std. 105E	221	342	50	52	Goal met/exceeded.
4. Expulsion Fuse Replacement	EA	C.12 - 5.3.3.7	10% Min.	625	643	63	88	Goal met/exceeded. 2 replacements not found at provided coordinates, appeared to be on structures nearby.
5. Distribution Sectionalizing	EA	C.2 - 5.3.3.8-1	10% Min.	592	603	59	100	Goal met. Cannot confirm exceeded amount of 603 per the 2% sampling discrepancy.
6. Non-Exempt Surge Arrester	EA	C.6 - 5.3.3.17.4	2.5% Min.	8,850	10,263	225	457	Goal met/exceeded.
7. System Protection deploy DCD (reclosers)	EA	C.7 - 5.3.3.18.1-1	Mil Std. 105E	100	126 (302)	20	26	Goal met/exceeded.
8. Removal of TripSaver Auto-Reclosing Functionality	EA	C.7 - 5.3.3.18.1-1	Mil Std. 105E	100	126	Data Request	Data Request	Goal met/exceeded. Capability primarily removed via manual software update or by replacing device.

3.1.3 Large Volume Quantifiable Goal/Target – Not Field Verifiable

3.1.3.1 REVIEW OF INITIATIVES

5.3.3.8-2 – C.4 - TRANSMISSION LINE EVALUATION FOR PSPS SCOPING

The IE requested data for 80 transmission lines evaluated based upon the Fire Protection Index, sustained wind at the site over the past 10-years, the highest wind gust at the entire site over the past 10-years, and the transmission vegetation risk. Six lines were designed as a “Black Swan” with a high consequence factor. According to PG&E’s documents, Black Swan events are “areas that have a low likelihood of observing an outage, but critical conditions that may lead to explosive wildfire growth.” PG&E further states: “In 2020, PG&E introduced an evaluation of Black Swan conditions to review low probability, high consequence events. The inclusion of Black Swan Guidance allows PG&E to identify lines that may show, for example, low wind-related outage probability but may experience conditions that have been present in some past catastrophic fire incidents. This allows a pass at capturing outage and potential ignition events that are much rarer.” Of the remaining lines, 53 were ranked by their Fire Potential Index, and 21 were rated with no Fire Potential Index. The criteria for these rankings incorporated historical weather conditions in their areas and existing vegetation conditions.

5.3.4.1 - D.2 – HFTD DISTRIBUTION POLE INSPECTIONS. PERFORM DETAILED OVERHEAD INSPECTIONS ON 100% OF HFTD TIER 3, AND 33% OF HFTD TIER 2 DISTRIBUTION ASSETS

PG&E had a target of inspecting 339,728 distribution poles for 2020. Using Military Standard 105 as a guide for this batch size, an initial sample size of 800 locations was requested by the IE. However, due to miscommunications between the IE and PG&E, only 315 reports were received from PG&E. All of the distribution pole inspections provided by PG&E contained reports of the structures and equipment along with photographs. At two locations, the data in the reports could not be verified from analyzing the provided photos (the photos were either too dark or trees obscured the pole). Of the remaining 313 pole inspections, 25 had discrepancies (8.0%) between what was recorded on the form and what can be seen in the photos. Please refer to Appendix F for a listing of equipment sites with discrepancies and their structure-specific notes.

5.3.4.15 - D.4 - SUBSTATION HFTD INSPECTIONS (SUBSTATIONS). GOING FORWARD, THE SUPPLEMENTAL INSPECTIONS WILL BE PERFORMED IN PG&E-OWNED SUBSTATIONS BASED ON THE FOLLOWING RISK FACTORS: HIGH FIRE THREAT DISTRICTS (HFTD), TRANSMISSION SUBSTATION CRITICALITY, AND DISTRIBUTION SUBSTATION CUSTOMER COUNT. IN 2020, SUPPLEMENTAL INSPECTIONS ONCE ANNUALLY FOR ALL HFTD TIER 3 STATIONS, ON A THREE-YEAR CYCLE FOR STATIONS IN HFTD TIER 2

The IE did not have an opportunity to examine all of the substation inspection documents. However, the documents TD-3322B-065 (Wildfire Defensible Space for Substations) and TD-3322B-066 (Substation Vegetation Job Aid) were reviewed by the IE. The Job Aid document outlines the various codes to prioritize work for vegetation removal within Zone 1 (30’ of substation’s perimeter) and within Zone 2 (an additional 70’ beyond Zone 1). TD-3322B-065 gives guidelines for the inspection of defensible space in and around substations. These documents provide clear, specific guidelines regarding substation vegetation.

3.1.3.2 TRENDS AND THEMES

The following is an overview of the themes and trends extrapolated from the review of section 3.1.3 Large Volume Quantifiable Goal/Target– Not Field Verifiable. It incorporates assessing the quality of the information provided in response to requests for data, adherence to applicable utility standards in the information provided, and adherence to quantifiable WMP goals. Concluding this section is a table briefly summarizing non-field verifiable programs targeted.

The documentation reviewed for Section 5.3.3.8-2 - C.4 - Transmission Line Evaluation for PSPS Scoping showed variables incorporated into the scoring methodology used to rank and identify transmission lines based upon their possibility of initiating a wildfire event. Historical weather conditions and vegetation patterns, in addition to other criteria, were considered for each line.

The distribution pole inspection records for 5.3.4.1 - D.2 – HFTD Distribution Pole Inspections were found to have a relatively high frequency of discrepancies. There appeared to be several records where the description of the equipment at the pole's site did not match what could be seen in the accompanying photographs. The IE recommends that sample pole inspection forms be selected to confirm the data listed on the forms versus the evidence shown in the photographs of the poles in question, a robust QA/QC process. If this internal sampling and reviewing are presently ongoing, then it is recommended that larger sample sizes be taken to ensure the accuracy of the data, and follow-up training is instituted where inspection data is inaccurate. The IE also recommends that a section indicating HFTD Tier the pole or equipment is located should be added to the forms.

Substation HFTD Inspections (substations) - 5.3.4.15 - D.4 had thorough job aids and guidelines for personnel to follow. The jobs aids included pictures with their associated codes to help inspectors select the appropriate code. However, the IE did not have the opportunity to examine all of the substation inspection documents.

Per the Independent Evaluator Findings Summaries above, PG&E's progress on their Wildfire Mitigation Programs is summarized below.

Table 3: Large Volume Quantifiable Goal/Target – Not Field Verifiable Summary Table.

Program Target	Sections	Summary
Documentation for Transmission Line Evaluation for PSPS Scoping	5.3.3.8-2 – C.4	Activity completed; Assessed to be in Compliance
HFTD Distribution Pole Inspections	5.3.4.1 - D.2	Non-Compliance: 8.0% of data on Inspection Reports do not correspond with images attached to Inspection Report, See Appendix F
Substation HFTD Inspections (substations)	5.3.4.15 - D.4	Activity completed; Assessed to be in Compliance

3.1.4 Small (Less Than 100 Items) Volume Quantifiable Goal/Target

3.1.4.1 REVIEW OF INITIATIVES

5.3.2 SITUATIONAL AWARENESS & FORECASTING

5.3.2.1.6 - B.5 - Live Fuel Moisture (LFM) Sampling

Live Fuel Moisture is a key component in the Fire Potential Index (FPI) and fire spread modeling typically sampled in the field. Per the 2020 WMP Section 5.3.2.1.6, PG&E has found that despite existing LFM samplings being carried out across PG&E's territory, as shown in the USFS National Fuel Moisture Database (Appendix B Item No. 29), there are many gaps in the LFM data that provides challenges in creating and calibrating the LFM models to predict LFM for use in PG&E's FPI model. With these identified challenges, PG&E targeted field sampling of 30 sites in 2020 utilizing the Safety and Infrastructure Protection Team (SIPT) resources in partnership with the San Jose State University (SJSU) Fire Weather Research Laboratory.

The IE conducted a SME interview on June 7th with Heather Rock, Director of Climate Resilience, and Scott Strenfel, Manager of Meteorology Operations and Fire Science, per Appendix D, Item No. 19, and PG&E confirmed the completion of the 30 sites targeted for LFM sampling. During the SME interview, PG&E presented the Technosylva Software (See Figure 12), which PG&E utilizes for modeling and simulating fire spreads across historical data sets. As described within PG&E's 2021 WMP Section 7.3.2.1.2 Fuel Moisture Sampling and Modeling, PG&E confirmed compliance with stated targets of sampling 30 locations utilizing SIPT personnel and continued partnership with the SJSU. With the SME Interview and documentation from the 2021 WMP, the IE verified PG&E completed the 30 sampling locations in compliance with 2020 WMP goals.

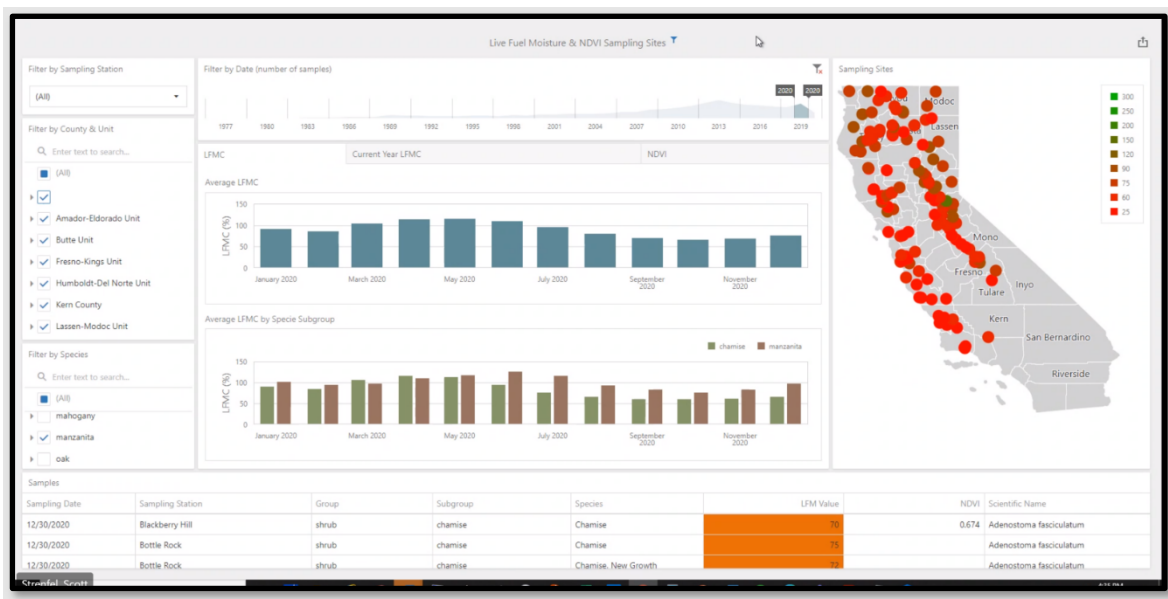


Figure 12: Technosylva Model Interface Presented During SME Interview

5.3.2.2.7 - Line Sensor Devices

Initially included within the PG&E Smart Grid program, PG&E deployed line sensing devices through PG&E's North Bay Tier 2 and Tier 3 HFTD to improve public safety through the real-time monitoring of the grid. With the success of this Smart Grid Initiative, PG&E transitioned to proactively operationalize the installation of line sensors to monitor and locate grid disturbances for analysis and dispatch of field inspectors. As described within this section of the 2020 WMP, PG&E targeted deploying line sensors to approximately 20 feeders covering 3,000-line miles.

As described in the 2020 PG&E Smart Grid Annual Report Rulemaking 08-12-009 (Appendix B Item No. 5), PG&E confirmed the installation of 987 current-measuring line sensors and 25 Early Fault Detection (EFD) line sensors at more than 350 locations. Additionally, PG&E's 2021 WMP Section 7.3.2.2.5 Line Sensor Devices, PG&E identified that sensors were deployed on 46 feeders in 2020 in Tier 2 and Tier 3 HFTD areas for a total of 612 sensors on 4,131-line miles. With the self-reported documentation provided by PG&E, the IE confirmed that PG&E met its goal of deploying line sensors to 20 feeders.

5.3.2.2.8 - Distribution Arcing Fault Signature Library

Through the assessment of emerging technologies, PG&E intends to build tools and methods for detecting incipient fault conditions as they occur for proactive maintenance or real-time protective circuit de-energization. The technology required for building the Distribution Arcing Fault Library includes the utilization of optical sensors with immunity to electromagnetic interference and instrument transformer saturation to provide a high-frequency sampling of voltage, current, temperature, pressure, vibration, and acoustic variables.

North American Electric Reliability Corporation (NERC) Wildfire Mitigation Reference (Appendix B Item No. 30, PG&E in collaboration with Oak Ridge National Laboratory (ORNL) and Lawrence Livermore National Laboratory are evaluating data from the high-fidelity sensor cluster for incorporating into the developing Distribution Arcing Fault Signature Library utilizing emerging sensor technology. On April 8, 2021, the US Department of Energy hosted a Wildfire Webinar Series on Sensing and Detection, where the Oak Ridge National Laboratory described their joint efforts with PG&E on capturing real signatures and analysis for the library (Appendix B Item No. 31). Also, as described within the 2021 WMP Section 7.3.2.2.6 Distribution Arcing Fault Signature Library, PG&E identified the specialized sensor's installation in December 2020 on the Half Moon Bay 1103 Circuit with ongoing analytical analysis of captured data into 2021. By reviewing third-party documentation that describes PG&E's efforts for the installation of the sensor on the distribution feeder for the incorporation and development of the Distribution Arcing Fault Signature Library, the IE has confirmed that PG&E complies with the 2020 WMP goals found in this section.

High-Fidelity Optical Sensor

- At the core of the technology is a passive optical sensing mechanism capable of monitoring AC voltage (10kV-115kV), current (5-2000A), acoustics, temperature, and vibration.
- The frequency range of the optical detection can be tuned to cover over 30kHz bandwidth.
- The variety of sensing parameters integrated into the cluster also includes temperature, vibration and acoustics.
 - Facilitates correlation between different parameters (voltage/current/vibration/etc.) for signature learning
- Nominal sampling rate is 20kHz but can be increased up to 2MHz



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Figure 13: ORNL Wildfire Webinar Presentation (Appendix B Item No. 31)

5.3.2.5.1 - F.1 - Safety and Infrastructure Protection Team (SIPT)

Per Senate Bill 901 SEC.31.764.b. (Appendix B Item No. 32) mandates that “An electrical corporation that has a contract for private fire safety and prevention, mitigation, or maintenance services shall make an effort to reduce or eliminate the use of contract private fire safety and prevention, mitigation, and maintenance personnel in favor of employing highly skilled and apprenticed personnel to perform those services in direct defense of utility infrastructure in collaboration with public agency fire departments having jurisdiction.” PG&E established these in-house fire protection services by developing the Safety and Inspection Protection Team (SIPT) with a 2020 WMP initiative goal to increase staffing levels and associated equipment needs.

The goal/target for initiative 5.3.2.5.1 – F.1 _Safety and Infrastructure Protection Team (SIPT) is identified on page 5-105 of the 2020 WMP to be completed before the 2020 fire season as: “Update and stabilize the current technology solutions and processes and increase staffing levels to support fire prevention and mitigation activities. Targeted staffing levels and associated equipment needs: 98 SIPT Crew members, 40 engines”. The goal/target for this initiative is the same across initiatives 5.3.6.2 and 5.3.6.6.

The IE conducted a SME Interview on June 4th with Ben Almario, Director Wildfire Safety Operations (Appendix D Item No. 20) where the director described the deployment of resources and first responders for supporting the fire protection services described in the Senate Bill 901. Additionally, the director identified the increase of personnel to 40 two-man units that include 12 to 15 relief crews to meet the staffing level needs. Through the SME interview, this WMP initiative has been found to be in compliant with the 2020 WMP and PG&E continues to evaluate staffing resources into 2021.

5.3.3 GRID DESIGN & SYSTEM HARDENING

5.3.3.8-3 - C.1 - SCADA Transmission Switching (switches)

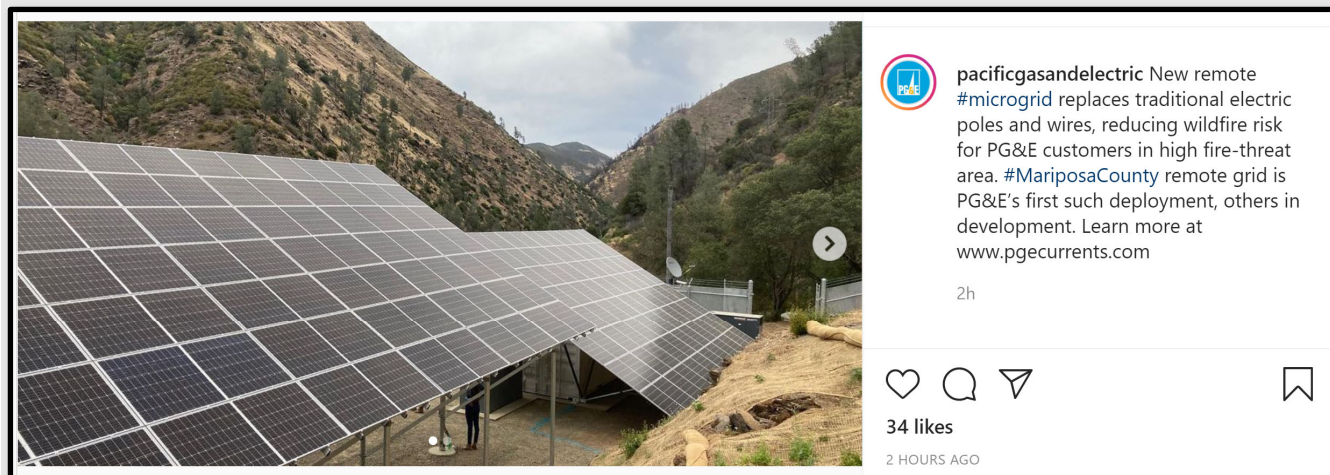
Installation of SCADA transmission switches allows for the sectionalization of transmission lines to minimize the scope of transmission outages during PSPS events and increased speed of restoration during such events resulting in a reduction in disruption to transmission grid operations. In the 2020 WMP, PG&E established a target to install 23 additional SCADA Transmission Switches by the end of 2020.

The IE conducted a SME interview on June 6th with Maria Ly, Manager, Electric Networks (Appendix D Item No. 21) who confirmed that PG&E exceeded the 2020 WMP commitment goals. As reported in the 2021 WMP Table PG&E-7.2-1 C.1 Scada Transmission Switching (switches) PG&E installed 54 SCADA transmission switches, exceeding the goal in 2020 by 31 installations. With the SME Interview and documentation from the 2021 WMP, the IE verified that PG&E exceeded the 2020 WMP goals for the installation of SCADA transmission switches.

5.3.3.8-6 - I.6 - Microgrids for PSPS Mitigation (operationalized units)

Included in PG&E's strategy to reduce and mitigate PSPS occurrences during high fire threat events, microgrids can be utilized through permanent and temporary front-of-the-meter microgrid solutions also described as Resilience Zones. These resilience zones allow for the safe re-energization of customers during PSPS events. Although the PG&E's 2020 WMP plan does not identify specifically targeted installations for 2020, PG&E continued to assess and develop the scope, schedule, and locations for the ideal installation based on available information.

Although the number of microgrid installations was not stated in the 2020 WMP, the IE conducted a SME interview on June 7th with Tracy Maratukulam, Director, Public Safety Power Shutoff (Appendix D Item No. 22), who described the various types of microgrids PG&E deploys and installs while actively supporting the communications to customers when a microgrid has been identified to serve those communities. Further details on PG&E's approach identified through PG&E's news release "PG&E Strengthening Community Resilience with Comprehensive Microgrid Solutions" (Appendix B Item No. 34). Through the SME interview conducted and the information publicly available reviewed, the IE confirmed that PG&E remains in compliance with the 2020 WMP initiative with ongoing microgrid installations into 2021. This analysis does not mean that PG&E is in compliance with the requirements imposed or to be imposed by the Commission in the microgrid rulemaking pending before it, Rulemaking 19-09-009, or its PSPS proceeding, Rulemaking 18-12-005.



**Figure 14: PG&E's Remote Microgrid Social Media post from June 8th, 2021
(Appendix B Item No. 33)**

5.3.3.17.2-2 - C.11 Butte County Rebuild (UG de-energized miles)

As a part of the Butte County Rebuild, PG&E committed to the Town of Paradise that PG&E will underground all electrical distribution power in the Town and some surrounding areas as the town rebuilds from the Camp Fire as announced by PG&E during a special meeting of the town council (Appendix B Item No. 37). With PG&E's announcement to underground in Butte County, PG&E tracked the total number of miles undergrounded in Butte County separately from the System Hardening underground miles. With this ongoing undergrounding, PG&E targeted 20 miles of undergrounding to be completed in 2020 as described in the Paradise Post Article (Appendix B Item No. 36) as well as in the 2020 WMP per Table PGE 5-1 Major Investments and Implementation of Wildfire Mitigation - Initiatives Category.

As described within the 2020 ARC Report Appendix Table 1 and the 2021 WMP Report Table PG&E-7.2-1 2020 WMP Commitments and Performance, PG&E reported the completion of 21.3 miles of undergrounding within Butte County, which exceeds the announced 20 miles targeted for undergrounding in 2020. With the articles and reports referenced above and the completion of over 20 miles in 2020, the IE confirms that PG&E is in compliance with the 2020 WMP initiative for Butte County.

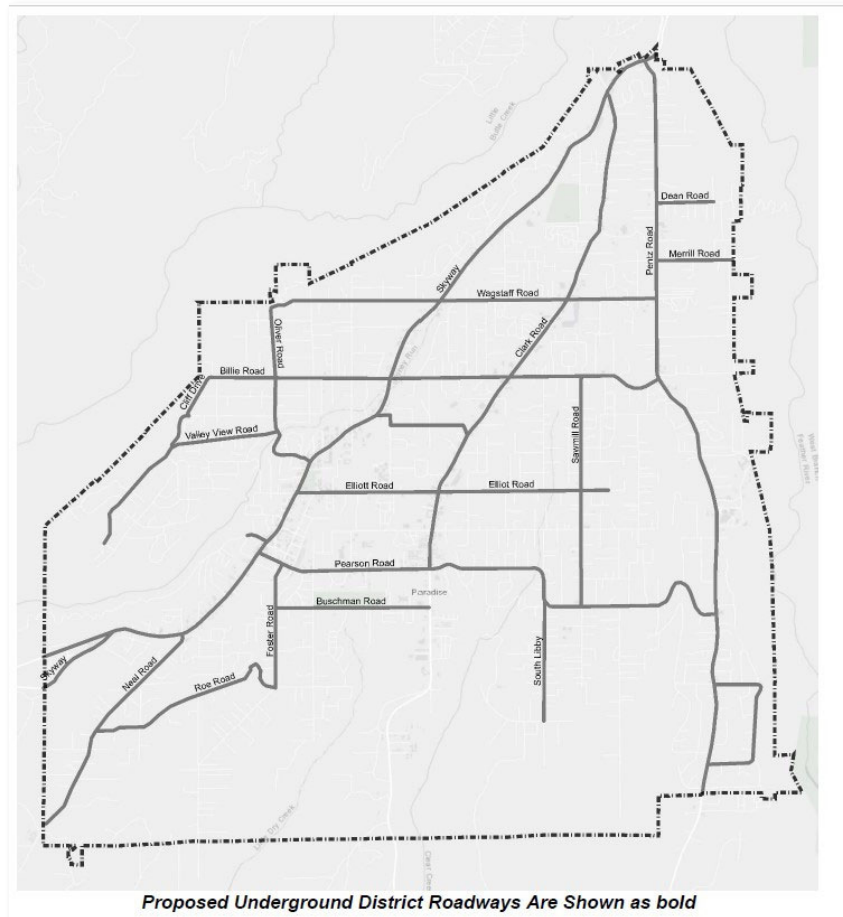


Figure 15: Proposed Underground District Roadways from the Paradise Post (Appendix B Item No. 36)

5.3.6 GRID OPERATIONS & OPERATING PROTOCOLS

5.3.6.2 - F.1 - SIPT Crews and Engines Resourcing

The goal/target for initiative 5.3.6.2 – F.1 _SIPT Crews and Engine Resourcing is identified on page 5-204 of the 2020 WMP to be completed before the 2020 fire season as: “Update and stabilize the current technology solutions and processes and increase staffing levels to support fire prevention and mitigation activities. Targeted staffing levels and associated equipment needs: 98 SIPT Crew members, 40 engines”. The goal/target for this initiative is the same across initiatives 5.3.2.5.1 and 5.3.6.6.

The IE conducted a SME Interview on June 4th with Ben Almario, Director Wildfire Safety Operations (Appendix D Item No. 28), where the director described the increase in total staff members to 102, which exceeded the 2020 WMP target of 98 crew members. Of the 102 crew members, PG&E manages 40 two-person crews, including 12 to 15 relief crews. Additionally, the director showed the SIPT location map during the interview, and per the 2020 ARC Report, PG&E

obtained 42 engines. Therefore, per this IE interview with the Director of Wildfire Safety Operations for PG&E, the IE has confirmed PG&E complied with the 2020 WMP initiatives in this section.

5.3.6.6 - Stationed and on-call ignition prevention and suppression resources and services

The goal/target for initiative 5.3.6.6 – Stationed and On-Call Prevention Resources and Services is identified on page 5-212 of the 2020 WMP to be completed before the 2020 fire season as: “Stabilize the current technology solutions and processes and increase staffing levels to support fire prevention and mitigation activities. Targeted staffing levels and associated equipment needs: 98 SIPT Crew members, 40 engines”. The goal/target for this initiative is the same across initiatives 5.3.2.5.1 and 5.3.6.2.

The IE conducted a SME Interview on June 4th with Ben Almario, Director Wildfire Safety Operations (Appendix D Item No. 28 and 32), where the director described the increase in total staff members to 102, which exceeded the 2020 WMP target of 98 crew members. Of the 102 crew members, PG&E manages 40 two-person crews, including 12 to 15 relief crews. Additionally, the director showed the SIPT location map during the interview, and per the 2020 ARC Report, PG&E obtained 42 engines. Therefore, per this IE interview with the Director of Wildfire Safety Operations for PG&E, the IE has confirmed PG&E complied with the 2020 WMP initiatives in this section.

3.1.4.2 TRENDS AND THEMES

For the evaluation of the Small Volume Quantifiable Goal/Target initiatives categorized by PG&E (Appendix A list of 2020 WMP Activities) at the commencement of this IE ARC Report, the IE reviewed publicly available documents, online articles, and related published reports as referenced throughout the section and detailed within Appendix B List of Supplemental Documents Reviewed. Concurrently, the IE conducted SME interviews (Appendix D SME Interview Summary) with various directors and managers responsible for the management and operations of the stated initiatives within this section.

Through the review and evaluation of these WMP activities, PG&E’s trend across the 2020 WMP activities identified within this section complies with the stated goals identified within the 2020 WMP, and PG&E continues to incorporate data collected analytics, lessons learned, and technological assessments into 2021 goals and future PG&E initiatives.

Table 4: Small (Less Than 100 Items) Volume Quantifiable Goal/Target Summary Table

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on finding
WMP Activity Completion	5.3.2.1.6	B.5 Live Fuel Moisture (LFM) Sampling	Activity Completed	Compliant with the 2020 WMP
WMP Activity Completion	5.3.2.2.7	Line Sensor Devices	Activity Completed	Compliant with the 2020 WMP
WMP Activity Completion	5.3.2.2.8	Distribution Arcing Fault Signature Library	Activity Completed	Compliant with the 2020 WMP



WMP Activity Completion	5.3.2.5.1	F.1 Safety and Infrastructure Protection Teams (SIPT)	Activity Completed	Compliant with the 2020 WMP
WMP Activity Completion	5.3.3.8-3	C.1 SCADA Transmission Switching (switches)	Activity Completed	Compliant with the 2020 WMP
WMP Activity Completion	5.3.3.8-6	I.6 Microgrids for PSPS Mitigation (operationalized units)	Activity Completed	Compliant with the 2020 WMP
WMP Activity Completion	5.3.3.17.2-2	C.11 Butte County Rebuild (UG de-energized miles)	Activity Completed	Compliant with the 2020 WMP
WMP Activity Completion	5.3.6.2	F.1 SIPT Crews and Engines Resourcing	Activity Completed	Compliant with the 2020 WMP
WMP Activity Completion	5.3.6.6	Stationed and on-call ignition prevention and suppression resources and services	Activity Completed	Compliant with the 2020 WMP

3.1.5 Qualitative Goal/Target

3.1.5.1 REVIEW OF INITIATIVES

Pursuant to the Final IE Scope of Work for the Review of Compliance with 2020 WMP (Appendix B Item No. 56), PG&E provided "a complete list of all 2020 WMP activities with no quantifiable goals/targets that were conducted in 2020." 2020 WMP activities identified within the Qualitative Goal/Target list were assessed within this section and are presented below in tables grouped by the associated initiative category. The IE findings are defined as follows:

- Activity Validated – Qualitative work on initiative began and ended in 2020.
- Activity In Progress – Qualitative work on initiative began in 2020 and continues into 2021.
- Activity Ongoing – Qualitative work on initiative is incorporated in operations to be repeated annually.

5.1.D NEW OR EMERGING TECHNOLOGIES

Table 5: New or Emerging Technologies Qualitative Goal/Target Summary Table

Initiative Name	Initiative Validation	Finding
5.1.D.3.6 (pg. 5-17) - C.8 - Rapid Earth Fault Current Limiter (REFCL) Pilot	<ul style="list-style-type: none"> • PG&E's 2021 WMP plan Calistoga REFCL Pilot Project. • KPIX CBS SF BayArea News Article, PG&E Tests New Wildfire-Detection Power Line Tech in Calistoga (Appendix B Item No. 2). • Request for Proposal (RFP) EPIC Capacitive Balancing Units (Appendix B Item No. 3). 	Activity Validated
5.1.D.3.8 - C.3 - Remote Grids 5.3.3.8-5	<ul style="list-style-type: none"> • PG&E's 2021 WMP (Page 356) indicates the initiative is in progress with 5 remote grid sites being deployed. • PG&E's Advice Letter 6017E (Appendix B Item No. 38). 	Activity In Progress

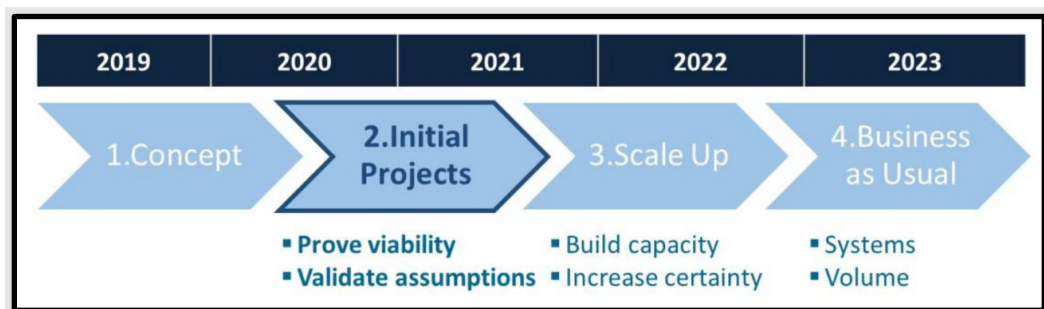


Figure 16: Illustrative Timeline for Remote Grid Projects and Potential Expansion – From PG&E's Advice Letter 6017E (Appendix B Item No. 38)

5.3.1 RISK ASSESSMENT & MAPPING

Table 6: Risk Assessment and Mapping Qualitative Goal/Target Summary Table

Initiative Name	Initiative Validation	Finding
5.3.1.1 - A summarized risk map that shows the overall ignition probability and estimated wildfire consequence along the electric lines and equipment	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Paul McGregor, Director, Risk Management per Appendix D Item No. 1. 	Activity Validated
5.3.1.2 - Climate-driven risk map and modelling based on various relevant weather scenarios	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science per Appendix D Item No. 2. 	Activity Validated
5.3.1.3 - Ignition probability mapping showing the probability of ignition along the electric lines and equipment	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Paul McGregor, Director, Risk Management per Appendix D Item No. 3. 	Activity Validated
5.3.1.4 - Initiative mapping and estimation of wildfire and PSPS risk-reduction impact	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Paul McGregor, Director, Risk Management per Appendix D Item No. 4. 	Activity Validated
5.3.1.5 - Match drop simulations showing the potential wildfire consequence of ignitions that occur along the electric lines and equipment	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Paul McGregor, Director, Risk Management per Appendix D Item No. 5. 	Activity Validated
5.3.1.6 - Weather-driven risk map and modelling based on various relevant weather scenarios	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science per Appendix D Item No. 6. 	Activity Validated

5.3.2 SITUATIONAL AWARENESS & FORECASTING

Table 7: Situational Awareness and Forecasting Qualitative Goal/Target Summary Table

Initiative Name	Initiative Validation	Finding
5.3.2.1.1 - B.1 - Upgrade POMMS Model to 2km	<ul style="list-style-type: none"> PG&E's 2021 WMP plan, Table 7.2-1 Commitments and Performance. PG&E EPIC Project #5 – New Forecast Methods for Improved Storm Damage Modeling, Preliminary Project Summary – Notice of Upcoming Bid Solicitation. SME Interview conducted on June 7th with Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science per Appendix D Item No. 49. 	Activity Validated
5.3.2.1.1 - B.3 - Wind Event Forecasting Tool (Diablo)	<ul style="list-style-type: none"> PG&E's Quarterly Initiative (QIU) for First Quarter 2021. Appendix B Item No.7 SME Interview conducted on June 7th with Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science per Appendix D Item No. 50. 	Activity in Progress
5.3.2.1.1 - B.6 - Re-calibrate the OPW and FPI models	<ul style="list-style-type: none"> PG&E's Quarterly Initiative (QIU) for First Quarter 2021. Appendix B Item No.7 SME Interview conducted on June 7th with Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science per Appendix D Item No. 51. 	Activity Validated
5.3.2.1.2 - B.4 - Wildfire Spread Model - Operational Impacts	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science per Appendix D Item No. 47. 	Activity Validated
5.3.2.1.5 - B.2 - NOAA-20 Satellite Data	<ul style="list-style-type: none"> PG&E's Online Fire-Detection Satellite Map (Appendix B Item No. 6). SME Interview conducted on June 7th with Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science per Appendix D Item No. 52. 	Activity Validated

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5.3.2.1.7 - Addressing Weather Forecast Model Uncertainty	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science per Appendix D Item No. 48. 	Activity Validated
5.3.2.1.8 - PG&E Lightning Detection Network (PLDN)	<ul style="list-style-type: none"> PG&E's custom internal application displaying lightning strikes in near real time and displaying historical data. 2021 WMP, Figure PG&E-7-3-2-17: Example output from the PLDN showing historical lightning from March 29, 2019. PG&E 2020 Q4 QIU. Appendix B Item No. 53 	Activity Validated
5.3.2.1.9 - Information Sharing	<ul style="list-style-type: none"> PG&E's Online Weather Application and Map sharing weather information including: Weather Station data, and Live Feeds from Wildfire Alert Cameras (Appendix B Item No. 9). PG&E's Online Weather Awareness for the 7-day PSPS Forecast including information from the CA National Guard, County, and Municipal Fire agencies (Appendix B Item No. 10). 	Activity Validated

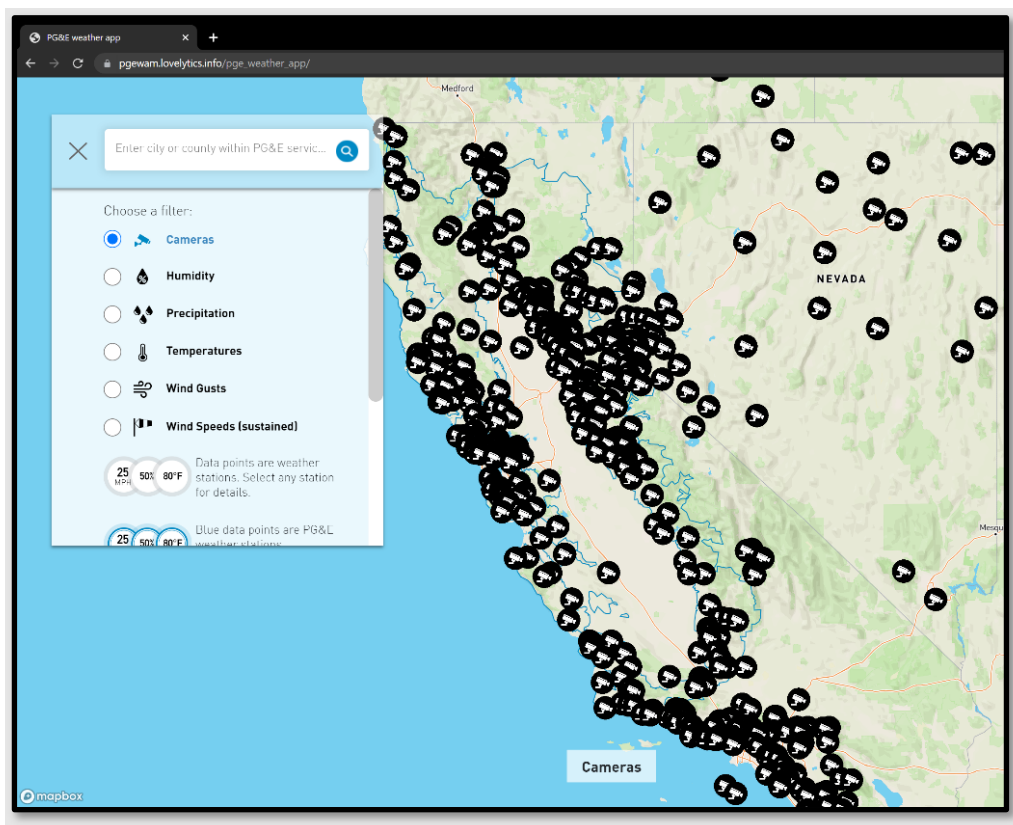


Figure 17: PG&E Online Weather Application Map (Appendix B Item No. 9)

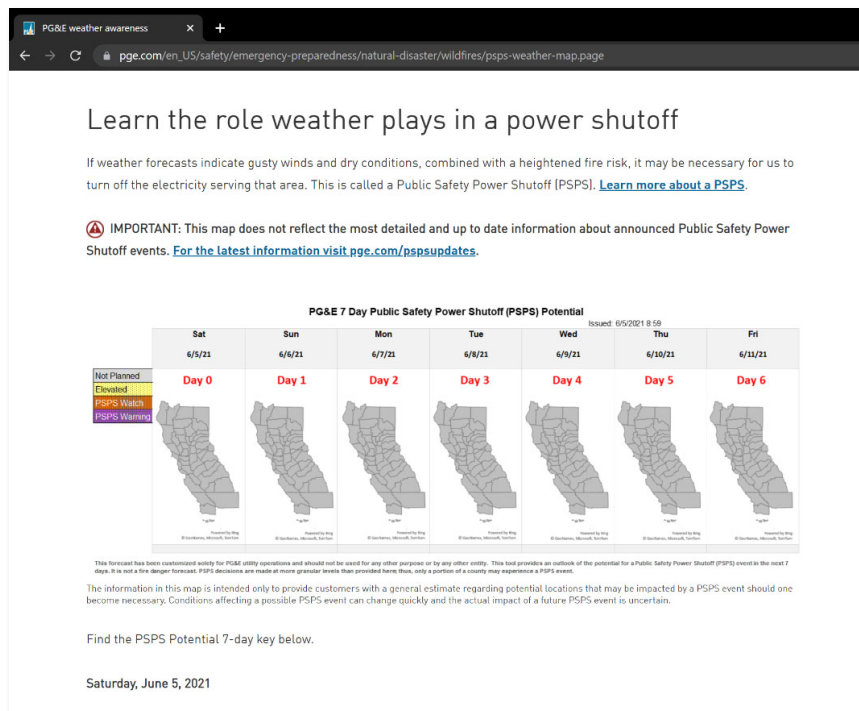


Figure 18: PG&E Weather Awareness 7-Day PSPS Forecast (Appendix B Item No. 10)

Table 7: Situational Awareness and Forecasting Qualitative Goal/Target Summary Table (continued)

Initiative Name	Initiative Validation	Finding
5.3.2.1.10 - Collaborative Efforts to Advance Fire Science	<ul style="list-style-type: none"> SJSU Fire Weather Research Online Workshop Funded by PG&E (Appendix B Item No. 12). PG&E Community Wildfire Safety Program Presentation to Alameda County on June 2, 2020 describing ongoing collaboration with SJSU Fire Weather Research Lab (Appendix B Item No. 13). 	Activity in Progress
5.3.2.2.1 - Electric Transmission: Continuous Monitoring Sensors	<ul style="list-style-type: none"> PG&E 2020 Q4 QIU. Appendix B Item No. 53 SEL-T400L Time-Domain Line Protection, (Ultra-High-Speed Transmission Line Relay Traveling-Wave Fault Locator High Resolution Event Recorder) 2021 (Appendix B Item No. 42). 	Activity in Progress
5.3.2.2.2 - Electric Distribution: Continuous Monitoring Sensors"	<ul style="list-style-type: none"> PG&E 2020 Q4, QIU, 03/31/2021, PG&E installed pilots in 2020. Appendix B Item No. 53. 	Activity in Progress

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5.3.2.2.4 - Distribution Fault Anticipation (DFA) Technology	<ul style="list-style-type: none"> DFA pilot completed in 2020 as a part of EPIC 2.34 – Predictive Risk Identification with Radio Frequency (RF) Added to line sensors per EPIC 2020 Annual Report (Appendix B Item No. 48). Per 2021 WMP section 7.3.2.2.3 additional deployment of DFA was installed following completion of the pilot program with intent to expand deployment further. 	Activity Validated
5.3.2.2.5 - Early Fault Detection (EFD)	<ul style="list-style-type: none"> EFD pilot completed in 2020 as a part of EPIC 2.34 – Predictive Risk Identification with Radio Frequency (RF) added to line sensors per EPIC 2020 Annual Report (Appendix B Item No. 48). Per 2021 WMP section 7.3.2.2.3 additional deployment of EFD was installed following completion of the pilot program with intent to expand deployment further. 	Activity Validated
5.3.2.3.1 - Electric Transmission: Fault Indicators	<ul style="list-style-type: none"> Per the 2020 WMP, PG&E had no future plans for installing fault Indicators for detecting faults on electric lines and equipment for transmission other than continuous monitor sensors. They are covered under 5.3.2.2. Continuous Monitoring Sensors within the 2020 WMP. However, per the 2021 WMP, PG&E is exploring other technologies such as Line Sensors, SCADA or SmartMeter technologies. 	Activity in Progress
5.3.2.3.2 - Electric Distribution: Fault Indicators	<ul style="list-style-type: none"> As described in the 2020 WMP, PG&E does not have a program to install additional fault indicators in fire areas for future years. However, per the 2021 WMP PG&E is exploring other technologies such as line sensors, SCADA or SmartMeter technologies. 	Activity in Progress
5.3.2.4 - Forecast of a fire risk index, fire potential index, or similar	<ul style="list-style-type: none"> SME Interview conducted on June 7th Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science Appendix D Item No. 15. 	Activity Validated
5.3.2.5.2 – SIPT Data collection	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Ben Almario, Director, Wildfire Safety Operations per Appendix D Item No. 16. 	Activity Validated

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5.3.2.6 - Weather forecasting and estimating impacts on electric lines and equipment	<ul style="list-style-type: none"> Per PG&E's response to in Case 3:14-cr-00175-WHA Document 1322 Filed 03/03/21, the Outage Producing Winds (OPW) was updated in 2020 to incorporate historical data as described. Appendix B Item No. 17. 	Activity Validated
5.3.2.7 - Wildfire Safety Operations Center (WSOC)	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Ben Almario, Director, Wildfire Safety Operations per Appendix D Item No. 18. SME Interview conducted on June 4th with Angie Gibson, Director, Emergency Preparedness and Response, Strategy and Execution per Appendix D Item No. 17. 	Activity Validated

5.3.3 GRID DESIGN & SYSTEM HARDENING

Table 8: Grid Design and System Hardening Qualitative Goal/Target Summary Table

Initiative Name	Initiative Validation	Finding
5.3.3.1 - Capacitor maintenance and replacement program	<ul style="list-style-type: none"> Per 2020 WMP section 5.3.3.1 and 2021 WMP section 7.3.3.1 capacitor inspection and maintenance is carried out on an ongoing annual basis. PG&E 2021 Q1 QIU, Appendix B Item No. 7. 	Activity Ongoing
5.3.3.2 - Circuit breaker maintenance and installation to de-energize lines upon detecting a fault	<ul style="list-style-type: none"> TD-3222M Substation Maintenance and Construction Manual Circuit Breakers Booklet, Appendix B Item No. 51. TD-3222S Substation Equipment Maintenance Requirements, Appendix B Item No. 52 	Activity Ongoing
5.3.3.3 - Covered conductor installation	<ul style="list-style-type: none"> PG&E does not have a stand-alone targeted program for covered conductor installations. See Section 5.3.3.17 System Hardening of the 2020 WMP. 	Activity Ongoing
5.3.3.4 - Covered conductor maintenance	<ul style="list-style-type: none"> Per GO165 Program, PG&E continues to implement covered conductor maintenance within PG&E's standard yearly operations. 	Activity Ongoing
5.3.3.5 – Cross-arm maintenance, repair, and replacement	<ul style="list-style-type: none"> Per GO165 Program, PG&E continues to implement cross-arm maintenance within PG&E's standard yearly operations. Crossarm replacement completed as a part of System Hardening Program. 	Activity Ongoing



	<ul style="list-style-type: none"> SME interview conducted on June 10th with Mike Theide, Manager Electric Distribution Field QA-QC per Appendix D Item No. 83. 	
5.3.3.6 - Distribution pole replacement and reinforcement, including with composite poles	<ul style="list-style-type: none"> The Pole Test & Treat (PT&T) Program is an ongoing yearly program designed for determining distribution pole replacement and reinforcement. 	Activity Ongoing
5.3.3.8-4 - C.9 - System Hardening Criteria Refinement (Dist.)	<ul style="list-style-type: none"> PG&E Quarterly Initiative Update (QIU) for Fourth Quarter 2020, Appendix B Item No. 53. Calibration of System Hardening criteria with PSPS tool completed and criteria were applied during 10/25 PPS event. PG&E 2021 Q1 QIU, Appendix B Item No. 7 	Activity Validated
5.3.3.9-1 - C.5 System Hardening (SCADA enabled circuit breakers)	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Maria Ly, Manager, Electric Networks and Michelle Sakamoto per Appendix D Item No. 45. 	Activity Ongoing
5.3.3.9-2 - Replacement of Legacy 4C Controllers (reclosers)	<ul style="list-style-type: none"> Twenty 4C reclosers replaced in Q4 of 2020. PG&E Quarterly Initiative Update (QIU) for Fourth Quarter 2020, Appendix B Item No. 53. Remaining 4C controllers to be replaced per 2021 WMP section 7.3.3.9.1. 	Activity in Progress
5.3.3.10 - Maintenance, repair, and replacement of connectors, including hotline clamps	<ul style="list-style-type: none"> SME Interview conducted on June 10th with Mike Theide, Manager, Electric Distribution Field QA-QC per Appendix D Item No. 84. 	Activity Ongoing
5.3.3.11 - Mitigation of impact on customers and other residents affected during PPS event	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PPS Customer Engagement and Strategy per Appendix D Item No. 23. 	Activity Ongoing
5.3.3.12-1 - Substation Animal Abatement	<ul style="list-style-type: none"> 21 locations completed in 2020. PG&E Quarterly Initiative Update (QIU) for Fourth Quarter 2020, Appendix B Item No. 53. Seven additional locations completed in Q4 of 2020. Nine locations completed in Q1 of 2021 with 20 locations planned for work in 2021-2022. 	Activity in Progress

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5.3.3.12-2 - Transmission Line Initiatives	<ul style="list-style-type: none"> SME Interview conducted on June 10th with Steve Zubiri, Transmission Construction Manager, Appendix D Item No. 85. 	Activity Ongoing
5.3.3.12-3 - Wildfire Safety Inspection Program Distribution Repair Work	<ul style="list-style-type: none"> At the end of Q3 2020 208,501 distribution tags had been created, 73,359 were closed, and 131,151 remained open. PG&E Quarterly Initiative Update (QIU) for Fourth Quarter 2020, Appendix B Item No. 53. PG&E is evaluating integrating 2021 Wildfire Distribution Risk model into the maintenance program to prioritize maintenance activities. PG&E 2021 Q1 QIU, Appendix B Item No. 7. 	Activity in Progress
5.3.3.14 - Transformers maintenance and replacement	<ul style="list-style-type: none"> Per GO165 Program, PG&E continues to implement transformer maintenance and replacement within PG&E's standard yearly operations. 	Activity Ongoing
5.3.3.15 - Transmission tower maintenance and replacement	<ul style="list-style-type: none"> 5,100 tags were completed for steel transmission tower repair withing HFTD areas. Quarterly Initiative Update (QIU) for Fourth Quarter 2020, Appendix B Item No. 53. SME Interview conducted on June 10th with Steve Zubiri, Transmission Construction Manager, Appendix D Item No. 86. 	Activity Ongoing
5.3.3.16 - Undergrounding of electric lines and/or equipment	<ul style="list-style-type: none"> As described within the 3.1.1 Large Volume Quantifiable Goal/Target – Field Verifiable Section, PG&E continues to implement undergrounding of electric lines and equipment as part of PG&E's System Hardening Program. 	Activity Ongoing
5.3.3.17.1 - System Hardening Design Guidance	<ul style="list-style-type: none"> Per TD-9001B-009 Rev 2 the Fire Rebuild Design Guidance for System Hardening is continuing to be evolved by PG&E (Appendix B Item 20). 	Activity in Progress
5.3.3.17.3 - Relationship Between System Hardening and Enhanced Vegetation Management	<ul style="list-style-type: none"> Vegetation Risk Model and Conductor Risk Model Completed in November 2020. Items six and seven. Table PG&E-4.5-1: Overview of PG&E Risk and Operation Models. 2021 WMP. SME Interview conducted on June 7th with Paul McGregor, Director Risk Management 	Activity Validated

	& Jon Eric Thalman, Risk Analytics per Appendix D Item No. 87.	
5.3.3.17.5 - Transmission Line System Hardening Overview and Strategy	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Paul McGregor, Director Risk Management & Jon Eric Thalman, Risk Analytics per Appendix D Item No. 81. 	Activity Validated
5.3.3.18.1-2 - Increased Protection Sensitivity	<ul style="list-style-type: none"> As described within the 3.1.1 Large Volume Quantifiable Goal/Target – Field Verifiable Section, PG&E has deployed System Protection Reclosers, and continues to explore more sensitive protection settings. 	Activity Validated
5.3.3.18.2 - Transmission Line Modeling	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Paul McGregor, Director Risk Management & Jon Eric Thalman, Risk Analytics per Appendix D Item No. 82. 	Activity Validated
5.3.3.18.3 - Building and Sourcing Services	<ul style="list-style-type: none"> PG&E's 2020 Q4 QIU indicates that these services are provided as needed to support other WMP Initiatives per Appendix B Item No. 53. 	Activity Ongoing

5.3.6 GRID OPERATIONS & OPERATING PROTOCOLS

Table 9: Grid Operations and Operating Protocols Qualitative Goal/Target Summary Table

Initiative Name	Initiative Validation	Finding
5.3.6.3 - F.5 - Implement SafetyNet Observation Cards	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Ben Almario, Director, Wildfire Safety Operations per Appendix D Item No. 29. 	Activity Validated
5.3.6.4 - F.2 - Protocols for PSPS Re-Energization	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Ben Almario, Director, Wildfire Safety Operations per Appendix D Item No. 30. 	Activity Validated
5.3.6.5 - PSPS events and mitigation of PSPS impacts	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Shawn Holder, Manager PSPS PMO per Appendix D Item No. 31. 	Activity Validated

5.3.7 DATA GOVERNANCE

Table 10: Data Governance Qualitative Goal/Target Summary Table

Initiative Name	Initiative Validation	Finding
5.3.7.1 - Consolidate Data Into Single Repository	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Shawn Holder, Manager PSPS PMO per Appendix B Item No. 5. PG&E's Smart Grid Annual Report (2020). PG&E's 2021 WMP plan, Table 7.3.7.1 Centralized Repository for Data (Page 703). 	Activity in Progress
5.3.7.2 - Collaborative research on utility ignition and/or wildfire	<ul style="list-style-type: none"> SJSU Fire Weather Research Online Workshop Funded by PG&E. Appendix B Item No. 12. 	Activity in Progress

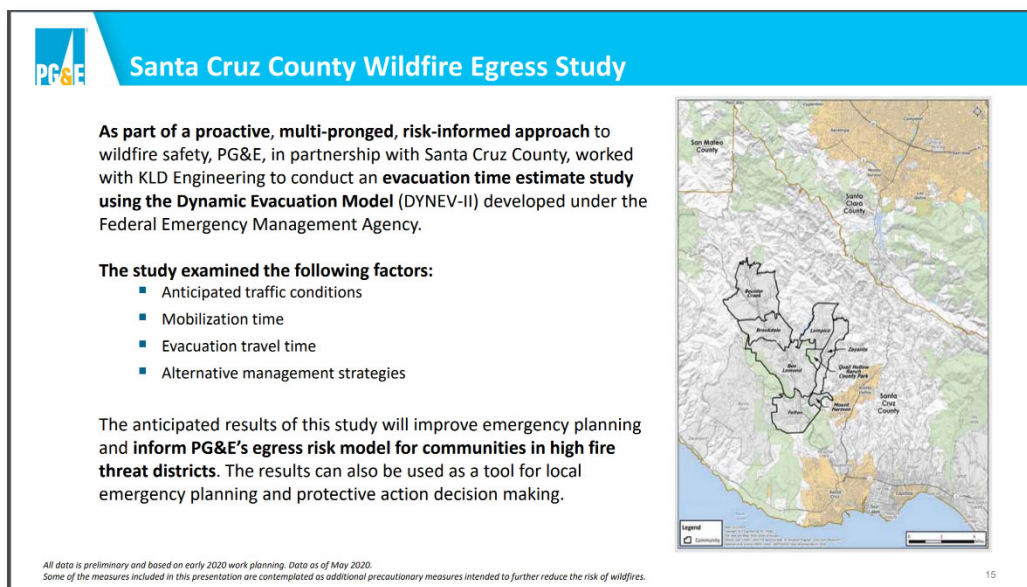


Figure 19: Excerpt From Community Wildlife Safety Program Presentation (Appendix B Item No.22)

Table 10: Data Governance Qualitative Goal/Target Summary Table (continued)

Initiative Name	Initiative Validation	Finding
5.3.7.3 - Documentation and disclosure of wildfire-related data and algorithms	<ul style="list-style-type: none"> Per PG&E incorporated wildfire-related data and algorithms and provided reporting on them in the filed A2006012 Application with 2020 Risk Assessment and Mitigation Phase (RAMP) Report per Appendix B Item No. 23. 	Activity Ongoing

5.3.7.4 - Define and track ignition near miss events	<ul style="list-style-type: none"> WSD and PG&E are working together for changing the terminology from Near Miss events to Risk Events (Appendix B Item No. 25 CPUC Stakeholders 2021 Wildfire Mitigation Plans and Safety Culture Assessments WSD-011 Agenda ID#18852). They are also developing and standardizing the safety and operational metrics (Appendix B Item No. 26 Assigned Commissioners Ruling Regarding Development of Safety and Operational Metrics Rulemaking 20-07-013) 	Activity Ongoing
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5.3.8 RESOURCE ALLOCATION METHODOLOGY

Table 11: Resource Allocation Methodology Qualitative Goal/Target Summary Table

Initiative Name	Initiative Validation	Finding
5.3.8.1 - Allocation methodology development and application	<ul style="list-style-type: none"> PG&E had no qualitative targets identified within the 2020 WMP for this section. 	N/A
5.3.8.2 - Risk reduction scenario development and analysis	<ul style="list-style-type: none"> The development and analysis of the risk reduction model continues to be ongoing as shown through workshop presentations given by PG&E to CPUC, per PG&E's Vegetation Management WSD Presentation per Appendix B Item No. 27. 	Activity Ongoing
5.3.8.3 - Risk spend efficiency analysis	<ul style="list-style-type: none"> As described within the filed A2006012 Application with 2020 Risk Assessment and Mitigation Phase (RAMP) Report per Appendix B Item No. 23, the Risk Spend Efficiencies (RSE's) were updated within the 2020 RAMP report. 	Activity Validated

5.3.9 EMERGENCY PLANNING & PREPAREDNESS

Table 12: Emergency Planning and Preparedness Qualitative Goal/Target Summary Table

Initiative Name	Initiative Validation	Finding
5.3.9.1 - Adequate and trained workforce for service restoration	<ul style="list-style-type: none"> SME Interview conducted on June 3rd with Robert Cupp, Director, Emergency Preparedness and Response, Field Operations per Appendix D Item No. 35. 	Activity Ongoing

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5.3.9.2-1 - Community outreach, public awareness, and communications efforts	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy per Appendix D Item No. 36. 	Activity Validated
5.3.9.3-1 - Customer support in emergencies	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy per Appendix D Item No. 38. 	Activity Ongoing
5.3.9.3-2 - I.8 CRC Mitigate PSPS Customer Impacts	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy per Appendix D Item No. 39. 	Activity Ongoing
5.3.9.3-3 - I.7 - PSPS - 24/7 Information Updates	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy per Appendix D Item No. 40. 	Activity Ongoing
5.3.9.4 - I.5 - CERP (Update and Publish)	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Angie Gibson, Director, Emergency Preparedness and Response, Strategy and Execution per Appendix D Item No. 41. 	Activity Validated
5.3.9.5-1 - I.1 - Emergency Preparation and Restoration	<ul style="list-style-type: none"> SME Interview conducted on June 3rd with Robert Cupp, Director, Emergency Preparedness and Response, Field Operations per Appendix D Item No. 42. 	Activity Ongoing
5.3.9.5-2 - I.2 - PSPS - Service Restoration	<ul style="list-style-type: none"> SME Interview conducted on June 3rd with Robert Cupp, Director, Emergency Preparedness and Response, Field Operations per Appendix D Item No. 43. 	Activity Validated
5.3.9.5-3 - I.3 - PSPS Customer Impact Mitigation	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Maria Ly, Manager, Electric Networks and Michelle Sakamoto per Appendix D Item No. 44. 	Activity Validated
5.3.9.6 - Protocols in place to learn from wildfire events	<ul style="list-style-type: none"> PG&E PSPS Report to the CPUC for De-energization event lessons learned per Appendix B Item No. 46. PG&E CERP Plan per Appendix B Item No. 47 	Activity Validated

	<ul style="list-style-type: none"> PG&E's 2021 WMP plan, Table 7.3.9.6 Protocols in Place to Learn from Wildfire Events (Page 793). 	
5.3.9.7 - Resource Sharing to Support Inspection Work and Other Aspects of the Wildfire Management Plan	<ul style="list-style-type: none"> PG&E member of the California Utilities Emergency Association per Appendix B Item No. 44). PG&E member of the Western Region Mutual Assistance Agreement (WRMAA) per Appendix B Item No. 45). 	Activity Ongoing

5.3.10 STAKEHOLDER COOPERATION & COMMUNITY ENGAGEMENT

Table 13: Stakeholder Cooperation and Community Engagement Qualitative Goal/Target Summary Table

Initiative Name	Initiative Validation	Finding
5.3.10.1 - Community engagement	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy per Appendix D Item No. 7. 	Activity Ongoing
5.3.10.2 - Cooperation and best practice sharing with agencies outside CA	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Matthew Pender, Director, Community Wildfire Safety Program PMO & Joscelyn Wong, Electric Program Manager, Asset Risk Management per Appendix D Item No. 8. 	Activity Ongoing
5.3.10.3 - Cooperation with suppression agencies	<ul style="list-style-type: none"> SME Interview conducted on June 3rd with Robert Cupp, Director, Emergency Preparedness and Response, Field Operations per Appendix D Item No. 9. 	Activity Ongoing
5.3.10.4 - Forest service and fuel reduction cooperation and joint roadmap	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Mariano Mandler, Senior Director, Environmental Health and Safety & Jon Wilcox, Environmental Resources & Mitigation Manager per Appendix D Item No. 10. 	Activity Ongoing

3.1.5.2 TRENDS AND THEMES

The IE team evaluated Qualitative Goal/Targets for 74 initiatives related to PG&E's 2020 WMP across 8 categories. Validation was completed by document review of publicly available material as well as material provided by PG&E through document request. Refer to Appendix B for a List of Documents Reviewed. Validation was also carried out by conducting SME interviews, listed in appendix D.

The IE team evaluation of the Qualitative Goal/Targets validated 34 initiatives, identified 25 initiatives as ongoing, and identified 15 initiatives as in progress.

Information reviewed in the course of the evaluation of the initiatives underscored the ongoing nature of the efforts associated with the qualitative goals/targets. Work towards initiatives that has been validated for the 2020 WMP is currently in the process of being executed for the 2021 WMP. PG&E has approached the qualitative goals systematically relying on established processes where appropriate, developing new processes to fill in, monitoring outcomes, and refining the approach to incorporate feedback to be carried forward to future wildfire mitigation efforts.

3.2 VERIFICATION OF FUNDING

The IE's primary assessment data used to verify each WMP activity's funding include PG&E's annual report on compliance for the 2020 WMP, dated March 31, 2021, and PG&E's variance explanation spreadsheet received on June 09, 2021, Appendix B, Items 54 & 55. Concurrently, the IE conducted the relevant SME interviews within Appendix D while reviewing public and confidential documents referenced in Appendix B and correlated to the list of 2020 WMP activities that PG&E provided within Appendix A. In addition, the IE analyzed the various funding verification findings of each activity/item in this report against its related activity category and initiative. The multi-pronged approach aided in providing additional insight and a better understanding of PG&E's reporting on WMP activities funding.

The IE conducted two primary SME interviews, Appendix D item's 46 & 88, dedicated to discussing financials and several additional SME interviews overlapping with initiatives covered during these interviews. The primary interviews focused on specific activities associated with underspend and elaborations on PG&E's reported WMP expenditure results. As a result of the SME interview discussions with Christopher Wong, Principal, Business Finance, and Jack Liu, Business Planning Expert, the IE team received from PG&E an updated financial analysis on June 9, 2021, labeled: IE Analysis 2020 vs. 2020 Plan v2 (Excel File), Appendix B, Item 55. The provided financial analysis spreadsheet better aligned with PG&E's most updated expenditures reported in the revised 2021 WMP report issued on June 3, 2021.

For each item self-reported by PG&E that was less than 100 percent of its forecasted spend, the IE summarized its findings in the following Table 14: 2020 WMP Funding Verification Summary. The table provides details on funding initiative variances/discrepancies and references the source document(s) used to compile the information. The IE noted in its results that several 2020 WMP activities did not record any allocation of costs spent and were registered as "Unused Budget." The IE used the ARC report as the main variance comparison against PG&E's reported budgets and spend. However, there are instances where the variances between the reported information and the ARC report, Appendix B, Item 54, differ from the information received from PG&E on June 9, 2021; report labeled: IE Analysis 2020 Actual vs. 2020 Plan v2 (Excel file), Appendix B, Item 55. In those instances, the additional variance was noted within the "detail on funding discrepancy" in Section 3.2 Verification of Funding, Table 1 2020 WMP Funding Verification Summary, shown below.

A detailed comparative analysis between the 2020 ARC Report (Expense and Capital Costs) and the variance reconciliation labeled: IE Analysis 2020 vs. 2020 Plan v2 (Excel file), provided by PG&E on June 9, 2021, is provided as part of Appendix E, labeled: Verification of Funding Analysis. Due to the number of program initiatives covered within the review and the IE assessment schedule duration constraints, a written narrative was provided for activities/initiatives with an underspend value greater than 5 million, see the following Table 1 WMP Funding Verification Summary. For activities/initiatives with an underspend value of less than 5 million, a detailed budget and spend comparison is provided in the following, Table 2 2020 WMP Funding Verification Summary and the Verification of Funding Analysis in Appendix E.

Table 14: 2020 WMP Funding Verification Summary (\$ Thousands)

Initiative Category	2020 Initiative Number	Initiative Name	2020 WMP Page No.	Funding Discrepancy Amount	Detail on Funding Discrepancy
Vegetation Management & Inspections	5.3.5.20	Vegetation management to achieve clearances around electric lines and equipment	Table 25, Pg. 5-200	\$ (438,311)	No spend was allocated to this \$438.31 million 2020 WMP Activity/Initiative per the 2020 ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2, this item was realigned in the 2021 WMP to initiative 7.3.5.20 Vegetation Management to Achieve Clearances Around Electric Lines and Equipment, which also does not show any budget allocation to the 2021 WMP activity and states: "VM to achieve clearances around electric lines and equipment is conducted as part of the routine and EVM programs as described in Section 7.3.5.2 for the primary distribution efforts related to "achieving clearances" and Section 7.3.5.3 for transmission efforts on that front."
Grid Design & System Hardening	5.3.3.15	Transmission tower maintenance and replacement	Table 23, Pg. 5-137	\$ (191,849)	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget underspent of \$191.85 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was reduced from \$284.01 million to \$108.44 million, still resulting in an underspent amount by \$16.28 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, PG&E noted in their explanation for the underspent amount under Section 5.3.3.15:</p>

					“Primarily driven by lower unit cost (enhanced program management oversight driving efficiency gains) and lower volume where notifications were assigned to a program but ended up being completed in another program.”
Grid Operations & Operating Protocols	5.3.6.5-1, 5.3.6.5-2, and 5.3.6.5-3	PSPS events and mitigation of PSPS impacts	Table 26, Pg. 5-210	\$ (129,546)	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspent of \$129.55 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E’s variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was reduced from \$210.36 million to \$153.61 million, resulting in an underspent amount of \$72.80 million.</p> <p>PG&E stated that they incurred less than planned PSPS event costs and have attributed those reductions in costs per event to the investments made to mitigate PSPS events, such as fire risk modeling, system hardening, sectionalizing devices. In addition, a portion of PSPS event work was booked to distribution orders.</p>
Vegetation Management & Inspections	5.3.5.11	Patrol inspections of vegetation around distribution electric lines and equipment	Table 25, Pg. 5-191	\$ (105,349)	<p>No spend was allocated to this \$105.35 million 2020 WMP Activity/Initiative per the 2020 ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E’s variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, there are no-cost allocations for this initiative.</p> <p>Per 2020 WMP Section 5.3.5.11 Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment and 2021 WMP Section 7.3.5.11 Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment, there is no specific program to perform “patrols” around distribution lines unique from the inspections described in Sections 5.3.5.11 (2020 WMP)and 7.3.5.2. (2021 WMP).</p>
Asset Management & Inspections	5.3.4.9	D.1 - Ultrasonic Inspections Pilot	Table 24, Pg. 5-165	\$ (93,178)	<p>No spend was allocated to this \$93.18 million 2020 WMP Activity/Initiative per the 2020 ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E’s variance explanation spreadsheet received on June 9th,</p>

					<p>2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, this item was realigned in the 2021 WMP to initiative 7.3.4.9 Other discretionary inspection of distribution electric lines and equipment, beyond inspections mandated by rules and regulations.</p> <p>In 2021 WMP, PG&E stated that they are not planning discretionary inspection activities beyond those described in Sections 7.3.4.1 and 7.3.4.4 in 2021.</p>
Asset Management & Inspections	5.3.4.10	Other discretionary inspection of transmission electric lines and equipment, beyond inspections mandated by rules and regulations	Table 24, Pg. 5-166	\$ (59,705)	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$59.71 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was decreased from 60.05 million to \$347 thousand, matching the actual spend of \$347 thousand and resulting in a full spend. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Sections 7.3.4.2 and 7.3.4.10 have been switched in the 2021 WMP. 7.3.4.2 is now the Enhanced Inspections Program for Transmission, wherein the 2020 WMP 5.3.4.2 consisted of MATs BFU, BFW, and BFY (non-enhanced inspections). For the activities described in 7.3.4.10, activities are not discreetly tracked in MATs, work was estimated.</p> <p>Enhanced Inspections 2020 WMP plan units: 21,558 at \$2,786 per unit; 2020 actuals: 27,399 at \$1,488 per unit.</p>
Vegetation Management & Inspections	5.3.5.12	Patrol inspections of vegetation around transmission electric lines and equipment	Table 25, Pg. 5-191	\$ (35,893)	<p>No spend was allocated to this 2020 WMP Activity/Initiative with a budget of 35.89 million, per the ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, there are no-cost allocations for this initiative.</p>

					Per 2020 WMP Section 5.3.5.12 Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment and 2021 WMP Section 7.3.5.12 Patrol Inspections of Vegetation Around Transmission Electric Lines and Equipment, there is no specific program to perform “patrols” around distribution lines unique from the inspections described in Sections 5.3.5.3 (2020 WMP)and 7.3.5.3. (2021 WMP).
Grid Design & System Hardening	5.3.3.10	Maintenance, repair, and replacement of connectors, including hotline clamps	Table 23, Pg. 5-129	\$(32,741)	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$32.74 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E’s variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was decreased from \$41.91 million to \$4.70 million, resulting in an overspend amount of \$4.46 million. The actual spend did not change between the ARC report and PG&E’s variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per the ARC Report, PG&E self-reported that System Hardening components will no longer be tracked at the asset component level.</p>
Grid Design & System Hardening	5.3.3.5	Crossarm maintenance, repair, and replacement	Table 23, Pg. 5-118	\$ (22,575)	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget underspent of \$22.58 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E’s variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was reduced from \$90.50 million to \$78.51 million, resulting in an underspent amount of \$10.58 million. The actual spend did not change between the ARC report and PG&E’s variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per PG&E’s Analysis 2020 Actual vs. 2020 Plan, dated 06.09.21 - Underspend primarily driven by Covid 19 impacts and resources diverted to emergency response efforts related to fires</p>

Emergency Planning & Preparedness	5.3.9.4	I.5 - CERP (Update and Publish)	Table 29, Pg. 5-243	\$(21,181)	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget underspent of \$21.18 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was reduced from \$25.71 million to \$986 thousand, resulting in an overspend amount by \$3.54 million. The actual spend amount of \$4.53 million did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per the 2020 ARC Report, PG&E self-reported the 2020 actuals associated with the Field Ops group instead of all of the Disaster and Emergency Preparedness (EP&R) larger team/group mapped to this initiative.</p>
Asset Management & Inspections	5.3.4.13	Pole Loading Calculations and Desktop Validation	Table 24, Pg. 5-169	\$(19,396)	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget underspent of \$19.40 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was reduced from \$38.0 million to \$14.20 million, resulting in an overspend amount by \$4.40 million. The actual spend amount of \$18.61 million did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per the 2020 ARC Report, PG&E self-reported the underspend was attributed to the 2020 WMP activity/initiative falling short of the initially forecasted annual target for 2020 of completing 230 thousand pole loading assessments. PG&E stated that they refined their quality standards, switched vendors, and are still on track to finish all poles in Tier 2 and Tier 3 HFTD areas by the end of 2024 as originally forecasted.</p>
Grid Design & System Hardening	5.3.3.3	Covered conductor installation	Table 23, Pg. 5-116	\$ (17,017)	<p>No spend was allocated to this 2020 WMP Activity/Initiative per the ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, there are no-cost allocations for this initiative.</p>

					Per 2020 WMP Section 5.3.3.3 Covered Conductor Installation, this initiative was consolidated with the System Hardening program in the 2020 WMP Section 5.3.3.17, and in the 2021 WMP, Section 7.3.3.3 Covered Conductor Installation, PG&E describes the installation of covered conductor and replacement of existing poles, cross-arms, and other equipment as part of their System Hardening, Section 5.3.3.17 (2020 WMP) and Section 7.3.3.17 (2021 WMP), which is one consolidated program and the item is not tracked down at the asset component level.
Vegetation Management & Inspections	5.3.5.16	Removal and remediation of trees with strike potential to electric lines and equipment	Table 25, Pg. 5-197	\$ (14,639)	<p>No spend was allocated to this 2020 WMP Activity/Initiative per the ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, there are no-cost allocations for this initiative.</p> <p>Per 2020 WMP Section 5.3.5.16 and 2021 WMP Section 7.3.5.16, PG&E does not perform a separate effort to identify, remove and remediate trees with strike potential. For this activity/initiative, PG&E has referenced Section 5.3.5.3 in 2020 WMP and Sections 7.3.5.2, 7.3.5.3, and 7.3.5.15 in 2021 WMP for work covered under those sections.</p>
Grid Design & System Hardening	5.3.3.8-1	C.2 - Distribution Sectionalizing (automated devices)	Table 23, Pg. 5-122	\$ (13,345)	This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$13.35 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was decreased from \$83.39 million to \$63.37 million, resulting in an overspend amount of \$6.67 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.
Grid Design & System Hardening	5.3.3.18.1	C.7 - System Protection deploy DCD (reclosers)	Table 23, Pg. 5-148	\$ (11,299)	No spend was allocated to this 2020 WMP Activity/Initiative per the ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and

					<p>PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, there are no-cost allocations for this initiative.</p> <p>Per 2020 WMP Section 5.3.3.18.1 Evaluating New Protection Technologies, PG&E piloted the downed conductor detection (DCD) feature (200 plus reclosers). In the 2021 WMP Section 7.3.3.9.1 Installation of System Automation Equipment, PG&E addressed this activity/initiative as part of the larger effort to replace existing oil-filled reclosers and controllers with a solid dielectric recloser and new micro-processor controller with protection elements like Downed Conductor Detection (DCD), Sensitive Ground Fault, and platforms that allow for future protection elements.</p>
Grid Design & System Hardening	5.3.3.8-3	C.1 - SCADA Transmission Switching (switches)	Table 23, Pg. 5-122	\$ (11,059)	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$11.06 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was decreased from \$11.18 million to \$0 (no budget), the actual spend was also decreased to \$0 (no spend).</p>
Grid Design & System Hardening	5.3.3.1	Capacitor maintenance and replacement program	Table 23, Pg. 5-114	\$ (8,180)	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$8.18 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was decreased from \$16.74 million to \$7.53 million, resulting in an overspend amount of \$1.03 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p>
Situational Awareness & Forecasting	5.3.2.1.1	Advanced weather monitoring and weather stations, B.1 -	Table 22, Pg. 5-60	\$ (8,149)	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$8.15 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan</p>

		Upgrade POMMS Model to 2km			<p>v2, the actual spend was increased from \$488 thousand to \$8.43 million, still resulting in an underspent amount of \$211 thousand, 2% of the total budget. The budget did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per the ARC Report, the 2020 Actuals of this initiative, a subset of costs from the SOPP (Storm Outage Prediction Probability) project was mapped.</p> <p>In the 2020 WMP Plan, Weather Stations were mapped to this initiative. Per the ARC Report, PG&E noted and recorded the Weather Stations' actual costs of \$8.43 to WMP initiative 5.3.2.1.3 - B.10 - Weather Stations that had a budget allocation of \$342 thousand. The 2020 actuals recorded a total count of 404 weather stations at a unit cost of \$20,582 each. However, per recent findings, the IE noted that PG&E listed the actual cost of \$8.43 million, realigning the spend back to the original initiative.</p>
Grid Design & System Hardening	5.3.3.12-2	Transmission Line Initiatives	Table 23, Pg. 5-131	\$ (7,954)	<p>No spend was allocated to this 2020 WMP Activity/Initiative per the ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, there are no-cost allocations for this initiative.</p> <p>Per 2020 WMP Section 5.3.3.9 Installation of System Automation Equipment, PG&E included a narrative about the replacement of legacy 4C controllers (250 reclosers) to ensure reliable operation of reclosers. In the 2021 WMP Section 7.3.3.9.2 Installation of Single phase reclosers, PG&E did all planning efforts in 2020 selecting locations where they plan to install 70 sets of single phase reclosers by the end of 2021.</p>
Situational Awareness & Forecasting	5.3.2.7-1 and 5.3.2.7-2	Other, Wildfire Safety Operations Center (WSOC)	Table 22, Pg. 5-110	\$ (5,556)	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget underspent of \$5.56 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the actual spend</p>

					<p>amount was increased from \$4.08 million to \$5.0 million, still resulting in an underspend amount by \$4.64 million. The budget amount of \$9.64 million did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per the 2020 ARC Report and reconciliation spreadsheet provided on June 9th, underspend is primarily driven by incorrect overhead planning assumptions, resulting in headcount resourcing deviations related to the WSOC (Wildfire Safety Operations Center).</p>
Grid Design & System Hardening	5.3.3.9-3	Installation of system automation equipment	Table 23, Pg. 5-127	\$ (4,087)	<p>No spend was allocated to this \$4.09 million 2020 WMP Activity/Initiative per the 2020 ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$4.09 million to \$23.43 million, in addition, a spend amount of 17.24 million was allocated to this activity/initiative. The changes to the budget and spend resulted in an underspend of \$6.20 million.</p> <p>Per the PG&E, June 9th (IE Analysis 2020 vs. 2020 Plan v2) Report, "Primarily driven by project dependencies (gating factors), which includes delay in switchgear replacement, design delays, equipment requirements, lack of resources due to COVID 19 and fire response.</p>
Asset Management & Inspections	5.3.4.15-1 and -2	D.4 - Substation HFTD Inspections (substations)	Table 24, Pg. 5-172	\$11,957	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget overspend of \$11.96 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$8.99 million to \$29.75 million, resulting in an underspent amount of \$8.80 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p>

					Per the PG&E, June 9th (IE Analysis 2020 vs. 2020 Plan v2) Report, "Transmission substation inspections focused primarily on HFTD, non-HFTD was over planned incorrectly."
Grid Design & System Hardening	5.3.3.11-1 and 5.3.3.11-2	Mitigation of impact on customers and other residents affected during PSPS event	Table 23, Pg. 5-130	\$27,241	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget overspend of \$27.24 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, this item was realigned in the 2021 WMP to sub-initiative 7.3.3.11.1 Generation for PSPS Mitigation.</p> <p>Per the same June 9th report, the budget amount was increased from \$155.72 million to \$444.38 million, and the spend actuals increased from \$182.96 million to \$185.75 million, resulting in an underspend amount of \$258.63 million.</p> <p>PG&E Business Finance explained that PG&E's strategy has shifted from its initial plan to install several make-ready capital work and utilization of permanent generation equipment associated with the Distribution Generation Enabled Microgrid Services (DGEM). The current strategy entails fewer permanent installations and uses a hybrid of substation permanent and temporary generation equipment, which resulted in lower operating/event costs tied to the smaller deployment of Temporary Generation Reservations and Operations during PSPS events. Additionally, there are some invoices and final costs from 2020 spending that were recorded to the 2021 actuals, which collectively resulted in an overall underspend for this initiative.</p>
Grid Design & System Hardening	5.3.3.6	Distribution pole replacement and reinforcement, including with composite poles	Table 23, Pg. 5-119	\$31,092	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget overspend of \$31.09 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$212.48 million to \$257.85 million, resulting in an underspent amount of \$14.28 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p>

					Per the PG&E, June 9th (IE Analysis 2020 vs. 2020 Plan v2) Report, ""Primarily driven by Covid-19 impacts and resources diverted to emergency response efforts related to fires."
Grid Design & System Hardening	5.3.3.14	Transformers maintenance and replacement	Table 23, Pg. 5-136	\$52,658	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report, shows a budget overspend of \$52.66 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$36.68 million to \$120.21 million, resulting in an underspent amount by \$30.87 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, PG&E stated, "that the substation transformer maintenance underran, which drove the underspend. It was due to Covid 19 impacts of work/projects being reprioritized and pushed out to 2021."</p>
Asset Management & Inspections	5.3.4.2	D.3 - Transmission HFTD Inspections (structures)	Table 24, Pg. 5-157	\$89,444	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget overspend of \$89.44 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$413 thousand to \$142.33 million, resulting in an underspend amount by \$52.47 million.</p> <p>Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, PG&E stated that lower unit costs were the primary driver to the underspend. The budgets were based on actuals incurred in</p>

					2019 and future contract labor rates due to the accelerated nature of the Enhanced Inspections 2020.
Vegetation Management & Inspections	5.3.5.3	Detailed inspections of vegetation around transmission electric lines and equipment	Table 25, Pg. 5-184	\$117,826	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget overspend of \$117.83 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$13.05 million to \$140.07 million, resulting in an underspent amount of \$9.19 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per PG&E's latest self-report dated 06.09.21, (IE Analysis 2020 Actual vs. 2020 Plan v2) - The initiative is a percentage allocation based upon SME input (~71%) of the Transmission vegetation management program. Total transmission program underrun is driven by operational underruns in Routine, Orchard Removal, and IVM.</p>
Asset Management & Inspections	5.3.4.1	D.2 - Distribution HFTD Inspections (poles)	Table 24, Pg. 5-156	\$131,608	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget overspend of \$131.61 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$1.01 million to \$155.50 million, resulting in an underspent amount by \$22.89 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, PG&E stated that lower unit costs were the primary driver to the underspend. The budgets were based on actuals incurred in 2019 and future contract labor rates due to the accelerated nature of the Enhanced Inspections 2020.</p>

Table 15: 2020 WMP Funding Verification Summary for < \$5M Discrepancy (\$ Thousands)

Initiative Category	2020 Initiative Number	Initiative Name	2020 WMP Page No.	2020 ARC Report (Expense & Capital)			PG&E IE Analysis 2020 Actual vs 2020 Plan		
				Budget	Actual	Funding Discrepancy Amount	Budget	Actual	Variance
Grid Operations & Operating Protocols	5.3.6.2	F.1 - SIPT Crews and Engines Resourcing	Table 26, Pg. 5-204	\$14,876	\$9,957	\$(4,919)	\$8,926	\$9,957	\$1,032
Vegetation Management & Inspections	5.3.5.7.1 and 5.3.5.7.2	LiDAR inspections of vegetation around distribution electric lines and equipment	Table 25, Pg. 5-188	\$7,155	\$2,590	\$(4,565)	\$2,564	\$2,590	\$26
Vegetation Management & Inspections	5.3.5.6	Improvement of inspections	Table 25, Pg. 5-188	\$5,688	\$1,299	\$(4,388)	\$976	\$1,299	\$324
Vegetation Management & Inspections	5.3.5.9	Other discretionary inspections of vegetation around distribution electric lines and equipment	Table 25, Pg. 5-190	\$4,846	\$517	\$(4,329)	\$688	\$517	\$(172)
Grid Design & System Hardening	5.3.3.17.3	Relationship Between System Hardening and Enhanced Vegetation Management	Table 23, Pg. 5-199	\$67,471	\$63,498	\$(3,973)	\$5,023	\$11,224	\$6,201
Grid Design & System Hardening	5.3.3.9-2	Replacement of Legacy 4C Controllers (reclosers)	Table 23, Pg. 5-127	\$3,487	\$-	\$(3,487)	\$3,487	\$-	\$(3,487)

Situational Awareness & Forecasting	5.3.2.1.2	Advanced weather monitoring and weather stations, B.4 - Wildfire Spread Model - Operational Impacts	Table 22, Pg. 5-65	\$3,509	\$45	\$(3,463)	\$3,509	\$6,956	\$3,447
Situational Awareness & Forecasting	5.3.2.2.3	B.7 - Smart Meters - Partial Voltage Detection	Table 22, Pg. 5-91	\$3,919	\$750	\$(3,168)	\$3,919	\$2,590	\$(1,329)
Stakeholder Cooperation & Community Engagement	5.3.10.3	Cooperation with suppression agencies	Table 30, Pg. 5-252	\$7,501	\$4,529	\$(2,972)	\$986	\$4,529	\$3,543
Asset Management & Inspections	5.3.4.14	Quality assurance / quality control of inspections	Table 24, Pg. 5-170	\$4,389	\$1,831	\$(2,558)	\$133	\$1,831	\$1,698
Situational Awareness & Forecasting	5.3.2.3.1	Electric Transmission	Table 22, Pg. 5-97	\$3,040	\$500	\$(2,540)	\$500	\$500	\$-
Emergency Planning & Preparedness	5.3.9.7	Resource Sharing to Support Inspection Work and Other Aspects of the Wildfire Management Plan	Table 29, Pg. 5-247	\$2,156	\$-	\$(2,156)	\$2,156	\$5,878	\$3,722
Stakeholder Cooperation & Community Engagement	5.3.10.1	Community engagement	Table 30, Pg. 5-249	\$11,371	\$9,514	\$(1,857)	\$7,520	\$9,514	\$1,993
Vegetation Management & Inspections	5.3.5.14	Recruiting and training of vegetation management personnel	Table 25, Pg. 5-193	\$1,861	\$14	\$(1,847)	\$10	\$14	\$4

Situational Awareness & Forecasting	5.3.2.6	Weather forecasting and estimating impacts on electric lines and equipment	Table 22, Pg. 5-106	\$1,974	\$488	\$(1,486)	\$592	\$488	\$(104)
Situational Awareness & Forecasting	5.3.2.5.1	F.1 - Safety and Infrastructure Protection Teams (SIPT)	Table 22, Pg. 5-103	\$4,734	\$3,319	\$(1,414)	\$2,975	\$3,319	\$344
Grid Operations & Operating Protocols	5.3.6.6	Stationed and on-call ignition prevention and suppression resources and services	Table 26, Pg. 5-212	\$4,734	\$3,319	\$(1,414)	\$2,975	\$3,319	\$344
Vegetation Management & Inspections	5.3.5.5	Fuel management and reduction of "slash" from vegetation management activities	Table 25, Pg. 5-187	\$25,000	\$23,666	\$(1,334)	\$23,427	\$23,666	\$239
Situational Awareness & Forecasting	5.3.2.2.6	B.8 - Sensor IQ Pilot Deployment	Table 22, Pg. 5-94	\$1,819	\$563	\$(1,256)	\$1,819	\$1,871	\$52
Emergency Planning & Preparedness	5.3.9.2	Community outreach, public awareness, and communications efforts	Table 29, Pg. 5-240	\$7,701	\$6,478	\$(1,223)	\$3,850	\$6,478	\$2,627
Grid Design & System Hardening	5.3.3.8-5	C.3 - Remote Grids	Table 23, Pg. 5-122	\$943	\$-	\$(943)	\$943	\$755	\$(188)
Vegetation Management & Inspections	5.3.5.17-1 and 5.3.5.17-2	Substation inspection	Table 25, Pg. 5-199	\$1,160	\$453	\$(707)	\$468	\$453	\$(15)

Stakeholder Cooperation & Community Engagement	5.3.10.4	Forest service and fuel reduction cooperation and joint roadmap	Table 30, Pg. 5-254	\$3,133	\$2,687	\$(446)	\$3,133	\$2,687	\$(446)
Grid Operations & Operating Protocols	5.3.6.3	F.5 - Implement SafetyNet Observation Cards	Table 26, Pg. 5-205	\$1,235	\$840	\$(395)	\$1,235	\$840	\$(395)
Situational Awareness & Forecasting	5.3.2.2.1	Electric Transmission	Table 22, Pg. 5-90	\$930	\$633	\$(297)	\$930	\$1,219	\$290
Data Governance	5.3.7.3	Documentation and disclosure of wildfire-related data and algorithms	Table 27, Pg. 5-220	\$521	\$421	\$(101)	\$521	\$421	\$(101)
Vegetation Management & Inspections	5.3.5.10	Other discretionary inspections of vegetation around transmission electric lines and equipment	Table 25, Pg. 5-191	\$90	\$-	\$(90)	\$-	\$-	\$-
Data Governance	5.3.7.4	Define and track ignition near miss events	Table 27, Pg. 5-221	\$788	\$723	\$(65)	\$788	\$723	\$(65)
Asset Management & Inspections	5.3.4.12	Patrol inspections of transmission electric lines and equipment	Table 24, Pg. 5-168	\$61	\$48	\$(13)	\$61	\$48	\$(13)
Risk Assessment & Mapping	5.3.1.4	Initiative mapping and estimation of wildfire and PSPS risk-reduction impact	Table 21, Pg. 5-51	\$23	\$16	\$(8)	\$23	\$16	\$(8)

Situational Awareness & Forecasting	5.3.2.1.6	7.3.2.1.6 Advanced weather monitoring and weather stations, Other Meteorology Tools and Upgrades	Table 22, Pg. 5-78	\$-	\$325	\$325	\$-	\$-	\$-
Risk Assessment & Mapping	5.3.1.6	7.3.1.6 Weather-Driven Risk Map and Modelling Based on Various Relevant Weather Scenarios	Table 21, Pg. 5-53	\$-	\$475	\$475	\$545	\$475	\$(69)
Emergency Planning & Preparedness	5.3.9.1	Adequate and trained workforce for service restoration	Table 29, Pg. 5-239	\$1,452	\$1,969	\$517	\$4,188	\$1,969	\$(2,219)
Emergency Planning & Preparedness	5.3.9.6	Protocols in place to learn from wildfire events	Table 29, Pg. 5-246	\$1,597	\$2,166	\$569	\$4,607	\$2,166	\$(2,441)
Asset Management & Inspections	5.3.4.4	Infrared inspections of distribution electric lines and equipment	Table 24, Pg. 5-160	\$697	\$1,561	\$865	\$2,193	\$1,561	\$(632)
Emergency Planning & Preparedness	5.3.9.5	Preparedness and planning for service restoration	Table 29, Pg. 5-245	\$2,903	\$3,938	\$1,035	\$8,376	\$3,938	\$(4,437)
Grid Design & System Hardening	5.3.3.7	C.12 - Expulsion Fuse Replacement (non-exempt equipment)	Table 23, Pg. 5-121	\$5,423	\$7,847	\$2,423	\$8,278	\$7,847	\$(431)
Asset Management & Inspections	5.3.4.11	Patrol inspections of distribution electric lines and equipment	Table 24, Pg. 5-167	\$4,874	\$8,710	\$3,836	\$12,878	\$8,710	\$(4,167)

Vegetation Management & Inspections	5.3.5.18-1 and 5.3.5.18-2	Substation vegetation management, Maintenance substation transmission	Table 25, Pg. 5-200	\$1,889	\$5,794	\$3,905	\$6,064	\$5,794	\$(270)
Situational Awareness & Forecasting	5.3.2.1.3	Advanced weather monitoring and weather stations, B.10 - Weather Stations	Table 22, Pg. 5-68	\$342	\$8,426	\$8,085	\$342	\$257	\$(85)
Grid Design & System Hardening	5.3.3.12-1	Substation Animal Abatement	Table 23, Pg. 5-131	\$493	\$9,079	\$8,586	\$12,530	\$9,079	\$(3,452)
Grid Design & System Hardening	5.3.3.8-2	C.4 -Transmission Line Evaluation for PSPS Scoping	Table 23, Pg. 5-122	\$37,184	\$48,850	\$11,667	\$50,956	\$48,850	\$(2,106)
Vegetation Management & Inspections	5.3.5.8	LiDAR inspections of vegetation around transmission electric lines and equipment	Table 25, Pg. 5-189	\$5,597	\$25,222	\$19,625	\$27,614	\$25,222	\$(2,391)
Grid Design & System Hardening	5.3.3.2-1, 5.3.3.2-2, 5.3.3.2-3, and 5.3.3.2-4	Circuit breaker maintenance and installation to de-energize lines upon detecting a fault	Table 23, Pg. 5-115	\$34,195	\$57,731	\$23,536	\$44,328	\$57,731	\$13,404

Considering that the IE scope of work was focused on reviewing and verifying the funding of WMP activities that had a recorded under spend amount of less than 100 percent of the original budget, the IE has noted a few trends. The IE prepared the following conclusion of its financial verification findings that are tied to the overall cost allocation and auditing process, PG&E tracking of Maintenance Activity Type (MAT codes) against customized budget vs. actual spend reconciliations associated with WSD-defined initiatives detailed in the WMP filing, and the shortage of talent/resources to fulfill all the forecasted activities/ initiatives described and updated on an annual basis in the WMP.

The most significant underspent 2020 WMP initiatives are summarized below for purposes of providing a big picture summary of the entire funding verification efforts:

- **Routine maintenance and replacement activities of Transformers and Crossarms, distribution pole replacement and reinforcement, and Substation Inspections:** Per PG&E's latest self-reported notes, the underspend was primarily driven by COVID 19 impacts and resources diverted to emergency response efforts related to fires. These unforeseen events led to lower than forecasted routine infrastructure maintenance work but considered unusual circumstances rather than WMP non-compliance that needs to be addressed by PG&E.
- **Enhanced Transmission and Distribution Inspection:** Per PG&E's latest self-reported notes, the original budget for these two activities was established based on higher unit costs from historical data and the expectation that the program's accelerated nature would typically drive higher contract labor costs. The unit costs for these items have been lower, leading to cost savings, which is considered positive from an operational standpoint.
- **PSPS Events and Mitigation of PSPS Impacts:** The IE noted (from several SME interviews and review of financial data) that a few activities had lower than forecasted initially spend due to incurred less than planned event costs. Per PG&E's latest self-reported notes, investments such as fire risk modeling, system hardening, sectionalizing devices to mitigate PSPS events show fewer costs per event. Additionally, a shift in strategy by PG&E to utilize temporary generators instead of permanent generation capital work resulted in cost savings and underspend from the forecasted initial budget.
- **Additional Observations:**
 - a. Per the 2020 ARC Report, several underspends are due to actual cost from another program/initiative mapped to this initiative resulting in original budget misalignment.
 - b. Per the 2020 ARC Report, underspend is due to lower actual resource costs than budgeted.
 - c. Per the 2020 ARC Report, underspend is primarily due to overbudgeting in overhead assumptions.

3.3 VERIFICATION OF QA/QC PROGRAMS

PG&E implements four types of quality assurance and quality control (QA/QC) programs to ensure compliance with WMP activities. Sixty-three 2020 WMP activities do not have a QA/QC program type identified; 39 include one type, 26 include two types, four include three types, and two include all four types. The four types of QA/QC programs PG&E deployed per the 2020 WMP are:

1. Embedded QC
2. WMP PMO QC
3. Electric Operations QC
4. Internal Audit

The QA/QC program types as listed, per the document PG&E, provided titled 2020 WMP List of QA-QC Activities and PG&E Inventory Attachment 1 (Appendix B, Items No. 40 and No.39, respectively). Embedded QC is included in 39 activities that span across many of the WMP initiative categories. WMP PMO QC focuses on 38 defined commitments which are encapsulated in 42 activities. Electric Operations QC includes 11 activities, all in Asset Management & Inspections and Vegetation Management & Inspections. Internal Audit contains 19 activities that also span across many of the WMP initiative categories.

The IE's validation process included prioritizing the Embedded QC, Electric Operations QC, and Internal Auditing programs, since the WMP PMO QC's focus is to monitor and report progress of 38 defined commitments, which have been reported and published in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan.

Embedded QC is performed within the activity or program's internal processes at the activity or program level, with quality monitoring customized to each program. The IE conducted SME interviews and document reviews to validate Embedded QC. The finding of each activity relative to the type of QC identified by PG&E is summarized in the Validations table in this section of the report. For System Hardening activities identified as having Embedded QC, there are dedicated field-based teams responsible for verifying the quality and completion of hardening work performed on assets in the field. Their role is to be auditors, separate from employees who are construction managing projects on a day-to-day basis.

Internal audits are completed by the Internal Auditing (IA) department which operates autonomously within PG&E, completing audits across the utility, with efforts prioritized on the top risks at PG&E. Each year the IA department creates an annual plan outlining audit areas within PG&E. Per the IA SME interview, the department attempts to audit the top risk areas in the utility every 2-3 years. IA completed multiple separate audits in 2020 of WMP activities. Some of the department's audits are "control advisory" audits, which follow a less formal process that does not generate a full audit report. Still, they can include validations and guidance on new procedures and processes. IA is also responsible for auditing activities tied to PG&E's Incentive Compensation Plan, some of which were 2020 WMP activities. Activities and programs with goals tied to PG&E's Incentive Compensation Plan at minimum have a verification audit performed, which validates the progress and completion of the program's intent.

IA focuses audits mostly on procedures, processes, and controls. They, in general, do not perform "front lines of defense" auditing, like the Embedded QC and Electric Operations QC programs. When a program

is selected for an IA audit, the IA audit team reviews and assesses program operational procedures and controls, then designs testing. As an example, IA published an audit report in 2020 for PG&E asset management, inspection, and repair programs in the WMP. Action plan ownership in the audit report is tied back to operational departments and groups, such as substation, transmission, and distribution. Issues documented in IA audit reports are categorized as low, medium, or high risks. Low risks do not require a specific action plan. Medium and high-risk items are assigned a plan to address them. The audited department is responsible for the development of the action plan to address identified issues and is responsible for reporting progress toward completion of action plan items. IA is available to advise the audited department throughout the action plan process. All medium and high-risk items require IA to sign off on the risk before it closes, which IA validates as a part of the close process. All high-risk items are reported to the PG&E Board of Directors in a quarterly report.

Due to the quantity of QA/QC program initiatives covered within this review and the IE review schedule duration constraints, the IE conducted SME interviews for initiatives with QA/QC programs as self-identified by PG&E from the provided 2020 WMP List of QA-QC activities file. However, with the noted audit schedule constraints, these SME interviews were the primary validation for the QA/QC programs that PG&E has implemented and maintains since many of the QA/QC programs were not explicitly described within the 2020 WMP.

Table 16: QA/QC Initiative Verification Summary Table

Initiative Name	Initiative Validation	Finding	QA/QC Program Type
5.1.D.3.6 (pg. 5-17) - C.8 - Rapid Earth Fault Current Limiter (REFCL) Pilot	<ul style="list-style-type: none"> Per 2020 EPIC Annual Project Status (Appendix B Item No. 50), the REFCL Pilot (EPIC 3.15) is under construction with anticipated completion Q3 of 2021 with commissioning, testing, and QA/QC incorporated in the construction phase. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	Embedded QC, WMP PMO QC
5.1.D.3.8 - C.3 - Remote Grids 5.3.3.8-5	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.1.1 - A summarized risk map that shows the overall ignition probability and estimated wildfire consequence along the electric lines and equipment	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A



5.3.1.2 - Climate-driven risk map and modelling based on various relevant weather scenarios	<ul style="list-style-type: none"> SME Interview conducted on June 7th Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science Appendix D Item No. 2. 	Activity Validated	Embedded QC
5.3.1.3 - Ignition probability mapping showing the probability of ignition along the electric lines and equipment	<ul style="list-style-type: none"> SME Interview conducted on June 7th Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science Appendix D Item No. 3. 	Activity Validated	Embedded QC
5.3.1.4 - Initiative mapping and estimation of wildfire and PSPS risk-reduction impact	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.1.5 - Match drop simulations showing the potential wildfire consequence of ignitions that occur along the electric lines and equipment	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Paul McGregor, Director, Risk Management per Appendix D Item No. 5. 	Activity Validated	Embedded QC
5.3.1.6 - Weather-driven risk map and modelling based on various relevant weather scenarios	<ul style="list-style-type: none"> SME Interview conducted on June 7th Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science Appendix D Item No. 6. 	Activity Validated	Embedded QC
5.3.2.1.1 - B.1 - Upgrade POMMS Model to 2km	<ul style="list-style-type: none"> SME Interview conducted on June 7th Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science Appendix D Item No. 49. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	Embedded QC, WMP PMO QC
5.3.2.1.1 - B.3 - Wind Event Forecasting Tool (Diablo)	<ul style="list-style-type: none"> SME Interview conducted on June 7th Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, 	Activity Validated	Embedded QC, WMP PMO QC

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	<p>Meteorology Operations and Fire Science Appendix D Item No. 50.</p> <ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 		
5.3.2.1.1 - B.6 - Re-calibrate the OPW and FPI models	<ul style="list-style-type: none"> SME Interview conducted on June 7th Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science Appendix D Item No. 51. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	Embedded QC, WMP PMO QC
5.3.2.1.2 - B.4 - Wildfire Spread Model - Operational Impacts	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.2.1.3 - B.10 - Weather Stations	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	Embedded QC, WMP PMO QC
5.3.2.1.4 - B.9 - HD Cameras Deployment	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	Embedded QC, WMP PMO QC
5.3.2.1.5 - B.2 - NOAA-20 Satellite Data	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.2.1.6 - B.5 - Live Fuel Moisture (LFM) Sampling	<ul style="list-style-type: none"> SME Interview conducted on June 7th Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science Appendix D Item No. 19. Documented in PG&E's Annual Report on Compliance for 2020 	Activity Validated	Embedded QC, WMP PMO QC

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	Wildfire Mitigation Plan by PG&E's WMP PMO QC.		
5.3.2.1.7 - Addressing Weather Forecast Model Uncertainty	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.2.1.8 - PG&E Lightning Detection Network (PLDN)	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.2.1.9 - Information Sharing	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.2.1.10 - Collaborative Efforts to Advance Fire Science	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.2.2.1 - Electric Transmission	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.2.2.2 - Electric Distribution	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.2.2.3 - B.7 - SmartMeters - Partial Voltage Detection	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.2.2.4 - Distribution Fault Anticipation (DFA) Technology	<ul style="list-style-type: none"> Documented in PG&E's Electric Program Investment Charge (EPIC) 2020 Annual Report (Appendix B Item No. 48). Documented in PG&E's EPIC 2.34 Report (Appendix B Item. 49). 	Activity Validated	Embedded QC
5.3.2.2.5 - Early Fault Detection (EFD)	<ul style="list-style-type: none"> Documented in PG&E's Electric Program Investment Charge (EPIC) 2020 Annual Report (Appendix B Item No. 48) Documented in PG&E's EPIC 2.34 Report (Appendix B Item. 49) 	Activity Validated	Embedded QC
5.3.2.2.6 - B.8 - Sensor IQ Pilot Deployment	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC

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5.3.2.2.7 - Line Sensor Devices	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.2.2.8 - Distribution Arcing Fault Signature Library	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.2.3.1 - Electric Transmission	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.2.3.2 - Electric Distribution	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.2.4 - Forecast of a fire risk index, fire potential index, or similar	<ul style="list-style-type: none"> SME Interview conducted on June 7th Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science Appendix D Item No. 15. 	Activity Validated	Embedded QC
5.3.2.5.1 - F.1 - Safety and Infrastructure Protection Teams (SIPT)	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Ben Almario, Director, Wildfire Safety Operations per Appendix D Item No. 20. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.2.5.2 - Data collection	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39) 	N/A	N/A
5.3.2.6 - Weather forecasting and estimating impacts on electric lines and equipment	<ul style="list-style-type: none"> SME Interview conducted on June 7th Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science Appendix D Item No. 74. 	Activity Validated	Embedded QC
5.3.2.7 - Wildfire Safety Operations Center (WSOC)	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A

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5.3.3.1 - Capacitor maintenance and replacement program	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.2 - Circuit breaker maintenance and installation to de-energize lines upon detecting a fault	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.3 - Covered conductor installation	<ul style="list-style-type: none"> SME Interview conducted on June 10th Mike Theide, Manager, Electric Distribution Field QA-QC Appendix D Item No. 53. 	Activity Validated	Embedded QC
5.3.3.4 - Covered conductor maintenance	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.5 - Crossarm maintenance, repair, and replacement	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.6 - Distribution pole replacement and reinforcement, including with composite poles	<ul style="list-style-type: none"> SME Interview conducted on June 10th Mike Theide, Manager, Electric Distribution Field QA-QC Appendix D Item No. 54. 	Activity Validated	Embedded QC
5.3.3.7 - C.12 - Expulsion Fuse Replacement (non-exempt equipment)	<ul style="list-style-type: none"> SME Interview conducted on June 10th Mike Theide, Manager, Electric Distribution Field QA-QC Appendix D Item No. 55. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	Embedded QC, WMP PMO QC
5.3.3.8-1 - C.2 - Distribution Sectionalizing (automated devices)	<ul style="list-style-type: none"> SME Interview conducted on June 10th Mike Theide, Manager, Electric Distribution Field QA-QC Appendix D Item No. 56 SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 57 Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	Embedded QC, WMP PMO QC, Internal Audit
5.3.3.8-2 - C.4 -Transmission Line Evaluation for PSPS Scoping	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 	Activity Validated	WMP PMO QC

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	Wildfire Mitigation Plan by PG&E's WMP PMO QC.		
5.3.3.8-3 - C.1 - SCADA Transmission Switching (switches)	<ul style="list-style-type: none"> SME Interview conducted on June 10th Steven Zubiri, Transmission Construction Manager Appendix D Item No. 58. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	Embedded QC, WMP PMO QC
5.3.3.8-4 - C.9 - System Hardening Criteria Refinement (Dist.)	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.3.8-6 - I.6 - Microgrids for PSPS Mitigation (operationalized units)	<ul style="list-style-type: none"> SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 59. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC, Internal Audit
5.3.3.9-1 - C.5 System Hardening (SCADA enabled circuit breakers)	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Maria Ly, Manager, Electric Networks and Michelle Sakamoto per Appendix D Item No. 45. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	Embedded QC, WMP PMO QC
5.3.3.9-2 - Replacement of Legacy 4C Controllers (reclosers)	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.10 - Maintenance, repair, and replacement of connectors, including hotline clamps	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.11 - Mitigation of impact on customers and other residents affected during PSPS event	<ul style="list-style-type: none"> SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing per Appendix D Item No. 60 	Activity Validated	Internal Audit



	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Shawn Holder, Manager PSPS PMO per Appendix D Item No. 75. 		
5.3.3.12-1 - Substation Animal Abatement	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.12-2 - Transmission Line Initiatives	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.12-3 - Wildfire Safety Inspection Program Distribution Repair Work	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.13 - Pole Loading Assessments	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.14 - Transformers maintenance and replacement	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.15 - Transmission tower maintenance and replacement	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.16 - Undergrounding of electric lines and/or equipment	<ul style="list-style-type: none"> Per 5.3.3.16 Initiative description in 2020 WMP, Undergrounding of Electric Lines and/or equipment is tracked and managed under 5.3.3.17 system hardening for distribution assets, and 5.3.3.15 for transmission assets. 	N/A	Embedded QC, Internal Audit
5.3.3.17.1 - System Hardening Design Guidance	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.17.2-1 - C.10 System Hardening (line miles)	<ul style="list-style-type: none"> SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 61 SME Interview conducted on June 10th Mike Theide, Manager, Electric Distribution Field QA-QC Appendix D Item No. 62 	Activity Validated	Embedded QC, WMP PMO QC



	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 		
5.3.3.17.2-2 - C.11 Butte County Rebuild (UG de-energized miles)	<ul style="list-style-type: none"> SME Interview conducted on June 10th Mike Theide, Manager, Electric Distribution Field QA-QC Appendix D Item No. 63. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	Embedded QC, WMP PMO QC
5.3.3.17.3 - Relationship Between System Hardening and Enhanced Vegetation Management	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.17.4 - C.6 Non-Exempt Surge Arrester Replacement Program	<ul style="list-style-type: none"> SME Interview conducted on June 10th Mike Theide, Manager, Electric Distribution Field QA-QC Appendix D Item No. 64. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	Embedded QC, WMP PMO QC
5.3.3.17.5 - Transmission Line System Hardening Overview and Strategy	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.18.1-1 - C.7 - System Protection deploy DCD (reclosers)	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.3.18.1-2 - Increased Protection Sensitivity	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.18.2 - Transmission Line Modeling	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.3.18.3 - Building and Sourcing Services	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A



5.3.4.1 - D.2 - Distribution HFTD Inspections (poles)	<ul style="list-style-type: none"> Per PG&E's provided OH Checklist inspection record (Appendix C Data Request 014) SME Interview conducted on June 10th Mike Theide, Manager, Electric Distribution Field Appendix D Item No. 54 	Activity Validated	Embedded QC, WMP PMO QC, Internal Audit
5.3.4.1 - Distribution WSIP 2019 FMEA expansion	<ul style="list-style-type: none"> SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 65 	Activity Validated	Internal Audit
5.3.4.2-1 - D.3 - Transmission HFTD Inspections (structures)	<ul style="list-style-type: none"> Per PG&E's provided OH Checklist inspection record (Appendix C Data Request 016) 	Activity Validated	Embedded QC, WMP PMO QC, Elect Operations QC, Internal Audit
5.3.4.2-2 - Transmission WSIP 2019 FMEA expansion	<ul style="list-style-type: none"> SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 66 	Activity Validated	Elect Operations QC, Internal Audit
5.3.4.3 - D.1 - Ultrasonic Inspections Pilot	<ul style="list-style-type: none"> SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 67. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC, Internal Audit
5.3.4.4 - Infrared inspections of distribution electric lines and equipment	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39) 	N/A	N/A
5.3.4.5 - Predictive Modelling (high risk conductors)	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39) 	N/A	N/A
5.3.4.6 - Intrusive pole inspections	<ul style="list-style-type: none"> Due to time constraints this initiative was not assessed 	Not Assessed	Embedded QC, Elect Operations QC
5.3.4.7 - LiDAR inspections of distribution electric lines and equipment	<ul style="list-style-type: none"> SME Interview conducted on June 10th Christopher Pezzola, 	Activity Validated	Internal Audit

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	Director, Internal Auditing Appendix D Item No. 68.		
5.3.4.8 - D.7 - VM utilizing LiDAR data to support EVM program	<ul style="list-style-type: none"> SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 68. 	Activity Validated	WMP PMO QC
5.3.4.9 - D.1 - Ultrasonic Inspections Pilot	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.4.10 - Other discretionary inspection of transmission electric lines and equipment, beyond inspections mandated by rules and regulations	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.4.11 - Patrol inspections of distribution electric lines and equipment	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.4.12 - Patrol inspections of transmission electric lines and equipment	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.4.13 - Pole Loading Calculations and Desktop Validation	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.4.14 - Quality assurance / quality control of inspections	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.4.15 - D.4 - Substation HFTD Inspections (substations)	<ul style="list-style-type: none"> Per PG&E's provided Utility Bulletin: TD-3322B-065 Wildfire Defensible Space for Substations (Appendix C Data Request 017) 	Activity Validated	Embedded QC, WMP PMO QC, Internal Audit
5.3.5.1 - Additional efforts to manage community and environmental impacts	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39) 	N/A	N/A
5.3.5.2 - Detailed inspections of vegetation around distribution electric lines and equipment	<ul style="list-style-type: none"> SME Interview conducted on June 2nd Joanne Martin, Director of Quality Management, and Stephen Simon, Interim Director of Vegetation Management Appendix D Item No. 27 	Activity Validated	Embedded QC



5.3.5.3 - Detailed inspections of vegetation around transmission electric lines and equipment	<ul style="list-style-type: none"> • Per PG&E's provided Utility Procedure: TD-7103P-03, Transmission Right-of-Way Maintenance Procedure (TROW), Rev. 2 • Per PG&E's provided Utility Procedure: TD-7103P-04, Transmission Integrated Vegetation Management Procedure (TIVM), Rev. 2 • Per PG&E's provided Utility Procedure: TD-7103P-05, Transmission Vegetation Management Imminent Threat Procedure, Rev. 2 • SME Interview conducted on June 2nd Joanne Martin, Director of Quality Management, and Stephen Simon, Interim Director of Vegetation Management Appendix D Item No. 27 	Activity Validated	Embedded QC
5.3.5.4 - Emergency response vegetation management due to red flag warning or other urgent conditions	<ul style="list-style-type: none"> • Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.5.5 - Fuel management and reduction of "slash" from vegetation management activities	<ul style="list-style-type: none"> • Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.5.6 - Improvement of inspections	<ul style="list-style-type: none"> ▪ SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 69. 	Activity Validated	Elect Operations QC, Internal Audit
5.3.5.7 - LiDAR inspections of vegetation around distribution electric lines and equipment	<ul style="list-style-type: none"> • Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.5.8 - LiDAR inspections of vegetation around transmission electric lines and equipment	<ul style="list-style-type: none"> • Per PG&E's provided Utility Procedure: TD-7103P-03, Transmission Right-of-Way Maintenance Procedure (TROW), Rev. 2 • SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 66 	Activity Validated	Internal Audit

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5.3.5.9 - Other discretionary inspections of vegetation around distribution electric lines and equipment	<ul style="list-style-type: none"> SME Interview conducted on June 2nd Steven Fischer, Sr. Director of Vegetation Management Execution, and Joey Perez, Sr. Director of Vegetation Management Appendix D Item No. 26 	Activity Validated	Embedded QC, Elect Operations QC
5.3.5.10 - Other discretionary inspections of vegetation around transmission electric lines and equipment	<ul style="list-style-type: none"> Per PG&E's provided Utility Procedure: TD-7103P-03, Transmission Right-of-Way Maintenance Procedure (TROW), Rev. 2 Per PG&E's provided Utility Procedure: TD-7103P-05, Transmission Vegetation Management Imminent Threat Procedure, Rev. 2 	Activity Validated	Embedded QC, Elect Operations QC
5.3.5.11 - Patrol inspections of vegetation around distribution electric lines and equipment	<ul style="list-style-type: none"> SME Interview conducted on June 2nd Joanne Martin, Director of Quality Management, and Stephen Simon, Interim Director of Vegetation Management Appendix D Item No. 27 	Activity Validated	Embedded QC, Elect Operations QC
5.3.5.12 - Patrol inspections of vegetation around transmission electric lines and equipment	<ul style="list-style-type: none"> Per PG&E's provided Utility Procedure: TD-7103P-01, Transmission Non-Orchard Routine Patrol Procedure (TRPP), Rev. 2 (Appendix C Data Request 017) Utility Procedure: TD-7103P-02, Transmission Orchard Orchard Patrol Procedure (TOPP), Rev. 2 (Appendix C Data Request 017) 	Activity Validated	Embedded QC, Elect Operations QC
5.3.5.13 - Quality assurance / quality control of vegetation inspections	<ul style="list-style-type: none"> SME Interview conducted on June 2nd Joanne Martin, Director of Quality Management, and Stephen Simon, Interim Director of Vegetation Management Appendix D Item No. 27 	Activity Validated	Elect Operations QC
5.3.5.14 - Recruiting and training of vegetation management personnel	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.5.15 - E.1 - EVM line miles	<ul style="list-style-type: none"> SME Interview conducted on June 2nd Joanne Martin, 	Activity Validated	Embedded QC



	<p>Director of Quality Management, and Stephen Simon, Interim Director of Vegetation Management Appendix D Item No. 27</p> <ul style="list-style-type: none"> SME Interview conducted on June 10th Mike Theide, Manager, Electric Distribution Field Appendix D Item No. 62 		WMP PMO QC, Elect Operations QC, Internal Audit
5.3.5.16 - Removal and remediation of trees with strike potential to electric lines and equipment	<ul style="list-style-type: none"> Per PG&E's provided Utility Procedure: TD-7103P-05, Transmission Vegetation Management Imminent Threat Procedure, Rev. 2 Per PG&E's provided Utility Procedure: TD-7103P-09, Vegetation Management Hazard Notification Procedure, Rev. 5 	Activity Validated	Embedded QC, Elect Operations
5.3.5.17 - Substation inspection	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.5.18 - Substation vegetation management	<ul style="list-style-type: none"> Per PG&E's provided Utility Bulletin: TD-3322B-065 Wildfire Defensible Space for Substations (Appendix C Data Request 017) 	Activity Validated	Embedded QC
5.3.5.19 - Vegetation inventory system	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.5.20 - Vegetation management to achieve clearances around electric lines and equipment	<ul style="list-style-type: none"> SME Interview conducted on June 2nd Steven Fischer, Sr. Director of Vegetation Management Execution, and Joey Perez, Sr. Director of Vegetation Management Appendix D Item No. 26 Per PG&E's provided Utility Procedure: TD-7103P-03, Transmission Right-of-Way Maintenance Procedure (TROW), Rev. 2 	Activity Validated	Embedded QC
5.3.6.1 - F.3 - Removal of TripSaver Auto-Reclosing Functionality	<ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC



5.3.6.2 - F.1 - SIPT Crews and Engines Resourcing	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Ben Almario, Director, Wildfire Safety Operations per Appendix D Item No. 28. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.6.3 - F.5 - Implement SafetyNet Observation Cards	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Ben Almario, Director, Wildfire Safety Operations per Appendix D Item No. 29. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.6.4 - F.2 - Protocols for PSPS Re-Energization	<ul style="list-style-type: none"> SME Interview conducted on June 3rd with Robert Cupp, Director, Emergency Preparedness and Response, Field Operations per Appendix D Item No. 76. SME Interview conducted on June 4th with Ben Almario, Director, Wildfire Safety Operations per Appendix D Item No. 30. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.6.5 - PSPS events and mitigation of PSPS impacts	<ul style="list-style-type: none"> SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 70 	Activity Validated	Internal Audit
5.3.6.6 - Stationed and on-call ignition prevention and suppression resources and services	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.7.1 - Consolidate Data Into Single Repository	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A



5.3.7.2 - Collaborative research on utility ignition and/or wildfire	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.7.3 - Documentation and disclosure of wildfire-related data and algorithms	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.7.4 - Define and track ignition near miss events	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.8.1 - Allocation methodology development and application	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.8.2 - Risk reduction scenario development and analysis	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.8.3 - Risk spend efficiency analysis	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.9.1 - Adequate and trained workforce for service restoration	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.9.2-1 - Community outreach, public awareness, and communications efforts	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.9.2-2 - I.4 - Community Based Organizations (CBOs) Coordination	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy per Appendix D Item No. 37. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.9.3-1 - Customer support in emergencies	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39) 	N/A	N/A
5.3.9.3-2 - I.8 CRC Mitigate PSPS Customer Impacts	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Tracy Maratukulam, Director, Public 	Activity Validated	WMP PMO QC, Internal Audit



	<p>Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy per Appendix D Item No. 39.</p> <ul style="list-style-type: none"> SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 71. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 		
5.3.9.3-3 - I.7 - PSPS - 24/7 Information Updates	<ul style="list-style-type: none"> SME Interview conducted on June 7th with Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy per Appendix D Item No. 40. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.9.4 - I.5 - CERP (Update and Publish)	<ul style="list-style-type: none"> SME Interview conducted on June 4th with Angie Gibson, Director, Emergency Preparedness and Response, Strategy and Execution per Appendix D Item No. 41. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC
5.3.9.5-1 - I.1 - Emergency Preparation and Restoration	<ul style="list-style-type: none"> SME Interview conducted on June 3rd with Robert Cupp, Director, Emergency Preparedness and Response, Field Operations per Appendix D Item No. 42. SME Interview conducted on June 4th with Angie Gibson, Director, Emergency Preparedness and Response, 	Activity Validated	WMP PMO QC



	<p>Strategy and Execution per Appendix D Item No. 77.</p> <ul style="list-style-type: none"> Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 		
5.3.9.5-2 - I.2 - PSPS - Service Restoration	<ul style="list-style-type: none"> SME Interview conducted on June 3rd with Robert Cupp, Director, Emergency Preparedness and Response, Field Operations per Appendix D Item No. 43. SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 72 SME Interview conducted on June 4th with Shawn Holder, Manager PSPS PMO per Appendix D Item No. 78. Documented in PG&E's Annual Report on Compliance for 2020 Wildfire Mitigation Plan by PG&E's WMP PMO QC. 	Activity Validated	WMP PMO QC, Internal Audit
5.3.9.5-3 - I.3 - PSPS Customer Impact Mitigation	<ul style="list-style-type: none"> SME Interview conducted on June 10th Christopher Pezzola, Director, Internal Auditing Appendix D Item No. 73 SME Interview conducted on June 7th with Maria Ly, Manager, Electric Networks and Michelle Sakamoto per Appendix D Item No. 79. SME Interview conducted on June 7th Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science Appendix D Item No. 44. SME Interview conducted on June 7th with Paul McGregor, Director, Risk Management per Appendix D Item No. 80. Documented in PG&E's Annual Report on Compliance for 2020 	Activity Validated	WMP PMO QC, Internal Audit

Independent Evaluator ARC

	Wildfire Mitigation Plan by PG&E's WMP PMO QC.		
5.3.9.6 - Protocols in place to learn from wildfire events	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.9.7 - Resource Sharing to Support Inspection Work and Other Aspects of the Wildfire Management Plan	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.10.1 - Community engagement	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.10.2 - Cooperation and best practice sharing with agencies outside CA	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.10.3 - Cooperation with suppression agencies	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A
5.3.10.4 - Forest service and fuel reduction cooperation and joint roadmap	<ul style="list-style-type: none"> Per PG&E's provided Inventory Attachment 1 (Appendix B Item No. 39). 	N/A	N/A

3.4 VEGETATION MANAGEMENT ASSESSMENT

3.4.1 WMP Activity Completion

VEGETATION MANAGEMENT AND INSPECTION EVALUATION SUMMARY

The IE team reviewed PG&E's Vegetation Management and Inspection program associated with clearance or direct effect to distribution lines under their WMP. The review was led by Brian Callaghan, BVNA Forestry lead auditor, Jim Coalla, BVNA Forestry Program Manager, and Matt Matwijec, BVNA Forestry auditor. BVNA was supplemented with field reviews and corresponding imagery from C2 Group. BVNA conducted an assessment of the program examination of field sites, the evaluation of relevant documents, review of imagery, and SME interviews with PG&E staff and contractors. Inspections were carried out at 1,381 field sites to determine if vegetation management activities had occurred, whether they were completed as prescribed, and if they were effective.

PG&E has a robust vegetation management system that includes field identification, prescription implementation, 100% work verification, and quality assurance (QA) sampling. PG&E employs a wide range of inspectors and contractors whose qualifications and rigorous training are critical to the effectiveness of the Wildfire Mitigation Plan's Vegetation Management aspects. The field data demonstrate that activities had effectively occurred on 92% of sites visited by IE. The other sites varied, including no evidence of work having occurred (including three instances of partial completion) on 7.5% of sites. Finally, two sites (0.1%) were classified as null as they could not be accessed.

3.4.2 Sampling Methodology and Discussion

There are three primary categories for the sampling methodology.

- Statistical
- Non-statistical
- Other, a place to put identified audit populations that do not fit in either of these categories, or require a targeted sample based on high-risk or known elements

The IE initially applied a random statistical sample of completed vegetation management activities based on a geo-referenced data set at the county and circuit level in Tier 2 and 3 HFTD areas to gain acceptable samples throughout depicted regions (Figure 20). However, the initial data provided by PG&E was challenging to interpret; locations were difficult to validate because they lacked clarity on the prescriptions being employed. Clarification was requested and provided through data requests, specifically (DR015), PG&E provided its Enhanced Vegetation Management Pre-Inspector Trim Code Matrix (Appendix B - Documents Reviewed - Response to Data Requests, Item No. 14) and documentation of locations and types of trees where they completed work as part of the 2020 Catastrophic Event Memorandum Account inspection program. Locations were selected based on a combination of the initial data provided and refined through the additional data requests. Sites were selected where vegetation management activities occurred in all PG&E regions, and priority was given to Tier 2 and Tier 3 HFTD areas. Sites were chosen to cover a range of prescriptions and conditions.

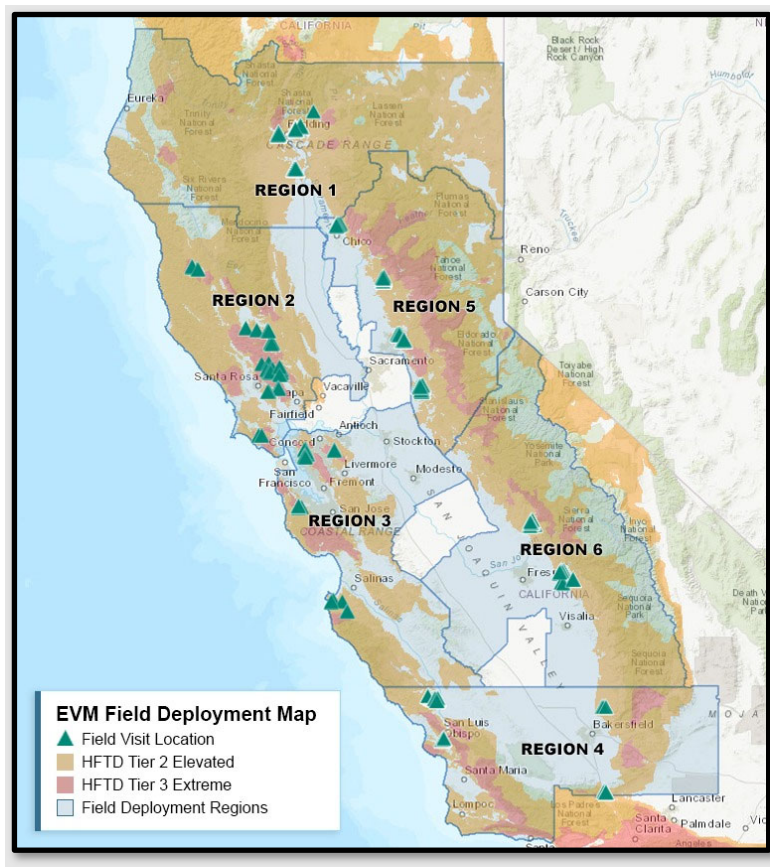


Figure 20: EVM Field Verification Planning Map

IE field teams audited 150 line miles total, comprising approximately 80 line miles of Tier 3 and 70 line miles of Tier 2. This data can further be demonstrated as 1,381 sites within the Tier 2 and Tier 3 sampled areas. At each location, the evaluator noted whether recent vegetation management activities had occurred. The site examination included evaluating fuel hazards (such as overhanging branches) and vegetation clearances or evidence of planned activity.

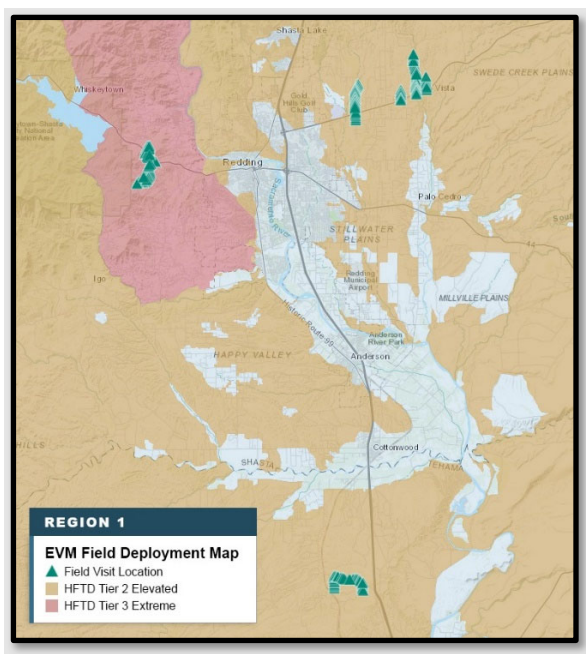


Figure 21: Distribution of plots evaluated within region 1.

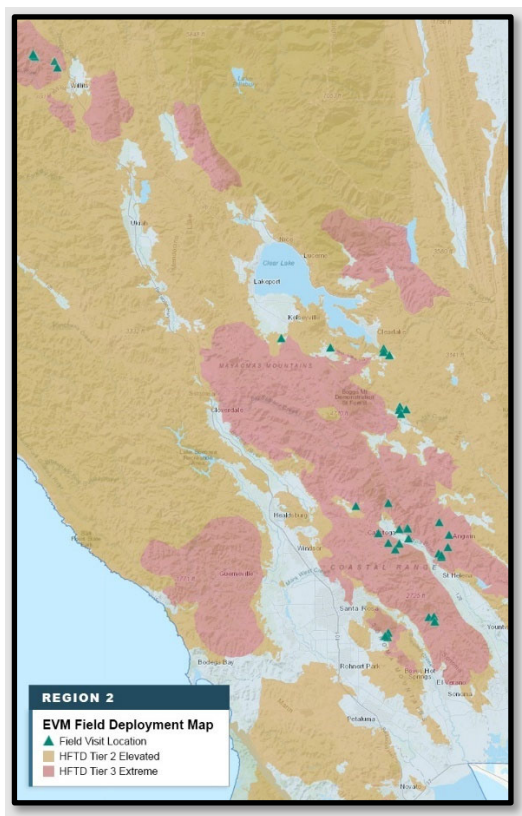


Figure 22: Distribution of plots evaluated within region 2.

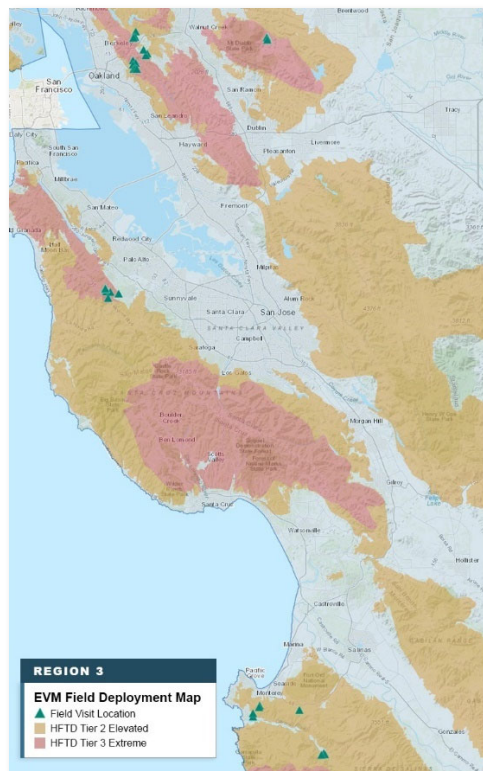


Figure 23: Distribution of plots evaluated within region 3.

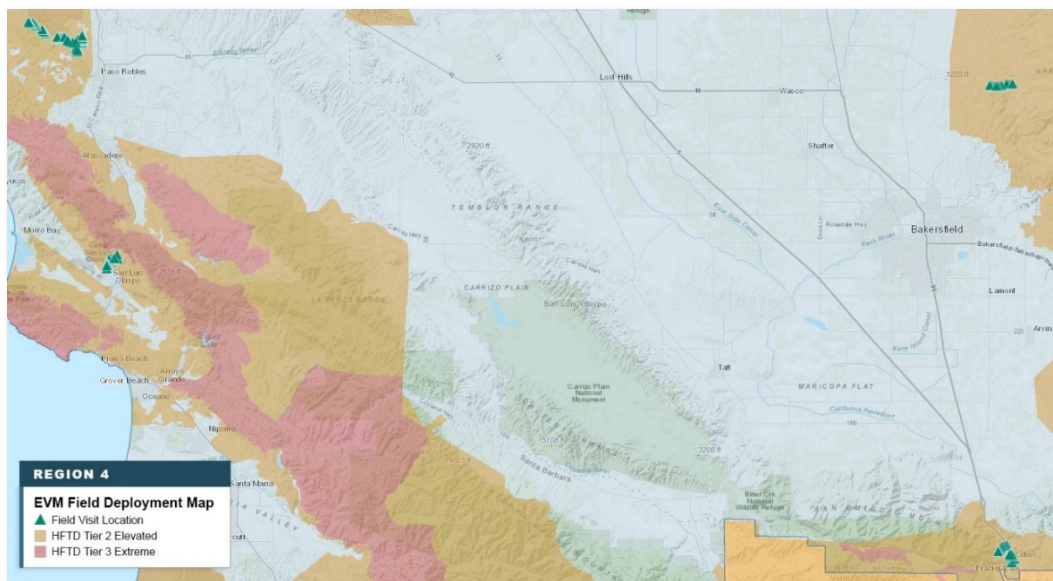


Figure 24: Distribution of plots evaluated within region 4.

During the assessment in Region 2, BVNA foresters observed vegetation management activities occurring, which led to informal interviews with PG&E staff, contractors, and inspectors.



Figure 25: IE team Interviewed Several Contractors and Inspectors Encountered During Their Field Work.

Overall, the IE field assessment visited 1,381 sites (see Table 1), with 92% (1,274) of sites assessed found to have vegetation management activities meeting the standards and best management practices. Seven percent of sites (105) had no evident vegetation management activities; three of these instances were on areas where trimming had taken place but not fully completed. Two sites could not be accessed as the properties were gated.

Table 17: Results of the BVNA/C2 Group field assessments.

Region	Yes	No	Null	Total
BVNA	1274	105	2	1381

Yes – vegetation management activities verified in compliance

No – No evidence of vegetation management activities

Null – Sites which could not be accessed

3.4.3 Large Volume Quantifiable Goal/Target – Field Verifiable

5.3.5 VEGETATION MANAGEMENT AND INSPECTIONS

5.3.5.15 – E.1 EVM line miles

Review of Initiatives

As per the WMP, PG&E committed to completing and validating additional EVM circuit miles for distribution circuit miles for circuits in Tier 2 and Tier 3 HFTD areas. PG&E's target metric in 2020 was 1,800 line miles for distribution lines. A coordination effort was conducted between the provided reports and related data. With the assessment of the field target sets, we confirmed that 1,878 miles were accomplished within the reports provided, which exceeded the targets set in the 2020 WMP based on the 150 miles evaluated by the IE.

Table 18: 2020 WMP Commitments and Performance – from PG&E ARC 202110331

2020 Commitments ^(a)	WMP Commitment	Summary of 2020 Performance
E.1 EVM (line miles)	In 2020, complete and validate an additional 1,800 EVM circuit miles on distribution lines in HFTD areas	1,878-line miles completed and validated

IE field teams examined 150 line miles of EVM activities covering 1,379 sites where activities reportedly took place; two sites were not accessible due to locked gates. The sites evaluated totaled approximately 80 line miles of infrastructure located in tier 3 and 70 line miles within tier 2 of the HFTD areas.

Trends and Themes

WMP Metric of 1,800 line miles was met and exceeded, and IE confirmed at 1,381 sites visited that 92% of the sites were found to have vegetation management activities meeting the standards and best management practices.

3.4.4 Large Volume Quantifiable Goal/Target – Not Field Verifiable

5.3.5 VEGETATION MANAGEMENT AND INSPECTIONS

5.3.5.2 Detailed inspections of vegetation around distribution electric lines and equipment

Review of Initiatives

PG&E carefully examines vegetation around the right-of-way (ROW) and rates and records the condition of each tree. In addition, PG&E VM staff inspect all distribution circuit miles in PG&E's service territory on a recurring cycle using a combination of different patrol methodologies and patrol types from the ground and air.

In response to the IE's data request (DR015), PG&E provided its Enhanced Vegetation Management Pre-Inspector Trim Code Matrix (Appendix B - Documents Reviewed - Response to Data Requests, Item No. 14) and documentation of locations and types of trees where they completed work as part of the 2020 Catastrophic Event Memorandum Account (CEMA) inspection program. Section 5.3.5.9 in the 2020 WMP refers to the CEMA program or "dead and dying tree program."

PG&E provided the IE with the following explanation associated with the data referenced above: "For clarification, inspectors are looking for dead, dying, and declining trees, or portions of trees including dead overhangs, that can contact our facilities if they fail. Instead of targeting types of trees, our tree mortality inspections are looking for specific conditions of any type of tree."

The following are the areas that PG&E currently patrol:

- State responsibility areas (SRAs)
- Wildland urban interface (WUI) areas
- Fire hazard severity zones (FHSZs)
- Designated high fire-threat districts (HFTDs)

Trends and Themes

Based on the SME Interview conducted on June 2nd with Joann Martin, PG&E Director of Quality Management per Appendix D Item No. 27., Ms. Martin indicated that VM inspections continue to look for opportunities to improve., PG&E further stated that it is looking to use a data-driven approach for future site selection, where checking rates of compliance occurs on weekly intervals.

5.3.5.3 Detailed inspections of vegetation around transmission lines and equipment

Review of Initiatives

PG&E undertakes visual inspections of vegetation around ROWs based on the Transmission Vegetation Management Standard dated 10/1/16 rev 2 (Appendix B - Documents Reviewed - Response to Data Requests, Item No. 17), where individual trees are carefully visually examined, and the condition of each tree is rated and recorded. PG&E's program recently introduced a LiDAR-based Risk Score Model to identify vegetation and fuel loading on transmission lines.

Trends and Themes

The visual inspection program overlays QA/QC with vegetation management work, specifically related to Routine Vegetation Management, Right of Way Maintenance, Orchard Program, and Vegetation control in order to provide a QA/QC program that complements the four elements. Based on the SME Interview conducted on June 2nd with Stephen Simon, PG&E Interim Director of VM per Appendix D Item No. 27., PG&E's EVM compliance rate for 2020 (as determined by the quality management department) was greater than 96%. The IE considers this compliance rate highly effective in wildfire mitigation. It is driven by a program/goal targeting higher-risk circuits and more rigorous vegetation management practices than previous PG&E practices or focusing on achieving a 100% compliance rate on lower-risk circuits.

5.3.5.17 Substation Inspection

Utility bulletin TD-3322B-065 established guidelines for defensible space around electric substations to reduce the risks of wildfires. Based on a review of the bulletin and the related job aid, IE can confirm the vegetation management process of substations is appropriate to the risk associated for substations.

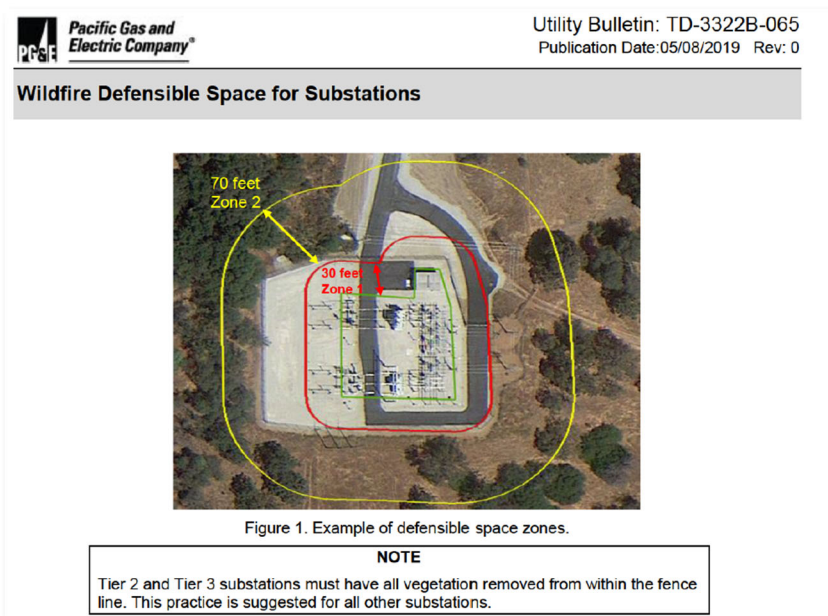


Figure 26: Utility Bulletin TD-332B-065

3.4.5 Small (less than 100 items) Volume Quantifiable Goal/Target

Pursuant to the Final IE Scope of Work for the Review of Compliance with 2020 WMP (Appendix B Item No. 56), PG&E provided "a complete list of all small volume (i.e., less than 100 units) 2020 WMP activities with quantifiable goals/targets that were conducted in 2020 related to the specific goal."

Based on the list PG&E provided, Section 5.3.5. Vegetation Management and Inspections did not include any 2020 WMP initiatives that are considered to be small volume (i.e., less than 100 units) 2020 WMP activities with quantifiable goals/targets.

3.4.6 Qualitative Goal/Target

5.3.5 VEGETATION MANAGEMENT AND INSPECTIONS

5.3.5.1 Additional efforts to manage community and environmental impacts

Review of Initiatives

PG&E makes work plans and schedules for vegetation management activities that are available to local governments and communities through a program known as “ProjectWise”. Reports of proposed activities are now provided a month ahead to counties that have opted to receive these reports. Currently more than half of the total 40 counties are part of this program.

An update on community outreach activities was provided during an SME interview with PG&E staff Joey Perez, Senior Manager Vegetation Management was emphasized that safety is of utmost importance. Outreach is carried out through phone calls, in person at the door, or by leaving a door hanger if the resident is not home. The intent is to answer questions and provide phone/email/website for public information. PG&E also carries out social media campaigns and town halls with questions/answers for the community.

According to PG&E staff Joey Perez Senior Manager Vegetation Management, community contact has not increased over the last few years but the amount of work has increased; they always make contact with affected parties before doing work. In the past, PG&E involved law enforcement in helping with resident communication when PG&E did not receive a response from the residents about the community and environmental impacts of the vegetation management work scheduled. Recently, law enforcement’s help is no longer effective, and PG&E is considering other alternatives to communicate with local landowners.

Trends and Themes

PG&E continues to communicate and partner with stakeholders regarding the vegetation work and its importance from a safety standpoint. In addition, and where possible, PG&E will inform cities and counties of vegetation management work within their community and work with them to address any questions or concerns or environmental impacts.

5.3.5.4 Emergency response vegetation management due to red flag warning or other urgent conditions

Review of Initiatives

All trees identified for work by pre-inspectors are evaluated for the priority of the required tree work that is necessary, with strike trees being of highest priority. Planning and execution of VM activities, such as trimming or removal, is carried out based upon the level of hazard.

The VM Priority Tag Procedure (TD-7102P-17) was reviewed by the IE. It is used to identify, and mitigate, trees that represent an immediate risk and rank them accordingly. Observations in the field confirmed that the procedure is being applied. However, the IE noted that shrubs and small trees are growing into the communication lines on many sites, which is not commonly flagged as a potential hazard but is located where vegetation management work is shown to be incomplete.

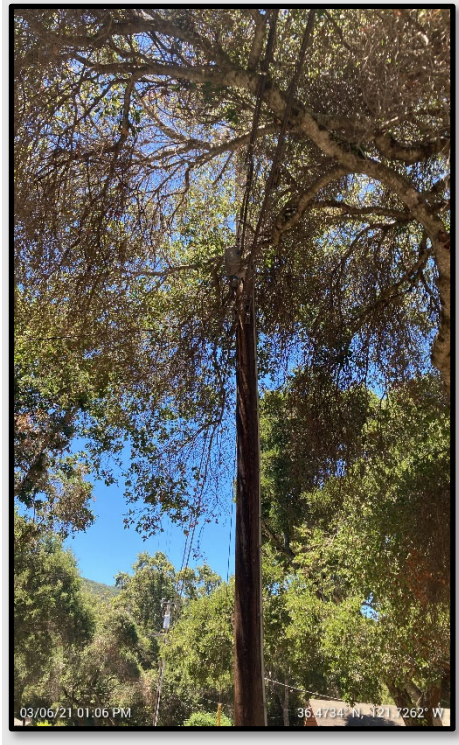


Figure 27: High risk tree found on a sample site.

5.3.5.5 Fuel management and reduction of “slash” from vegetation management activities

Review of Initiatives

The fuel reduction program is intended to reduce the fuels close to ignition sources. The IE found fuel loads being well managed on the sites they visited. Sites were observed where all trimmings had been chipped and spread on site and where hazards were being kept well away from lines. It was further noted that greater efforts were being made in the higher risk zones or circuits.



Figure 28: Example Fuel reduction work.



Figure 29: Site work included tree and slash removal.

Trends and Themes

In accordance with expectation for this type of program more efforts are being directed by PG&E towards managing high risk zones to minimize on-site slash and reduce fuel hazards.

5.3.5.6 Improvement of Inspections

Review of Initiatives

PG&E has an expansive inspection program for authenticating processes and identifying improvements. The program includes 100% validation of vegetation management work to verify work has been done and quality assessment sampling of selected completed projects is undertaken (WMP, pg. 645).

See Section 3.4.4 Large Volume Quantifiable Goal/Target - Not Field Verifiable for initiatives 5.3.5.2 and 5.3.5.3 within this report for details about the work performed under these two sections as referenced in the 2020 WMP.

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PG&E **Enhanced Vegetation Management**
Work Verification Responsibilities

PG&E's Work Verification (WV) Team conducts quality control inspections of all completed Enhanced Vegetation Management (EVM) work. The WV Team's primary responsibility is to verify that all work has been completed to scope, and all trees have been captured as vegetation points.

To learn more about the WV Team's roles and responsibilities, please see below for more details.

Work Verification Inspector (WVI) Responsibilities

- ☒ WVIs conduct their verification in the field by walking the entire segment
- ☒ While walking a segment, the WVIs will also inspect all surrounding veg points if it has the same unique segment ID assigned to them
- ☒ WVIs will also verify and assign a pass or fail status to each veg point; In the new Collector update (Version 8), veg points that pass will become white and uneditable while veg points that fail will become purple
- ☒ WVIs input the following information into Survey123:

<input checked="" type="checkbox"/> Username	<input checked="" type="checkbox"/> Whether non-listed trees are present
<input checked="" type="checkbox"/> Company	<input checked="" type="checkbox"/> Whether primary overhead lines are present
<input checked="" type="checkbox"/> Restrictions (i.e. access issues, safety, other)	<input checked="" type="checkbox"/> Whether debris exists in waterways
<input checked="" type="checkbox"/> Whether overhang and overhead scope was met	<input checked="" type="checkbox"/> Any additional comments

Once the WVI has input all the data mentioned above, they submit the survey. The GIS Team runs daily queries of the Survey 123 information, which automatically assigns a pass or fail status to each segment inspected.

Please note that WVIs do not have the ability to change or alter any information entered into Collector by pre-inspectors. In particular, WVIs are not doing any of the following:

- ☒ Editing any veg point attributes, including the location of the point
- ☒ Editing the trim code prescriptions
- ☒ Assigning a pass or fail status to each segment inspected
- ☒ Conducting tree work in the field
- ☒ Reviewing points that have the status LiDAR Not Valid

Common WVI Field Findings

The most common findings that cause a segment to fail include:

- Numerous missed inventory trees (i.e. trees that have the potential to strike the facility)
- Trees identified that do not completely meet the EVM scope

Figure 30: EVM Work Verification Responsibilities Dated 5/28/2020

PG&E continued to develop and adapt their systems. For example, in response to recent fire events a priority tag related to assessing burnt redwood has been added. (WMP, pg. 646).

During the evaluation, the IE were informed that the program had a compliance rate of more than 96% during quality assessments (per. Joann Martin PG&E Director Quality Management, SME). Given the detailed procedures and multiple site visits (identification, implementation, 100% review onsite, plus quality assessment) compliance should be closer to 100% and interview with Chief Risk Officer, Sumeet Singh confirmed that 100% compliance is the goal for the group. No information was provided on those activities which did not meet the PG&E standards.

Trends and Themes

Given the use of LIDAR, other technologies, and internal quality assurance processes, PG&E continuously looks to improve and adapt its inspection program.

5.3.5.7 LiDAR inspections of vegetation around distribution electric lines and equipment

Review of Initiatives

PG&E is working with LiDAR imagery to improve vegetation mapping and inventory as well as the rating hazard. More emphasis on LiDAR is being given to help identify strike potential tree ignition sources. In 2020, PG&E continued to study the implementation of ground-based lidar for assessing vegetation and fuel risk.

Trends and Themes

The use of LiDAR in many resource management fields has increased rapidly over the past decade. LiDAR units have become more precise, and the ability to process the information more efficiently has supported that increase. PG&E is continuing to develop LiDAR-based tools to improve their understanding of their infrastructure. Based on an interview with PG&E's Chief Risk Officer, ground-based LiDAR will be used in addition to airborne LiDAR to support their assessment initiatives.

5.3.5.8 LiDAR inspections of vegetation around transmission electric lines and equipment

Review of Initiatives

PG&E is working with LiDAR technologies to improve vegetation mapping and inventory as well as developing the rating hazards. PG&E is not currently using LiDAR as its primary inspection tool but continues to evaluate the technology to maximize the data collected for specific vegetation management purposes.

Trends and Themes

The use of LiDAR in many resource management fields has increased rapidly over the past decade. New applications are being developed constantly. PG&E is continuing to develop LiDAR-based tools to improve its information base.

5.3.5.9 Other discretionary inspections of vegetation around distribution electric lines and equipment

Review of Initiatives

Primarily this effort, referenced earlier in this report under Section 3.4.4 Large Volume Quantifiable Goal/Target - Not Field Verifiable for initiatives 5.3.5.2 as the CEMA20 program, involves performing a second annual inspection in many parts of PG&E's service territory to assess the different values and indices of fuel risk and identifying changed conditions since the latest routine inspection to recognize unsafe conditions which need to be resolved to lower high risk of tree mortality and wildfire risk.

The IE did not identify discretionary inspections in the data received from PG&E.

Trends and Themes

Additional/discretionary inspections are occurring during times of high/extreme fire hazard conditions.

5.3.5.10 Other discretionary inspections of vegetation around transmission electric lines and equipment

Review of Initiatives

As described within the 2020 WMP, this initiative related to other discretionary inspections of vegetation around transmission electric lines and equipment is found within the 2020 WMP Section 5.3.5.3. See Section 3.4.4 Large Volume Quantifiable Goal/Target - Not Field Verifiable for initiatives 5.3.5.3 within this report for the evaluation of the initiative.

5.3.5.11 Patrol inspections of vegetation around distribution electric lines and equipment

Review of Initiatives

As described within the 2020 WMP, this initiative related to patrol inspections of vegetation around distribution electric lines and equipment is found within the 2020 WMP Section 5.3.5.2. See Section 3.4.4 Large Volume Quantifiable Goal/Target - Not Field Verifiable for initiative 5.3.5.2 within this report for the evaluation of the initiative.

5.3.5.12 Patrol inspections of vegetation around transmission electric lines and equipment

Review of Initiatives

As described within the 2020 WMP, this initiative related to patrol inspections of vegetation around transmission electric lines and equipment is found within the 2020 WMP Section 5.3.5.3. See Section 3.4.4 Large Volume Quantifiable Goal/Target - Not Field Verifiable for initiatives 5.3.5.3 within this report for the evaluation of the initiative.

5.3.5.13 Quality assurance / quality control of vegetation inspections

Review of Initiatives

PG&E operates a management system that is third-party certified to the ISO 9001 standard, which emphasizes work procedures, monitoring, continual improvement, risk analysis, and reporting. In addition, PG&E has a detailed work verification process which includes a 100% verification of vegetation management work orders.

PG&E collects inspection data on an electronic platform called Collector, which is also available as a mobile app. This platform captures all stages of the vegetation management workflow into a centralized database. Additionally, the IE identified during staff interviews that the quality assurance is conducted at the various stages of the process (pre-inspection, fieldwork activities, and work verification after completion).

The IE discussed the verification process with PG&E and inquired about its compliance rate, which PG&E reported to be greater than 96%. There was no clear explanation of the non-complying activities and how they were overlooked in the work verification.

The IE in the field had difficulty with the data provided. Prescription codes were not made available to the IE, which meant that they could only determine that work had been done and its effectiveness at reducing vegetative hazards but not what type of work. Therefore, compliance could not be evaluated.

Trends and Themes

PG&E quality assurance program contains a stringent structure of checks and balances. The sample set for quality team to observe is selected based on analytical criteria however integration of data collection through Collector will enable even better coordination of information and more effective identification of sample set based on risk as well as hazards in the future.

5.3.5.14 Recruiting and training of vegetation management personnel**Review of Initiatives**

PG&E currently has approximately 1,000 qualified (ending 2020 with 1,072) vegetation management inspectors. However, with a high level of turnover in the field, PG&E's recruiting is ongoing to meet the goal of 1,500 contract inspectors.

PG&E has partnered with the Utility Arborist Association a branch of the Society of Arboriculture (ISA) to support and expand their Utility Vegetation Management (UVM) Certificate Program to nine courses. Working with six local colleges, PG&E have moved their training program beyond their service area and provide training opportunities to those seeking employment at any of the California utilities. They are seeking to have the other large utilities join in their support for the UVM program. PG&E also helps fund a scholarship program for the UVM Certificate Program.

PG&E pre-inspectors are qualified through the UVM Certificate Program that includes a 9-course comprehensive training program with online classes, mentoring, and training. There is skills assessment testing and trainees are mentored through their first year of on-the-job training. Work tends to be subjective so trainees must pass as assessment at the end of training period. Work is constantly being checked and evaluated to identify where additional training requirements are needed.

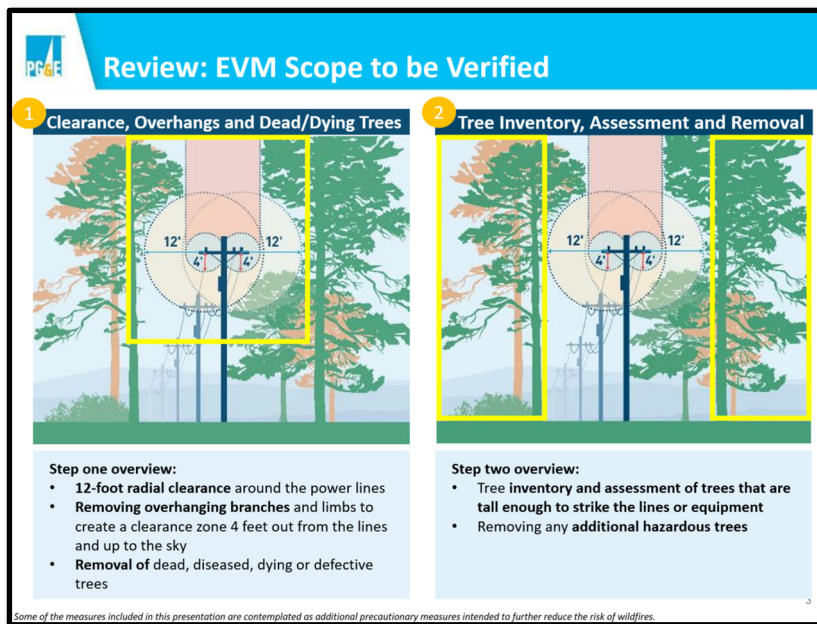


Figure 31: From EVM Work Verification Training Updated 5/2020

It was confirmed that the tree crew training program was under budget due to the impact of COVID-19 on program rollout in a classroom setting.

Trends and Themes

During the interviews with PG&E staff Steven Fischer PG&E Senior Director of Enhanced Vegetation Management, it was recognized that hiring and retaining trained VM staff has been a challenge. The IE was able to confirm that PG&E has taken actions to address the retention and turnover of staff dedicated to vegetation management, and to improve this situation, an effort is being put into creating a job stream for VM workers by partnering with academic institutions and creating a career path to retain more staff.

5.3.5.15 Remediation of at-risk species

Review of Initiatives

PG&E has a program in place to recognize and, where possible, mitigate “at-risk” trees as described within the 2020 WMP. each geographic region within PG&E’s territory compiled a list of the regions ten highest “at-risk” tree species. PG&E has developed a Tree Assessment Tool (TAT) that aids inspectors in identifying and evaluating a tree's risk of striking electrical equipment.. During field assessment as described within 3.4.3 Large Volume Quantifiable Goal/Target - Field Verifiable within this report, “at-risk” tree species as defined within the 2020 WMP were observed on more than 23 sites where they had been removed, trimmed, or otherwise treated.



Figure 32: Douglas fir trees topped and trimmed.

Trends and Themes

PG&E is prioritizing the removal of “at-risk” species of trees as described above.

5.3.5.16 Removal and remediation of trees with strike potential to electric lines and equipment

Review of Initiatives

PG&E does not perform a specific survey or inspection to identify, remove and remediate trees with strike potential. Inspectors are trained to identify “strike trees” and they are identified during all inspections as part of their standard practices.

During the field assessments, at least ten sites were inspected where “strike trees” had either been removed, topped, or trimmed.



Figure 33: A large stump remains after the removal of a strike tree.

Trends and Themes

PG&E is prioritizing the removal of hazardous or “strike” trees as described above.

5.3.5.18 Substation vegetation management

The utility bulletin TD-3322B-065 established guidelines for defensible space around electric substations to reduce the risks of wildfires. Based on a review of the bulletin and the related job aid, the IE can confirm the vegetation management process of substations is appropriate to the risk associated with substations.

5.3.5.19 Vegetation inventory system

Review of Initiatives

As discussed within the 2020 WMP, PG&E's VM work is centralized within a system that includes "historical work prescribed and the timing of any tree work or inspections completed." PG&E's EVM program incorporates the use of ArcGIS applications to manage process workflows, and PG&E is currently in the process of developing an integrated tool to bring current systems together. Additionally, as noted within the 2020 WMP, costs associated with these tools and databases are included within the 2020 WMP Section 5.3.5.2 for distribution and 2020 WMP Section 5.3.5.3 for transmission.

Trends and Themes

The IE did not have an opportunity to examine the vegetation inventory systems.

5.3.5.20 Vegetation management to achieve clearances around electric lines and equipment**Review of Initiatives**

As described within the 2020 WMP, VM to achieve clearances around electric lines and equipment is conducted as part of PG&E's routine and enhanced VM programs found within 2020 WMP Section 5.3.5.2 for the primary distribution efforts related to 'achieving clearances' and 2020 WMP Section 5.3.5.3 for transmission efforts. Additionally, as noted within the 2020 WMP, costs associated with this initiative are not separated from 2020 WMP Sections 5.3.5.2 and 5.3.5.3. As further described within Section 3.2 Verification of Funding Section above, no spend was allocated to this initiative.

Trends and Themes

See Section 3.4.4 Large Volume Quantifiable Goal/Target - Not Field Verifiable for initiatives 5.3.5.2 and 5.3.5.3 within this report for trends and themes related to this initiative.

3.5 ELECTRICAL ENGINEER ASSESSMENT

3.5.1 WMP Activity Completion/ Sampling Methodology and Discussion

SMALL VOLUME – QUANTIFIABLE

REVIEW OF INITIATIVE

5.3.3.8-3 - C.1 SCADA TRANSMISSION SWITCHING (SWITCHES)

Discussions were held with PG&E Subject Matter Experts (SMEs) to confirm initiative compliance. Details of the switch technology utilized is described in Appendix D.

5.3.3.8-6 - I.6 MICROGRIDS FOR PSPS MITIGATION (OPERATIONALIZED UNITS)

Discussions were held with PG&E Subject Matter Experts (SMEs) to confirm initiative compliance. Details of the initiative operational processes are described in Appendix D.

5.3.3.9-1 - C.5 SYSTEM HARDENING (SCADA ENABLED CIRCUIT BREAKERS)

SCADA was targeted for 11 breaker installations. The response submitted by PG&E on June 7, 2021 via Data Request No. 2 – DRU-3764.02 shows that all were installed. No field verifications were performed.

5.3.3.9-2 REPLACEMENT OF LEGACY 4C CONTROLLERS (RECLOSERS)

Replacement was targeted for 20 reclosers. The response and documentation submitted by PG&E on June 7, 2021 via Data Request No. 3 DRU-3764.03 shows that all were installed. No field verifications were performed.

5.3.3.11 MITIGATION OF IMPACT ON CUSTOMERS AND OTHER RESIDENTS AFFECTED DURING PSPS EVENT

Discussions were held with PG&E Subject Matter Experts (SMEs) to confirm initiative compliance. Initially, 62 sites were targeted for implementation; however, 18 have been implemented. PG&E did not provide an updated detailed forecast of future installations.

5.3.3.17.5 TRANSMISSION LINE SYSTEM HARDENING OVERVIEW AND STRATEGY

Asset Management and Operability Assessment” was prepared for PG&E by an independent contractor and reviewed by the IE. PG&E submitted the document on June 7, 2021, via Data Request No. 5 DRU-3764.05. The contractor (with a Ph.D. and a registered PE in Civil and Structural Engineering) uses Bayesian and Log-Normal Outage Densities to analyze Fragility Functions and predictions of structural failures. The report states that a 100 percent probability cannot be given that a structure or tower will not fail, that there is always a statistical probability, based on the structure’s design criteria, and that hidden material and equipment flaws can remain hidden during inspections which could result in its premature failure.

5.3.3.18.1-2 INCREASED PROTECTION SENSITIVITY

A document was reviewed to confirm initiative compliance. The document “Description of Operation, Fast Tripping Scheme (FTS), December 2020” was submitted by PG&E via Data Request DRU-3764.06. A pilot was implemented to initiate instantaneous settings via SCADA on breakers and reclosers during possible fire events. While these settings will provide the most sensitive settings resulting in the fastest response time for the breakers and reclosers, they will circumvent the regular protection scheme. This seems to be a reasonable compromise given the added protection provided by the instantaneous reaction times of the breakers and reclosers. The increased protection sensitivity settings will only be implemented as weather conditions would indicate a potential wildfire scenario.

5.3.6.4 - F.2 PROTOCOLS FOR PSPS RE-ENERGIZATION

Discussions were held with PG&E Subject Matter Experts (SMEs) and the standard TD-1464B-002 reviewed to confirm initiative compliance. Details of the document reviewed are included in Appendix D.

SMALL VOLUME – QUANTIFIABLE

TRENDS and THEMES

The following summarizes the discussions held with Subject Matter Experts (SME’s) at PG&E regarding the topics in 3.1.2 c. Small Volume (<100) Quantifiable Goal/Target outlined below. The understanding comes from the knowledge gained from the standard practices of several utilities. Per the IE findings, PG&E’s progress on their relevant WMP programs is summarized below.

QUALITATIVE GOAL/TARGET

TRENDS and THEMES

The following is an outline of the documentation received from PG&E regarding the topics in section 3.1.2 d. Qualitative Goal/Target. The understanding comes from reviewing the information and relating the context with standard practices of several utilities. Per the IE findings, PG&E’s progress on their relevant WMP programs is summarized below.

Table 19: Electrical Engineer Assessment 3.1.2 c. Small Volume Quantifiable Goal/Target Summary Table

Program Target	Sections	Summary
SCADA Transmission Switching (switches)	5.3.3.8-3 - C.1	Activity completed based on Interview with SME Maria Ly, Appendix D.
Microgrids for PSPS Mitigation (operationalized units)	5.3.3.8-6 - I.6	Activity completed based on interview with SME Tracy Maratukulam, Appendix D.

Table 20: Electrical Engineer Assessment 3.1.2 d. Qualitative Goal/Target Summary Table

Program Target	Sections	Summary
System Hardening (SCADA enabled circuit breakers)	5.3.3.9-1 – C.5	Activity completed based on interview with SME Maria Ly, Appendix D, and PG&E's response to Data Request No. 2 DRU-3764.02.
Replacement of Legacy 4C Controllers (reclosers)	5.3.3.9-2	Activity completed based on PG&E's response to Data Request No. 3 DRU-3764.03.
Mitigation of impact on customers and other residents affected during PSPS event – installation of generators.	5.3.3.11	Non-Compliance - only 18 of the proposed units were installed.
Transmission Line System Hardening Overview and Strategy	5.3.3.17.5	Activity completed based on interview with SME Paul McGregor, Appendix D and PG&E document "A Framework for Risk-Based Transmission Line Asset Management and Operability Assessment."
Increased Protection Sensitivity	5.3.3.18.1-2	Activity completed based on PG&E document "Description of Operation, Fast Tripping Scheme (TFS), December 2020."
Protocols for PSPS Re-Energization	5.3.6.4 - F.2	Activity completed based on interview with SME Robert Cupp, Appendix D, and PG&E document "TD1464B-002."

4 CONCLUSION

Assessments of the WMP activities completed in 2020 were made in accordance with the Final Independent Evaluator Scope of Work for the Review of compliance with 2020 WMP dated April 21, 2021, by the State of California Public Utilities Commission (CPUC). For completion of this report, an analysis of initiatives within PG&E's 2020 WMP incorporated a combination of document reviews and field assessment techniques using pre-defined sampling methodologies, data requests for process standards, data requests for reports, requests for summarization of bulk data, requests for verification of funding, and various SME interviews. The magnitude of initiatives found within PG&E's WMP, when applied to the large geographical service area in combination with the limited time allocation, resulted in an assessment rate of completion of 94% (328 out of 346 initiatives).

To further clarify methodology for selective sampling, general and linear extrapolations and deductions were made from the review of public and confidential data. Prioritization of data associated with Tier 2 and Tier 3 HFTD is combined with opportunities of employing clustering, targeting, and randomization strategies. Data sets were requested targeting specific criteria for review and then randomized to consider specific report content when the data set was too large for functional review of all materials over the large service area and time allocated.

Large volume quantifiable goals for vegetation management were assessed by field forestry crews deployed over six regions, encompassing nearly the entire PG&E service territory. Work completed as part of this sampling was 1,381 sites which resulted in over 149 line miles assessed. As a large volume quantifiable goal, distribution pole inspections were evaluated through inspection reports received as part of a data request.

Qualitative goals outlined in the 2020 WMP spanned 8 WMP categories comprised of 74 initiatives. PG&E approach of qualitative goals relies on established processes where appropriate, developing new processes to fill gaps while simultaneously monitoring outcomes, and then refining the approach to incorporate feedback to be carried forward to future wildfire mitigation efforts. Initiatives tied to Data Governance and Community Engagement were evaluated to be ongoing; this is expected due to the type of initiatives. Initiatives linked to forecasting, grid design, and system hardening are considered ongoing due to emerging technologies.

QA/QC programs span across the spectrum of initiatives and funding categories. The QA/QC programs were evaluated based upon a comparison of various SME interviews and utility process documents procured upon request for data. Only broad findings of consistency in methodology were able to be considered for this evaluation. Verification of QA/QC funding required an analysis of utility furnished budget and spend line items for WMP initiatives in 2020 and 2021 and was further cross-referenced with public documents and interviews with SME's.

A summary of compliance with depicted initiatives outlined in PG&E 2020 WMP is demonstrated in table 21; the comprehensive IE Findings Summary is provided in Appendix G.

Table 21: IE Findings Summary

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
Verification of Funding	5.3.1.4	Initiative mapping and estimation of wildfire and PSPS risk-reduction impact	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.10.1	Community engagement	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.10.3	Cooperation with suppression agencies	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.10.4	Forest service and fuel reduction cooperation and joint roadmap	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.1.1	Advanced weather monitoring and weather stations, Weather Stations	Budget Underspent by \$8.15 million, 94% of total budget (2020 ARC Report). Budget Underspent by \$211 thousand, 2% of total new budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$488 thousand in 2020, \$8.15 million less than the \$8.64 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E increased its overall actual spend from \$488 thousand to \$8.43 million, resulting in an underspend amount of \$211 thousand.
Verification of Funding	5.3.2.1.2	Advanced weather monitoring and weather stations, Wildfire Cameras	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.2.1.3	B.10 - Weather Stations	Target Goal Not Met	PG&E target: (400) units, PG&E self-reported: (378) actual units

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Verification of Funding	5.3.2.1-3	Advanced weather monitoring and weather stations, Fire Detection & Alerting	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.2.3	B.7 - SmartMeters - Partial Voltage Detection	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.2.6	B.8 - Sensor IQ Pilot Deployment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.2-1	Electric Transmission	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.2-3	Continuous monitoring sensors	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.3.1	Electric Transmission	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.5.1	F.1 - Safety and Infrastructure Protection Teams (SIPT)	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.6	Weather forecasting and estimating impacts on electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.7-1	Other, Wildfire Safety Operations Center (WSOC)	Budget Underspent by \$5.56 million, 58% of total budget (2020 ARC Report). Budget Underspent by \$4.64 million, 48% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$4.08 million in 2020, \$5.56 million less than the \$9.64 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E increased the actual spend amount from \$4.08 million to \$5.0 million, still resulting in an underspend amount of \$4.64 million.



Verification of Funding	5.3.3.1	Capacitor maintenance and replacement program	Budget Underspent by \$8.18 million, 49% of the total budget (2020 ARC Report). Budget Overspent by \$1.03 million, 14% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$8.56 million in 2020, less than the \$16.74 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$16.74 million to \$7.53 million, resulting in an over-spend of 1.03 million. The actual spend of \$8.56 million did not change in both reports.
Verification of Funding	5.3.3.10	Maintenance, repair, and replacement of connectors, including hotline clamps	Budget Underspent by \$32.74 million, 78% of the total budget (2020 ARC Report). Budget Overspent by \$4.46 million, 95% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$9.17 million in 2020, less than the \$41.91 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$41.91 million to \$4.70 million, resulting in an overspend of 4.46 million. The actual spend of \$9.17 million did not change in both reports.
Verification of Funding	5.3.3.11-1	Mitigation of impact on customers and other residents affected during PSPS event	Budget Underspent by \$259.26 million, 60% of total budget.	PG&E spent \$174.40 million in 2020, which is less than the reported budget of \$433.66 million. PG&E cited strategic shifts to several initiatives and partial 2020 costs recorded in 2021 as



				part of the under-spend.
Verification of Funding	5.3.3.12-1	Substation Animal Abatement	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.3.12-2	Transmission Line Initiatives	Budget Underspent by \$7.95 million, 75% of the total budget (2020 ARC Report). Budget Underspent by \$115 thousand, 4% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$2.68 million in 2020, less than the \$10.63 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$10.63 million to \$2.79 million, resulting in an under-spend of 115 thousand. The actual spend of \$2.68 million did not change in both reports.
Verification of Funding	5.3.3.14	Transformers maintenance and replacement	Budget Overspent by \$52.66 million, 144% of total budget (2020 ARC Report). Budget Underspent by \$30.87 million, 26% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$89.34 million in 2020, \$52.66 million more than the \$36.68 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided by PG&E on June 9th to the IE (2020 Actual vs. 2020 Plan). PG&E increased its overall budget from \$36.68 million to \$120.21 million, resulting in an



				underspend amount of \$30.87 million.
Verification of Funding	5.3.3.15	Transmission tower maintenance and replacement	Budget Underspent by \$191.85 million, 68% of total budget (2020 ARC Report). Budget Underspent by \$16.28 million, 15% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$92.16 million in 2020, less than the \$284.01 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$284.01 million to \$108.44 million, still resulting in an underspend amount of \$16.28 million.
Verification of Funding	5.3.3.17.3	Relationship Between System Hardening and Enhanced Vegetation Management	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.3.18.1	C.7 - System Protection deploy DCD (reclosers)	Unused Budget of \$11.30 million, 100% of total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$11.30 million activity/initiative in 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$11.30 million initiative/activity.
Verification of Funding	5.3.3.2-2	Circuit breaker maintenance and installation to de-energize lines upon detecting a fault	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.3.3	Covered conductor installation	Unused Budget of \$17.02 million, 100%	PG&E did not spend or record any allocation

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			of total budget (2020 ARC Report).	of costs spent for this \$17.02 million activity/initiative in 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$17.02 million initiative/activity.
Verification of Funding	5.3.3.5	Cross-arm maintenance, repair, and replacement	Budget Underspent by \$22.58 million, 25% of the total budget (2020 ARC Report). Budget Underspent by \$10.58 million, 13% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent 67.92 million in 2020, less than the \$90.50 million budget in the 2020 ARC Report for the 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$90.50 million to \$78.51 million, resulting in an underspend amount of \$10.58 million. The actual spend of \$67.92 million did not change in both reports.
Verification of Funding	5.3.3.6	Distribution pole replacement and reinforcement, including with composite poles	Budget Overspent by \$31.09 million, 15% of the total budget (2020 ARC Report). Budget Underspent by \$14.28 million, 6% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan)	PG&E spent \$243.57 million in 2020, \$31.09 million more than the \$212.48 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE



				(2020 Actual vs. 2020 Plan), PG&E increased its overall budget from \$212.48 million to \$257.85 million, resulting in an underspend amount of \$14.28 million.
Verification of Funding	5.3.3.7	C.12 - Expulsion Fuse Replacement (non-exempt equipment)	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.3.8-1	C.2 - Distribution Sectionalizing (automated devices)	Budget Underspent by \$13.35 million, 16% of the total budget (2020 ARC Report). Budget Overspent by \$6.67 million, 11% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$70.05 million in 2020, less than the \$83.39 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$83.39 million to \$63.37 million, resulting in an overspend of 6.67 million. The actual spend of \$70.05 million did not change in both reports.
Verification of Funding	5.3.3.8-2	C.4 -Transmission Line Evaluation for PSPS Scoping	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.3.8-3	C.1 - SCADA Transmission Switching (switches)	Budget Underspent by \$11.06 million, 99% of the total budget (2020 ARC Report).	PG&E spent \$119 thousand in 2020, less than the \$11.18 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget



				from \$11.18 million to \$0, (no budget), and the actual spend was also decreased to \$0 (no spend).
Verification of Funding	5.3.3.8-5	C.3 - Remote Grids	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.3.9-2	Replacement of Legacy 4C Controllers (reclosers)	Unused Budget of \$3.49 million, 100% of total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$3.49 million activity/initiative in 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$3.49 million initiative/activity.
WMP Activity Completion	5.3.3.9-2	Replacement of Legacy 4C Controllers (reclosers)	Activity In Progress	Compliant with the 2020 WMP, per 2020 Q4 QIU and 2021 WMP goals to replace remaining 4C Controllers. See Verification of Funding related to the no spend related to this activity.
Verification of Funding	5.3.3.9-3	Installation of system automation equipment	Unused Budget of 4.09 million, 100% of the total budget (2020 ARC Report). Budget Underspent by \$6.20 million, 26% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E did not spend or record any allocation of costs spent for this \$4.09 million activity/initiative in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020

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				Plan), PG&E increased its overall budget from \$4.09 million to \$23.43 million. Additionally, a spend amount of 17.24 million was allocated to this activity/initiative. The changes to the budget and spend resulted in an underspend of 6.20 million.
WMP Activity Completion	5.3.4.1	D.2 - Distribution HFTD Inspections (poles)	8% error rate on inspections	Noted discrepancies within inspection reports reviewed (written content did not align with images)
Verification of Funding	5.3.4.1	D.2 - Distribution HFTD Inspections (poles)	Budget Overspent by \$131.61 million, 13,084% of the total budget (2020 ARC Report). Budget Underspent by \$22.89 million, 15% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$132.61 million in 2020, \$131.61 million more than the \$1.01 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan v2), PG&E increased its overall budget from \$1.01 million to \$155.50 million, resulting in an underspend amount of \$22.89 million.
Verification of Funding	5.3.4.10	Other discretionary inspection of transmission electric lines and equipment, beyond inspections mandated by rules and regulations	Budget Underspent by \$59.71 million, 99% of the total budget (2020 ARC Report). Budget Fully Spent (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$347 thousand in 2020, less than the \$60.05 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020



				Plan), PG&E reduced its overall budget from \$60.05 million to \$347 thousand, resulting in a full spend for the activity/initiative.
Verification of Funding	5.3.4.11	Patrol inspections of distribution electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.4.12	Patrol inspections of transmission electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.4.13	Pole Loading Calculations and Desktop Validation	Budget Underspent by \$19.40 million, 51% of total budget (2020 ARC Report). Budget Overspend by \$4.40 million, 31% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$18.61 million in 2020, \$19.40 million less than the \$38.0 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced the budget from \$38.0 million to \$14.20 million, resulting in an overspend amount of \$4.40 million.
Verification of Funding	5.3.4.14	Quality assurance / quality control of inspections	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.4.15-1	D.4 - Substation HFTD Inspections (substations)	Budget Overspent by \$11.96 million, 133% of the total budget (2020 ARC Report). Budget Underspent by \$8.80 million, 30% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$20.95 million in 2020, \$11.96 million more than the \$8.99 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020



				Plan v2), PG&E increased its overall budget from \$8.99 million to \$29.75 million, resulting in an underspend amount of \$8.8 million.
Verification of Funding	5.3.4.2	D.3 - Transmission HFTD Inspections (structures)	Budget Overspent by \$89.44 million, 21,640% of the total budget (2020 ARC Report). Budget Underspent by \$52.47 million, 37% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$89.86 million in 2020, \$89.44 million more than the \$413 thousand budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to the reconciliation spreadsheet provided on June 9th to the IE by PG&E (2020 Actual vs. 2020 Plan), the overall budget increased from \$413 thousand to \$142.33 million, resulting in an underspend amount of \$52.47 million.
Verification of Funding	5.3.4.4	Infrared inspections of distribution electric lines and equipment	Budget Overspent by \$865 thousand, 124% of the total budget (2020 ARC Report). Budget Underspent by \$632 thousand, 29% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$1.56 million in 2020, \$865 thousand more than the \$697 thousand budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E increased its overall budget from \$697 thousand to \$2.19 million, resulting in an underspend amount of \$632 thousand.



Verification of Funding	5.3.4.9	D.1 - Ultrasonic Inspections Pilot	Unused Budget of \$93.18 million, 100% of the total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$93.18 million activity/initiative in the 2020 ARC Report for 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$93.18 million initiative/activity.
Verification of Funding	5.3.5.10	Other discretionary inspections of vegetation around transmission electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.5.11	Patrol inspections of vegetation around distribution electric lines and equipment	Unused Budget of \$105.35 million, 100% of total budget.	PG&E did not spend or record any allocation of costs spent for this \$105.35 million 2020 WMP initiative/activity.
Verification of Funding	5.3.5.12	Patrol inspections of vegetation around transmission electric lines and equipment	Unused Budget of \$35.89 million, 100% of total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$35.89 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E decreased the budget by the full budget amount of \$35.89, resulting in a no spend.



Verification of Funding	5.3.5.14	Recruiting and training of vegetation management personnel	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.5.16	Removal and remediation of trees with strike potential to electric lines and equipment	Unused Budget of \$14.64 million, 100% of the total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$14.64 million in 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$14.64 million initiative/activity.
Verification of Funding	5.3.5.17	Substation inspection	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.5.17-2	Substation inspection, Transmission substation	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.5.18-2	Substation vegetation management, Maintenance substation transmission	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.5.20	Vegetation management to achieve clearances around electric lines and equipment	Approximately 7.5% non-compliant	Compliant with 2020 WMP per 92% of field site observations
Verification of Funding	5.3.5.20	Vegetation management to achieve clearances around electric lines and equipment	Unused Budget of \$438.31 million, 100% of the total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$438.31 million in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE



				(2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$438.31 million initiative/activity.
Verification of Funding	5.3.5.3	Detailed inspections of vegetation around transmission electric lines and equipment	Budget Overspent by \$117.83 million, 903% of the total budget (2020 ARC Report). Budget Underspent by \$9.19 million, 7% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$130.88 million in 2020, \$117.83 million more than the \$13.05 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan v2), PG&E increased its overall budget from \$13.05 million to \$140.07 million, resulting in an underspend amount of \$9.19 million.
Verification of Funding	5.3.5.5	Fuel management and reduction of “slash” from vegetation management activities	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.5.6	Improvement of inspections	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.5.7	LiDAR inspections of vegetation around distribution electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.5.8	LiDAR inspections of vegetation around transmission electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.5.9	Other discretionary inspections of vegetation around distribution electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.



Verification of Funding	5.3.5.9	Other discretionary inspections of vegetation around distribution electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.6.2	F.1 - SIPT Crews and Engines Resourcing	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.6.3	F.5 - Implement SafetyNet Observation Cards	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.6.3	F.5 - Implement SafetyNet Observation Cards	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.6.5	PSPS events and mitigation of PSPS impacts, Distribution and Transmission	Budget Underspent by \$129.55 million, 62% of total budget.	<p>PG&E spent \$80.81 million in 2020, less than the \$210.36 million in WMP.</p> <p>According to a reconciliation spreadsheet provided on June 9th (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$210.36 million to \$139.05, resulting in an underspent amount of \$58.58 million.</p> <p>PG&E stated that spend reductions in planned PSPS event costs were attributed to investments made to mitigate PSPS events, such as fire risk modeling, system hardening, and sectionalizing devices.</p>
Verification of Funding	5.3.6.5-1	PSPS events and mitigation of PSPS impacts	Budget Underspent by \$129.55 million, 62% of the total budget (2020 ARC Report).	PG&E spent \$80.81 million in 2020, less than the \$210.36 million budget in the 2020 ARC Report for 2020 WMP.



				According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$210.36 million to \$153.61, resulting in an underspend amount of \$72.80 million.
Verification of Funding	5.3.6.5-2	PSPS events and mitigation of PSPS impacts	Budget Underspent by \$129.55 million, 62% of the total budget (2020 ARC Report).	PG&E spent \$80.81 million in 2020, less than the \$210.36 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$210.36 million to \$153.61, resulting in an underspend amount of \$72.80 million.
Verification of Funding	5.3.6.6	Stationed and on-call ignition prevention and suppression resources and services	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.7.3	Documentation and disclosure of wildfire-related data and algorithms	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.7.4	Define and track ignition near miss events	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.9.1	Adequate and trained workforce for service restoration	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.9.2-1	Community outreach, public awareness, and communications efforts	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.



Verification of Funding	5.3.9.4	I.5 - CERP (Update and Publish)	Budget Underspent by \$21.18 million, 82% of total budget (2020 ARC Report). Budget Overspend by \$3.54 million, 359% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$18.61 million in 2020, \$19.40 million less than the \$38.0 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced the budget from \$38.0 million to \$14.20 million, resulting in an overspend amount of \$4.40 million.
Verification of Funding	5.3.9.5	Preparedness and planning for service restoration	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.9.6	Protocols in place to learn from wildfire events	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.9.7	Resource Sharing to Support Inspection Work and Other Aspects of the Wildfire Management Plan	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.1.6	7.3.1.6 Weather-Driven Risk Map and Modelling Based on Various Relevant Weather Scenarios	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.1.6	7.3.2.1.6 Advanced weather monitoring and weather stations, Other Meteorology Tools and Upgrades	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.

5 APPENDIX

APPENDIX A – LIST OF 2020 WMP ACTIVITIES

APPENDIX B – LIST OF DOCUMENTS REVIEWED

APPENDIX C – DATA AND INTERVIEW REQUESTS

APPENDIX D – SME INTERVIEW SUMMARY

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APPENDIX I – PG&E’S VARIANCE EXPLANATION SPREADSHEET RECEIVED ON JUNE 9TH, 2021 TITLED: IE ANALYSIS 2020 ACTUAL VS. 2020 PLAN V2

APPENDIX J – 3.1.2 LARGE VOLUME QUANTIFIABLE GOAL/TARGET – FIELD VERIFIABLE



Appendix A List of 2020 WMP Activities

SOW Category	2020 WMP Activities	WMP Table # / Category	2020 Initiative No.	Initiative Activity
WMP Activity Completion	d. Qualitative Goal/Target	5.1.D New or Emerging Technologies	5.1.D.3.6	Rapid Earth Fault Current Limiter (REFCL) Pilot
WMP Activity Completion	d. Qualitative Goal/Target	5.1.D New or Emerging Technologies	5.1.D.3.8	Remote Grids 5.3.3.8-5
WMP Activity Completion	d. Qualitative Goal/Target	5.3.1 Risk Assessment & Mapping	5.3.1.1	A summarized risk map that shows the overall ignition probability and estimated wildfire consequence along the electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.1 Risk Assessment & Mapping	5.3.1.2	Climate-driven risk map and modelling based on various relevant weather scenarios
WMP Activity Completion	d. Qualitative Goal/Target	5.3.1 Risk Assessment & Mapping	5.3.1.3	Ignition probability mapping showing the probability of ignition along the electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.1 Risk Assessment & Mapping	5.3.1.4	Initiative mapping and estimation of wildfire and PSPS risk-reduction impact
WMP Activity Completion	d. Qualitative Goal/Target	5.3.1 Risk Assessment & Mapping	5.3.1.5	Match drop simulations showing the potential wildfire consequence of ignitions that occur along the electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.1 Risk Assessment & Mapping	5.3.1.6	Weather-driven risk map and modelling based on various relevant weather scenarios
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.1	Upgrade POMMS Model to 2km
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.1	Wind Event Forecasting Tool (Diablo)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.1	Re-calibrate the OPW and FPI models
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.2	Wildfire Spread Model - Operational Impacts
WMP Activity Completion	a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.2 Situational Awareness & Forecasting	5.3.2.1.3	Weather Stations
WMP Activity Completion	a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.2 Situational Awareness & Forecasting	5.3.2.1.4	HD Cameras Deployment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.5	NOAA-20 Satellite Data
WMP Activity Completion	c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.6	Live Fuel Moisture (LFM) Sampling
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.7	Addressing Weather Forecast Model Uncertainty
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.8	PG&E Lightning Detection Network (PLDN)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.9	Information Sharing
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.10	Collaborative Efforts to Advance Fire Science
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.2.1	Electric Transmission
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.2.2	Electric Distribution
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.2 Situational Awareness & Forecasting	5.3.2.2.3	SmartMeters - Partial Voltage Detection
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.2.4	Distribution Fault Anticipation (DFA) Technology
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.2.5	Early Fault Detection (EFD)
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.2 Situational Awareness & Forecasting	5.3.2.2.6	Sensor IQ Pilot Deployment
WMP Activity Completion	c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.2.7	Line Sensor Devices
WMP Activity Completion	c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.2.8	Distribution Arcing Fault Signature Library
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.3.1	Electric Transmission
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.3.2	Electric Distribution
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.4	Forecast of a fire risk index, fire potential index, or similar

SOW Category	2020 WMP Activities	WMP Table # / Category	2020 Initiative No.	Initiative Activity
WMP Activity Completion	c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.5.1	Safety and Infrastructure Protection Teams (SIPT)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.5.2	Data collection
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.6	Weather forecasting and estimating impacts on electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.7	Wildfire Safety Operations Center (WSOC)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.1	Capacitor maintenance and replacement program
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.2	Circuit breaker maintenance and installation to de-energize lines upon detecting a fault
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.3	Covered conductor installation
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.4	Covered conductor maintenance
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.5	Crossarm maintenance, repair, and replacement
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.6	Distribution pole replacement and reinforcement, including with composite poles
WMP Activity Completion	a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.3 Grid Design & System Hardening	5.3.3.7	Expulsion Fuse Replacement (non-exempt equipment)
WMP Activity Completion	a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.3 Grid Design & System Hardening	5.3.3.8-1	Distribution Sectionalizing (automated devices)
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.3 Grid Design & System Hardening	5.3.3.8-2	Transmission Line Evaluation for PSPS Scoping
WMP Activity Completion	c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.8-3	SCADA Transmission Switching (switches)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.8-4	System Hardening Criteria Refinement (Dist.)
WMP Activity Completion	c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.8-6	Microgrids for PSPS Mitigation (operationalized units)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.9-1	System Hardening (SCADA enabled circuit breakers)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.9-2	Replacement of Legacy 4C Controllers (reclosers)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.10	Maintenance, repair, and replacement of connectors, including hotline clamps
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.11	Mitigation of impact on customers and other residents affected during PSPS event
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.12-1	Substation Animal Abatement
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.12-2	Transmission Line Initiatives
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.12-3	Wildfire Safety Inspection Program Distribution Repair Work
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.3 Grid Design & System Hardening	5.3.3.13	Pole Loading Assessments
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.14	Transformers maintenance and replacement
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.15	Transmission tower maintenance and replacement
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.16	Undergrounding of electric lines and/or equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.17.1	System Hardening Design Guidance
WMP Activity Completion	c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.17.2	Butte County Rebuild (UG de-energized miles)
WMP Activity Completion	a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.3 Grid Design & System Hardening	5.3.3.17.2-1	System Hardening (line miles)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.17.3	Relationship Between System Hardening and Enhanced Vegetation Management
WMP Activity Completion	a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.3 Grid Design & System Hardening	5.3.3.17.4	Non-Exempt Surge Arrester Replacement Program
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.17.5	Transmission Line System Hardening Overview and Strategy
WMP Activity Completion	a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.3 Grid Design & System Hardening	5.3.3.18.1	System Protection deploy DCD (reclosers)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.18.1	Increased Protection Sensitivity
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.18.2	Transmission Line Modeling
WMP Activity Completion	d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.18.3	Building and Sourcing Services
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.4 Asset Management & Inspections	5.3.4.1	Distribution HFTD Inspections (poles)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.1	Distribution WSIP 2019 FMEA expansion
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.4 Asset Management & Inspections	5.3.4.2-1	Transmission HFTD Inspections (structures)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.2-2	Transmission WSIP 2019 FMEA expansion

SOW Category	2020 WMP Activities	WMP Table # / Category	2020 Initiative No.	Initiative Activity
WMP Activity Completion	d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.3	Ultrasonic Inspections Pilot
WMP Activity Completion	d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.4	Infrared inspections of distribution electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.5	Predictive Modelling (high risk conductors)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.6	Intrusive pole inspections
WMP Activity Completion	d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.7	LiDAR inspections of distribution electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.8	VM utilizing LiDAR data to support EVM program
WMP Activity Completion	d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.9	Ultrasonic Inspections Pilot
WMP Activity Completion	d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.10	Other discretionary inspection of transmission electric lines and equipment, beyond inspections mandated by rules and regulations
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.4 Asset Management & Inspections	5.3.4.11	Patrol inspections of distribution electric lines and equipment
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.4 Asset Management & Inspections	5.3.4.12	Patrol inspections of transmission electric lines and equipment
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.4 Asset Management & Inspections	5.3.4.13	\ole Loading Calculations and Desktop Validation
WMP Activity Completion	d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.14	Quality assurance / quality control of inspections
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.4 Asset Management & Inspections	5.3.4.15	Substation HFTD Inspections (substations)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.1	Additional efforts to manage community and environmental impacts
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.5 Vegetation Management & Inspections	5.3.5.2	Detailed inspections of vegetation around distribution electric lines and equipment
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.5 Vegetation Management & Inspections	5.3.5.3	Detailed inspections of vegetation around transmission electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.4	Emergency response vegetation management due to red flag warning or other urgent conditions
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.5	Fuel management and reduction of “slash” from vegetation management activities
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.6	Improvement of inspections
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.7	LiDAR inspections of vegetation around distribution electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.8	LiDAR inspections of vegetation around transmission electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.9	Other discretionary inspections of vegetation around distribution electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.10	Other discretionary inspections of vegetation around transmission electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.11	Patrol inspections of vegetation around distribution electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.12	Patrol inspections of vegetation around transmission electric lines and equipment
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.13	Quality assurance / quality control of vegetation inspections
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.14	Recruiting and training of vegetation management personnel
WMP Activity Completion	a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.5 Vegetation Management & Inspections	5.3.5.15	EVM line miles
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.16	Removal and remediation of trees with strike potential to electric lines and equipment
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.5 Vegetation Management & Inspections	5.3.5.17	Substation inspection
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.18	Substation vegetation management

SOW Category	2020 WMP Activities	WMP Table # / Category	2020 Initiative No.	Initiative Activity
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.19	Vegetation inventory system
WMP Activity Completion	d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.20	Vegetation management to achieve clearances around electric lines and equipment
WMP Activity Completion	a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.6 Grid Operations & Operating Protocols	5.3.6.1	Removal of TripSaver Auto-Reclosing Functionality
WMP Activity Completion	c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.6.2	SIPT Crews and Engines Resourcing
WMP Activity Completion	d. Qualitative Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.6.3	Implement SafetyNet Observation Cards
WMP Activity Completion	d. Qualitative Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.6.4	Protocols for PSPS Re-Energization
WMP Activity Completion	d. Qualitative Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.6.5	PSPS events and mitigation of PSPS impacts
WMP Activity Completion	c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.6.6	Stationed and on-call ignition prevention and suppression resources and services
WMP Activity Completion	d. Qualitative Goal/Target	5.3.7 Data Governance	5.3.7.1	Consolidate Data Into Single Repository
WMP Activity Completion	d. Qualitative Goal/Target	5.3.7 Data Governance	5.3.7.2	Collaborative research on utility ignition and/or wildfire
WMP Activity Completion	d. Qualitative Goal/Target	5.3.7 Data Governance	5.3.7.3	Documentation and disclosure of wildfire-related data and algorithms
WMP Activity Completion	d. Qualitative Goal/Target	5.3.7 Data Governance	5.3.7.4	Define and track ignition near miss events
WMP Activity Completion	d. Qualitative Goal/Target	5.3.8 Resource Allocation Methodology	5.3.8.1	Allocation methodology development and application
WMP Activity Completion	d. Qualitative Goal/Target	5.3.8 Resource Allocation Methodology	5.3.8.2	Risk reduction scenario development and analysis
WMP Activity Completion	d. Qualitative Goal/Target	5.3.8 Resource Allocation Methodology	5.3.8.3	Risk spend efficiency analysis
WMP Activity Completion	d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.1	Adequate and trained workforce for service restoration
WMP Activity Completion	d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.2-1	Community outreach, public awareness, and communications efforts
WMP Activity Completion	b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.9 Emergency Planning & Preparedness	5.3.9.2-2	Community Based Organizations (CBOs) Coordination
WMP Activity Completion	d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.3-1	Customer support in emergencies
WMP Activity Completion	d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.3-2	CRC Mitigate PSPS Customer Impacts
WMP Activity Completion	d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.3-3	PSPS - 24/7 Information Updates
WMP Activity Completion	d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.4	CERP (Update and Publish)
WMP Activity Completion	d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.5-1	Emergency Preparation and Restoration
WMP Activity Completion	d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.5-2	PSPS - Service Restoration
WMP Activity Completion	d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.5-3	PSPS Customer Impact Mitigation
WMP Activity Completion	d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.6	Protocols in place to learn from wildfire events
WMP Activity Completion	d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.7	Resource Sharing to Support Inspection Work and Other Aspects of the Wildfire Management Plan
WMP Activity Completion	d. Qualitative Goal/Target	5.3.10 Stakeholder Cooperation & Community Engagement	5.3.10.1	Community engagement
WMP Activity Completion	d. Qualitative Goal/Target	5.3.10 Stakeholder Cooperation & Community Engagement	5.3.10.2	Cooperation and best practice sharing with agencies outside CA
WMP Activity Completion	d. Qualitative Goal/Target	5.3.10 Stakeholder Cooperation & Community Engagement	5.3.10.3	Cooperation with suppression agencies
WMP Activity Completion	d. Qualitative Goal/Target	5.3.10 Stakeholder Cooperation & Community Engagement	5.3.10.4	Forest service and fuel reduction cooperation and joint roadmap



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VERITAS



Appendix B List of Documents Reviewed

Item No.	Documents Reviewed - Public	Document Date
1	2021 Wildfire Mitigation Plan Report Rulemaking 18-10-007	Feb-21
2	PG&E Tests New Wildfire-Detection Power Line Tech in Calistoga News Article (https://sanfrancisco.cbslocal.com/2021/01/21/pge-wildfire-prevention-tech-calistoga-refcl-australia-texas-am/)	Jan-21
3	Request for Proposal (RFP) EPIC Capacitive Balancing Units	Nov-19
4	PG&E EPIC Project #5 - New Forecast Methods for Improved Storm Damage Modeling, Notice of Upcoming Bid Solicitation	N/A
5	PG&E Smart Grid Annual Report (2020) Rulemaking 08-12-009	Jul-05
6	PG&E Fire-Detection Satellite Map (https://www.pge.com/en_US/safety/emergency-preparedness/natural-disaster/wildfires/fire-detection-satellite-map.page)	N/A
7	PG&E Quarterly Initiative Update (QIU) for First Quarter 2021	
8	PG&E Wildfire Mitigation Plan Update - Self Report Notification Weather Stations and High Definition Cameras	Jun-21
9	PG&E's Online Weather Application and Map (https://pgewam.lovelytics.info/pge_weather_app/)	N/A
10	PG&E's Online Weather Awareness for the 7-Day PSPS Forecast (https://www.pge.com/en_US/safety/emergency-preparedness/natural-disaster/wildfires/pmps-weather-map.page)	N/A
11	Annual Electric Transmission Availability Performance Report Prepared by PG&E for California Independent System Operator (CAISO)	Jul-05
12	SJSU Fire Weather Research Online Workshop Funded by PG&E (https://www.fireweather.org/2021-workshop)	N/A
13	PG&E Community Wildfire Safety Program Presentation to Alameda County	Jun-20
14	PG&E 2019 and 2020 Wildfire Mitigation Plan Update - Enhanced Inspections	Mar-21
15	PG&E 2019 and 2020 Wildfire Mitigation Plan Update - Self Report Notification Hydroelectric Substations	Mar-21
16	Self-Report Notification Update: Fire Ignition Report	Mar-21
17	March 3, 2021 – Case No. 14-CR-00175-WHA; Document 1322 PG&E's Response to Order to Show Cause Why Further Conditions of Probation by Amici Should Not Be Impose	Mar-21
18	Voluntary Self-Identified Notification: GO 165 and WMP Enhanced Inspections	May-21
19	PG&E Utility Procedure TD-3322M Substation Maintenance and Construction (SM&C) Manual Circuit Breakers Booklet	Jun-19
20	PG&E TD-9001B-009 Rev 2 the Fire Rebuild Design Guidance for System Hardening is continuing to be evolved by PG&E	Nov-19

21	Wildfire Study Egress Study for San Lorenzo Valley, CA (https://www.kldcompanies.com/wildfire-study/)	2019
22	PG&E Community Wildfire Safety Program Presentation for Santa Cruz County	Jun-20
23	A2006012 Application of PG&E 2020 Risk Assessment and Mitigation Phase Report (RAMP)	Jun-20
24	PG&E Calculating Meteorological and PG&E Fire risk PG&E PSPS Decision-Making Guidance-3-Atch1-1	Mar-20
25	CPUC Stakeholders 2021 Wildfire Mitigation Plans and Safety Culture Assessments WSD-011 Agenda ID#18852	Oct-20
26	Assigned Commissioners Ruling Regarding Development of Safety and Operational Metrics Rulemaking 20-07-013	Nov-20
27	PG&E Vegetation Management WSD Presentation Wildfire Risk Model	Feb-21
28	SJSU Fire Weather Research Online Fuel Moisture Website (https://www.fireweather.org/fuel-moisture)	N/A
29	National Fuel Moisture Database (https://www.wfas.net/index.php/national-fuel-moisture-database-moisture-drought-103)	N/A
30	North American Electric Reliability Corporation (NERC) Wildfire Mitigation Reference Guide	Jan-21
31	US Department of Energy Wildfire Webinar Series: Webinar 1 - Sensing and Detection, Fire Testing Capabilities	8-Apr-21
32	Senate Bill 901 (https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB901)	N/A
33	PG&E Instagram Post Microgrid Installation In Mariposa County in HFTD Areas	8-Jun-21
34	PG&E News Release "PG&E Strengthening Community Resilience with Comprehensive Microgrid Solutions" (https://www.pge.com/en/about/newsroom/newsdetails/index.page?title=20200611_pge_strengthening_community_resilience_with_comprehensive_microgrid_solutions)	11-Jun-20
35	Action News Now Article "PG&E Continues Moving Power lines Underground in Paradise" (https://www.actionnewsnow.com/content/news/PGE-continues-moving-powerlines-underground-in-Paradise-572976261.html)	5-Nov-20
36	Paradise Post Article "Underground Utility Hearing is Tuesday" (https://www.paradisepost.com/2020/10/10/underground-utility-hearing-is-tuesday/)	20-Oct-20
37	T&Dworld Article "As Paradise Rebuild Begins, PG&E Commits to Underground Power Lines" (https://www.tdworld.com/intelligent-undergrounding/article/20972642/as-paradise-rebuild-begins-pge-commits-to-underground-power-lines)	29-May-19
38	PG&E Advice Letter 6017E Remote Grid Standalone Power System Supplemental Provisions Agreement	7-Apr-21
39	PG&E provided PG&E Inventory Attachment 1	7-May-21
40	PG&E provided 2020 WMP List of QA-QC Activities	7-May-21
41	PG&E Scaling Deployment of Grid Sensor Technologies to Proactively Mitigate Wildfire Risk: https://www.pgecurrents.com/2021/01/12/pge-scaling-deployment-of-grid-sensor-technologies-to-proactively-mitigate-wildfire-risk/	12-Jan-21

	SEL-T400L Time Domain Line Protection: https://cms-cdn.selinc.com/assets/Literature/Product%20Literature/Data%20Sheets/T400L_DS_20210304.pdf?v=20210318-130701	13-Jul-05
42		
43	SEL and PNM apply Time-Domain Technology to Protect High-Voltage Transmission Lines: https://www.tdworld.com/test-and-measurement/article/20971800/sel-and-pnm-apply-timedomain-technology-to-protect-highvoltage-transmission-lines	15-Oct-18
44	California Utilities Emergency Association (CUEA) Members Page (https://www.cuea-inc.com/about-us/membership/)	N/A
45	Western Region Mutual Assistance (WRMAA) Member Company Territory and Contacts (https://www.westernenergy.org/wrmaa-resources/)	N/A
46	PG&E Public Safety Power Shutoff (PSPS) Report to the CPUC De-energization Event - Lessons Learned	30-Oct-21
47	PG&E Company Emergency Response Plan (CERP)	1-Jul-19
48	Electric Program Investment Charge (EPIC) 2020 Annual Report	1-Mar-21
49	Electric Program Investment Charge EPIC 2.34 Predictive Risk Identification with Radio Frequency (RF) Added to Line Sensors Report	12-Nov-20
50	2020 PG&E EPIC Annual Project Status	N/A
51	TD-3222M Substation Maintenance and Construction Manual Circuit Breakers Booklet	6/2019 Rev. 10
52	TE-3322S Substation Equipment Maintenance Requirements	6-Nov-19
53	PG&E Quarterly Initiative Update (QIU) for Fourth Quarter 2020	
54	PGE 2020 ARC 20210331 2020 Variance Explanations (Excel File)	31-Mar-21
55	IE Analysis 2020 Actual vs. 2020 Plan v2 (Excel File)	6-Jun-21
56	Final Independent Evaluator Scope of Work for the Review of Compliance with 2020 WMP	21-Apr-21
57	Wildfire Safety Division 2021 Guidance on Engagement of Independent Evaluators Pursuant to Public Utilities Code 8386.3	6-Apr-21

Item No.	Documents Reviewed - Response to Data Requests	Document Date
1	Enhanced Vegetation Management Work Verification Responsibilities, PG&E (For Internal Use Only)	Not Dated
2	Enhanced Vegetation Management Survey 123 Guide, PG&E (For Internal Use Only)	1-May-20
3	Work Verification Inspector Training	Not Dated
4	PG&E Utility Procedure: TD-7102P-17 Vegetation Management Priority Tag Procedure, Rev. 0	6-Nov-20
5	2020 WMP F.3 TripSavers, PG&E (internal document)	Not Dated
6	PG&E Ad Hoc Map	© 2019
7	PG&E Construction Sketch, Notif: 114705149, JPA#PG190035TR, Rev. 0	27-Mar-19
8	PG&E Wildfire Hardening, Notif: 114705149, PM:74021961, Rev. 1	30-Apr-19
9	A Framework for Risk-Based Transmission Line Asset Management and Operability Assessment, Rev. 5 Draft	1-Jun-20
10	A Framework for Risk-Based Transmission Line Asset Management and Operability Assessment, Rev. 6 Draft	1-Jun-21
11	Description of Operation Fast Tripping Scheme (FTS)	1-Dec-21

12	PG&E Utility Standard: PSPS-1000S, Public Safety Power Shutoff (PSPS), Rev. 0	28-May-20
13	PG&E Utility Standard: PSPS-1000P-01, Public Safety Power Shutoff for Electric Transmission and Distribution, Rev. 1	25-Aug-20
14	Enhanced Vegetation Management Pre-Inspector Trim Code Matrix, PG&E (For Internal Use Only)	EVM 2020
15	PG&E Utility Bulletin: TD-3322B-065, Wildfire Defensible Space for Substations, Rev. 0	8-May-19
16	Substation Vegetation Job Aid, TD-3322B-066-JA21, Rev. 1	6-May-19
17	PG&E Utility Standard: TD-7103S, Transmission Vegetation Management Standard, Rev. 2	1-Oct-16
18	PG&E Utility Procedure: TD-7103P-01, Transmission Non-Orchard Routine Patrol Procedure (TRPP), Rev. 2	1-Oct-16
19	PG&E Utility Procedure: TD-7103P-02, Transmission Orchard Orchard Patrol Procedure (TOPP), Rev. 2	1-Oct-16
20	PG&E Utility Procedure: TD-7103P-03, Transmission Right-of-Way Maintenance Procedure (TROW), Rev. 2	1-Oct-16
21	PG&E Utility Procedure: TD-7103P-04, Transmission Integrated Vegetation Management Procedure (TIVM), Rev. 2	1-Oct-16
22	PG&E Utility Procedure: TD-7103P-05, Transmission Vegetation Management Imminent Threat Procedure, Rev. 2	1-Oct-16
23	PG&E Utility Procedure: TD-7103P-06, Vegetation Management Hazard Notification Procedure, Rev. 5	24-Feb-21



DATA REQUEST

Data Request Number: 001

Name: Omneya B. Salem
 Title: Financial Audit Lead
 Company: C2 Group

Data Request Date: 05.13.2021

Email: omneya.salem@conekt2.biz
 Phone #: 858-449-8118
 Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Actual	Method	Data Request
1. Weather Stations	Each	B.10 - 5.3.2.1.3	400	404	Field Image	List / Locations in Excel or format that can be imported into a database.
2. HD Cameras	Each	B.9 - 5.3.2.1.4	200	216	Office/Field Visual	List / IP Addresses or Locations in Excel or format that be inported into a database.
3. System Hardening	Miles	C.10 - 5.3.3.17.2-1	221	342	Field Visual	List / Locations in Excel or format that can be imported into a database.
4. Expulsion Fuse Replacement (non-exempt equipment)	Each	C.12 - 5.3.3.7	625	643	Field Visual	List / Locations in Excel or format that can be imported into a database.
5. Distribution Sectionalizing (automated devices)	Each	C.2 - 5.3.3.8-1	592	603	Field Visual	List / Locations in Excel or format that can be imported into a database.
6. Non-Exempt Surge Arrester (replacement program)	Each	C.6 - 5.3.3.17.4	8,850	10,263	Field Visual	List / Locations in Excel or format that can be imported into a database.
7. System Protection deploy DCD (reclosers)	Each	C.7 - 5.3.3.18.1-1	100	126	Field Visual	List / Locations in Excel or format that can be imported into a database.
8. EVM (enhanced veg. management)	Miles	E.1 - 5.3.5.15	1,800	1,878	Field Visual	List / Locations in Excel or format that can be imported into a database.



DATA REQUEST

Data Request Number: 002

Name: Omneya B. Salem on behalf of Matt Matwijec

Title: BV Forestry Auditor

Company: BV

Data Request Date: 05.20.2021

Email: matthew.matwijec@bureauveritas.com

Phone #: 832-328-3287

Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Actual	Method	Data Request
1. EVM (enhanced veg. management)	Miles	E.1 - 5.3.5.14 / 5.3.5.15 / 5.3.5.16	1,800	1,878	Field Visual	To support field visual audits, please provide description of EVM activity at each lat/long. Location provided in response to Data Request 001
2. EVM (enhanced veg. management)	Miles	E.1 - 5.3.5.15	1,800	1,878	Field Visual	To support field visual audits, please provide examples of completed Quality Assurance (inspection checklists/ reports) for selected EVM treatments
3. EVM (enhanced veg. management)	N/A	E.1 - 5.3.5.15	N/A	N/A	Documentation Review	Please provide documents that outline the QA/QC processes and procedures that were followed to ensure the work was completed in a satisfactory manner.
4. EVM (enhanced veg. management)	N/A	5.3.5.4	N/A	N/A	Documentation Review	Per PG&E 2020-Q4 QIU, Please provide Priority 1 Condition in the VM Priority Tag Procedure (TD-7102P-17) referenced in section 7.3.5.4 (page 639 of the 2021 WMP)



DATA REQUEST

Data Request Number: 003

Name: Omneya B. Salem on behalf of Tom Lyons

Title: Electrical Engineer

Company: BV

Data Request Date: 05.25.2021

Email: Thomas.Lyons@bureauveritas.com

Phone #: 916-397-1657

Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Requested Sample Size (1)	Method	Data Request
1. Transmission Line Evaluation for PSPS Scoping	# of Transmission Lines in HFTD	5.3.3.8	552 total Transmission Lines	80	Review of Studies to determine if the line can be removed from future PSPS Events	Summaries of studies to determine if the line can be removed from future PSPS Events for 80 Transmission Lines in the Tier 3 and Tier 2 Zones. Documentation (PDF or other available format) of the HFTD
2. Transmission Structure Inspections	Number of Inspections	5.3.4.2	26,282	315	Review of Inspection Records	inspection records for 315 towers from the Tier 3 and Tier 2 Zones. If intrusive inspections, model of the test instrument used if other than drill and probe method Documentation (PDF or other available format) of the HFTD
3. Distribution Pole Inspections	Number of Inspections	5.3.4.1	339,728	800	Review of Inspection Records	inspection records for 800 distribution poles from the Tier 3 and Tier 2 Zones. If intrusive inspections, model of the test instrument used if other than drill and probe method.

(1) Sample Size based upon Mil Std 105E, General Inspection Level II, Normal



DATA REQUEST

Data Request Number: 004 (Associated with DR 003)

Name: Omneya B. Salem on behalf of Marc Underwood

Title: Project Manager

Company: BV

Data Request Date: 05.27.2021

Email: marc.underwood@bureauveritas.com

Phone #: 916-761-2416

Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Data Request
1. Transmission Line Evaluation for PSPS Scoping	Each	5.3.3.8	552 total Transmission Lines	List locations in Excel format with identifying information and locational information for all targets
2. Transmission Structure Inspections	Each	5.3.4.2	26,282	List locations in Excel format with identifying information and locational information for all targets
3. Distribution Pole Inspections	Each	5.3.4.1	339,728	List locations in Excel format with identifying information and locational information for all targets



DATA REQUEST

Data Request Number: 005

Name: Omneya B. Salem on behalf of Matt Matwijec

Title: BV Forestry Auditor

Company: BV

Data Request Date: 05.27.2021

Email: matthew.matwijec@bureauveritas.com

Phone #: 832-328-3287

Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Actual	Method	Data Request
1. EVM (enhanced veg. management)	N/A	E.1 - 5.3.5.1	N/A	N/A	Interview	Request for PG&E to identify and set up an interview with the subject matter expert(s) (SME) who is(are) familiar with section 5.3.5.1 of the WMP and the following: informing customers and communities about the vegetation management work taking place or planned to take place in their communities, and progress towards collaboration with local governments to address potential concerns about planned and ongoing EVM work.
2. EVM (enhanced veg. management)	N/A	E.1 - 5.3.5.13	N/A	N/A	Interview	Request for PG&E to identify and set up an interview with the subject matter expert(s) (SME) who is(are) familiar with section 5.3.5.1 of the WMP and the following: any QC and QA programs to assess the performance of vegetation management activities and to incorporate the lessons learned from prior years. Request for PG&E to identify and set up an interview with the subject matter expert(s) (SME) who is(are) familiar with section 5.3.5.1 of the WMP and the following:
3. EVM (enhanced veg. management)	N/A	E.1 - 5.3.5.14	N/A	N/A	Interview	On-boarding qualified pre-inspectors; identifying and hiring qualified tree workers; confirming that pre-inspectors and tree workers are properly trained and qualified. In addition, this person(s) should provide an update on 2020 totals for personnel and any change/ new training updates from the lessons learned from prior years.



DATA REQUEST

Data Request Number: 006

Name: Omneya B. Salem
 Title: Financial Audit Lead
 Company: C2 Group

Data Request Date: 06.01.2021

Email: omneya.salem@conekt2.biz
 Phone #: 858-449-8118
 Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Actual	Method	Data Request
3.d. Qualitative Goal/Target	N/A	5.3.1.1 - A summarized risk map that shows the overall ignition probability and estimated wildfire consequence along the electric lines and equipment	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Category: 5.3.1 Risk Assessment & Mapping. <u>The goal is cover all six items shown on the list in one session</u>
3.d. Qualitative Goal/Target	N/A	5.3.1.2 - Climate-driven risk map and modelling based on various relevant weather scenarios	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Category: 5.3.1 Risk Assessment & Mapping. <u>The goal is cover all six items shown on the list in one session</u>
3.d. Qualitative Goal/Target	N/A	5.3.1.3 - Ignition probability mapping showing the probability of ignition along the electric lines and equipment	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Category: 5.3.1 Risk Assessment & Mapping. <u>The goal is cover all six items shown on the list in one session</u>
3.d. Qualitative Goal/Target	N/A	5.3.1.4 - Initiative mapping and estimation of wildfire and PSPS risk-reduction impact	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Category: 5.3.1 Risk Assessment & Mapping. <u>The goal is cover all six items shown on the list in one session</u>
3.d. Qualitative Goal/Target	N/A	5.3.1.5 - Match drop simulations showing the potential wildfire consequence of ignitions that occur along the electric lines and equipment	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Category: 5.3.1 Risk Assessment & Mapping. <u>The goal is cover all six items shown on the list in one session</u>
3.d. Qualitative Goal/Target	N/A	5.3.1.6 - Weather-driven risk map and modelling based on various relevant weather scenarios	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Category: 5.3.1 Risk Assessment & Mapping. <u>The goal is cover all six items shown on the list in one session</u>



DATA REQUEST

Data Request Number: 007

Name: Omneya B. Salem
 Title: Financial Audit Lead
 Company: C2 Group

Data Request Date: 06.01.2021

Email: omneya.salem@conekt2.biz
 Phone #: 858-449-8118
 Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Actual	Method	Data Request
3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	N/A	5.3.2.1.6 - B.5 - Live Fuel Moisture (LFM) Sampling	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting and 5.3.06 Grid Operations & Operating Protocols. <u>The goal is to cover all SIPT-related questions for all five items shown on this list in one session.</u>
3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	N/A	5.3.2.5.1 - F.1 - Safety and Infrastructure Protection Teams (SIPT)	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting and 5.3.06 Grid Operations & Operating Protocols. <u>The goal is to cover all SIPT-related questions for all five items shown on this list in one session.</u>
3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	N/A	5.3.6.2 - F.1 - SIPT Crews and Engines Resourcing	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting and 5.3.06 Grid Operations & Operating Protocols. <u>The goal is to cover all SIPT-related questions for all five items shown on this list in one session.</u>
3.d. Qualitative Goal/Target	N/A	5.3.6.3 - F.5 - Implement SafetyNet Observation Cards	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting and 5.3.06 Grid Operations & Operating Protocols. <u>The goal is to cover all SIPT-related questions for all five items shown on this list in one session.</u>
3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	N/A	5.3.6.6 - Stationed and on-call ignition prevention and suppression resources and services	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting and 5.3.06 Grid Operations & Operating Protocols. <u>The goal is to cover all SIPT-related questions for all five items shown on this list in one session.</u>



DATA REQUEST

Data Request Number: 008

Name: Omneya B. Salem
 Title: Financial Audit Lead
 Company: C2 Group

Data Request Date: 06.01.2021

Email: omneya.salem@conekt2.biz
 Phone #: 858-449-8118
 Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Actual	Method	Data Request
d. Qualitative Goal/Target	N/A	5.3.2.07 - Wildfire Safety Operations Center (WSOC)	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
c. Small (less than 100 items) Volume Quantifiable Goal/Target	N/A	5.3.3.08-3 - C.1 - SCADA Transmission Switching (switches)	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
c. Small (less than 100 items) Volume Quantifiable Goal/Target	N/A	5.3.3.08-6 - I.6 - Microgrids for PSPS Mitigation (operationalized units)	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
d. Qualitative Goal/Target	N/A	5.3.3.11 - Mitigation of impact on customers and other residents affected during PSPS event	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
d. Qualitative Goal/Target	N/A	5.3.9.1 - Adequate and trained workforce for service restoration	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
d. Qualitative Goal/Target	N/A	5.3.9.2-1 - Community outreach, public awareness, and communications efforts	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	N/A	5.3.9.2-2 - I.4 - Community Based Organizations (CBOs) Coordination	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
d. Qualitative Goal/Target	N/A	5.3.9.3-1 - Customer support in emergencies	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
d. Qualitative Goal/Target	N/A	5.3.9.3-2 - I.8 CRC Mitigate PSPS Customer Impacts	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
d. Qualitative Goal/Target	N/A	5.3.9.3-3 - I.7 - PSPS - 24/7 Information Updates	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
d. Qualitative Goal/Target	N/A	5.3.9.4 - I.5 - CERP (Update and Publish)	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
d. Qualitative Goal/Target	N/A	5.3.9.5-1 - I.1 - Emergency Preparation and Restoration	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
d. Qualitative Goal/Target	N/A	5.3.9.5-2 - I.2 - PSPS - Service Restoration	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.
d. Qualitative Goal/Target	N/A	5.3.9.5-3 - I.3 - PSPS Customer Impact Mitigation	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.2 Situational Awareness & Forecasting 5.3.3 Grid Design & System Hardening, and 5.3.9 Emergency Planning & Preparedness. The goal is to cover all PSPS-related questions under these categories for all thirteen items shown on this list in one session.



DATA REQUEST

Data Request Number: 009

Name: Omneya B. Salem
 Title: Financial Audit Lead
 Company: C2 Group

Data Request Date: 06.01.2021

Email: omneya.salem@conekt2.biz
 Phone #: 858-449-8118
 Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Actual	Method	Data Request
d. Qualitative Goal/Target	N/A	5.3.10.1 - Community engagement	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.10 Stakeholder Cooperation & Community Engagement. <u>The goal is to cover all questions related this initiative in one session.</u>
d. Qualitative Goal/Target	N/A	5.3.10.2 - Cooperation and best practice sharing with agencies outside CA	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.10 Stakeholder Cooperation & Community Engagement. <u>The goal is to cover all questions related this initiative in one session.</u>
d. Qualitative Goal/Target	N/A	5.3.10.3 - Cooperation with suppression agencies	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.10 Stakeholder Cooperation & Community Engagement. <u>The goal is to cover all questions related this initiative in one session.</u>
d. Qualitative Goal/Target	N/A	5.3.10.4 - Forest service and fuel reduction cooperation and joint roadmap	N/A	N/A	Interview	Request for one (1) interview with one or more PG&E SME's to discuss WMP Initiative Categories: 5.3.10 Stakeholder Cooperation & Community Engagement. <u>The goal is to cover all questions related this initiative in one session.</u>



DATA REQUEST

Data Request Number: 010

Name: Omneya B. Salem
 Title: Financial Audit Lead
 Company: C2 Group

Data Request Date: 06.01.2021

Email: omneya.salem@conekt2.biz
 Phone #: 858-449-8118
 Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Actual	Method	Data Request
N/A	N/A	5.1.D New or Emerging Technologies	N/A	N/A	Interview	We request a meeting with PG&E Financial SMEs to discuss variances shown in the following records/documents: PGE_2020 ARC_20210331__2020 Variance Explanations, PGE-2020-Q4-QIU, and Attachment-1-Tables-updated (which shows the 2020 WMP budgeget/cost forecasts). We want to cover the underspend items, the realigned initiatives resulting in deviations from original budget forecasts, and are cordially requesting at least a 2-hour session as an initial attempt to get clarifications on the sections referenced in this request. Please note: we will include Section 5.3.05 Vegetation Management & Inspections in a separate subsequent request.
N/A	N/A	5.3.01 Risk Assessment & Mapping	N/A	N/A	Interview	We request a meeting with PG&E Financial SMEs to discuss variances shown in the following records/documents: PGE_2020 ARC_20210331__2020 Variance Explanations, PGE-2020-Q4-QIU, and Attachment-1-Tables-updated (which shows the 2020 WMP budgeget/cost forecasts). We want to cover the underspend items, the realigned initiatives resulting in deviations from original budget forecasts, and are cordially requesting at least a 2-hour session as an initial attempt to get clarifications on the sections referenced in this request. Please note: we will include Section 5.3.05 Vegetation Management & Inspections in a separate subsequent request.
N/A	N/A	5.3.02 Situational Awareness & Forecasting	N/A	N/A	Interview	We request a meeting with PG&E Financial SMEs to discuss variances shown in the following records/documents: PGE_2020 ARC_20210331__2020 Variance Explanations, PGE-2020-Q4-QIU, and Attachment-1-Tables-updated (which shows the 2020 WMP budgeget/cost forecasts). We want to cover the underspend items, the realigned initiatives resulting in deviations from original budget forecasts, and are cordially requesting at least a 2-hour session as an initial attempt to get clarifications on the sections referenced in this request. Please note: we will include Section 5.3.05 Vegetation Management & Inspections in a separate subsequent request.
N/A	N/A	5.3.03 Grid Design & System Hardening	N/A	N/A	Interview	We request a meeting with PG&E Financial SMEs to discuss variances shown in the following records/documents: PGE_2020 ARC_20210331__2020 Variance Explanations, PGE-2020-Q4-QIU, and Attachment-1-Tables-updated (which shows the 2020 WMP budgeget/cost forecasts). We want to cover the underspend items, the realigned initiatives resulting in deviations from original budget forecasts, and are cordially requesting at least a 2-hour session as an initial attempt to get clarifications on the sections referenced in this request. Please note: we will include Section 5.3.05 Vegetation Management & Inspections in a separate subsequent request.
N/A	N/A	5.3.04 Asset Management & Inspections	N/A	N/A	Interview	We request a meeting with PG&E Financial SMEs to discuss variances shown in the following records/documents: PGE_2020 ARC_20210331__2020 Variance Explanations, PGE-2020-Q4-QIU, and Attachment-1-Tables-updated (which shows the 2020 WMP budgeget/cost forecasts). We want to cover the underspend items, the realigned initiatives resulting in deviations from original budget forecasts, and are cordially requesting at least a 2-hour session as an initial attempt to get clarifications on the sections referenced in this request. Please note: we will include Section 5.3.05 Vegetation Management & Inspections in a separate subsequent request.

N/A	N/A	5.3.06 Grid Operations & Operating Protocols	N/A	N/A	Interview	We request a meeting with PG&E Financial SMEs to discuss variances shown in the following records/documents: PGE_2020 ARC_20210331__2020 Variance Explanations, PGE-2020-Q4-QIU, and Attachment-1-Tables-updated (which shows the 2020 WMP budget/cost forecasts). We want to cover the underspend items, the realigned initiatives resulting in deviations from original budget forecasts, and are cordially requesting at least a 2-hour session as an initial attempt to get clarifications on the sections referenced in this request. Please note: we will include Section 5.3.05 Vegetation Management & Inspections in a separate subsequent request.
N/A	N/A	5.3.07 Data Governance	N/A	N/A	Interview	We request a meeting with PG&E Financial SMEs to discuss variances shown in the following records/documents: PGE_2020 ARC_20210331__2020 Variance Explanations, PGE-2020-Q4-QIU, and Attachment-1-Tables-updated (which shows the 2020 WMP budget/cost forecasts). We want to cover the underspend items, the realigned initiatives resulting in deviations from original budget forecasts, and are cordially requesting at least a 2-hour session as an initial attempt to get clarifications on the sections referenced in this request. Please note: we will include Section 5.3.05 Vegetation Management & Inspections in a separate subsequent request.
N/A	N/A	5.3.08 Resource Allocation Methodology	N/A	N/A	Interview	We request a meeting with PG&E Financial SMEs to discuss variances shown in the following records/documents: PGE_2020 ARC_20210331__2020 Variance Explanations, PGE-2020-Q4-QIU, and Attachment-1-Tables-updated (which shows the 2020 WMP budget/cost forecasts). We want to cover the underspend items, the realigned initiatives resulting in deviations from original budget forecasts, and are cordially requesting at least a 2-hour session as an initial attempt to get clarifications on the sections referenced in this request. Please note: we will include Section 5.3.05 Vegetation Management & Inspections in a separate subsequent request.
N/A	N/A	5.3.09 Emergency Planning & Preparedness	N/A	N/A	Interview	We request a meeting with PG&E Financial SMEs to discuss variances shown in the following records/documents: PGE_2020 ARC_20210331__2020 Variance Explanations, PGE-2020-Q4-QIU, and Attachment-1-Tables-updated (which shows the 2020 WMP budget/cost forecasts). We want to cover the underspend items, the realigned initiatives resulting in deviations from original budget forecasts, and are cordially requesting at least a 2-hour session as an initial attempt to get clarifications on the sections referenced in this request. Please note: we will include Section 5.3.05 Vegetation Management & Inspections in a separate subsequent request.
N/A	N/A	5.3.10 Stakeholder Cooperation & Community Engagement	N/A	N/A	Interview	We request a meeting with PG&E Financial SMEs to discuss variances shown in the following records/documents: PGE_2020 ARC_20210331__2020 Variance Explanations, PGE-2020-Q4-QIU, and Attachment-1-Tables-updated (which shows the 2020 WMP budget/cost forecasts). We want to cover the underspend items, the realigned initiatives resulting in deviations from original budget forecasts, and are cordially requesting at least a 2-hour session as an initial attempt to get clarifications on the sections referenced in this request. Please note: we will include Section 5.3.05 Vegetation Management & Inspections in a separate subsequent request.



DATA REQUEST

Data Request Number: 011

Name: Omneya B. Salem
 Title: Financial Audit Lead
 Company: C2 Group

Data Request Date: 06.01.2021

Email: omneya.salem@conekt2.biz
 Phone #: 858-449-8118
 Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Actual	Method	Data Request
N/A	N/A	5.3.05 Vegetation Management & Inspections	N/A	N/A	Interview	We request a meeting with PG&E Financial SMEs to discuss variances for Section 5.3.05 Vegetation Management & Inspections shown in the following records/documents: PGE_2020 ARC_20210331_2020 Variance Explanations, PGE-2020-Q4-QIU, and Attachment-1-Tables-updated (which shows the 2020 WMP budgeget/cost forecasts). We want to cover the underspend items, the realigned initiatives resulting in deviations from original budget forecasts, and are cordially requesting at least a 2-hour session to get clarifications.



DATA REQUEST



Data Request Number: 012

Name: Omneya B. Salem
 Title: Financial Audit Lead
 Company: C2 Group

Data Request Date: 06.01.2021

Email: omneya.salem@conekt2.biz
 Phone #: 858-449-8118
 Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Actual	Method	Data Request
a. Large Volume Quantifiable Goal/Target - Field Verifiable	Each	5.3.6.1 - F.3 - Removal of TripSaver Auto-Reclosing Functionality	273	N/A	Verification Document	Request for documentation or other form of confirmation from PG&E to identify how automatic reclosing functionality is permanently removed from Trip Savers, and what work was performed in the field to remove the functionality?

 						
DATA REQUEST						
Data Request Number: 013			Data Request Date: 06.02.2021			
Name: Marc Underwood on behalf of Tom Lyons			Email: Thomas.Lyons@bureauveritas.com			
Title: Electrical Engineer			Phone #: 916-397-1657			
Company: BV			Preferred Point of Contact: Email or Phone			
Section Consolidation	Units	IE Goal Name	Target	Initial IE Category	Annual Quality Target	Data Request
5.3.03 Grid Design & System Hardening	Most recent evaluations of microgrid installations.	5.3.3.8-4 - C.9 - System Hardening Criteria Refinement (Dist.)		d. Qualitative Goal/Target	PG&E plans to continue operationalizing microgrid installations; the precise scope and schedule for these installations will be based evaluation of the current program and best available information.	Provide documentation including number of microgrids studied and implemented in 2020.
5.3.03 Grid Design & System Hardening	# of circuit breakers enabled with SCADA	5.3.3.9-1 - C.5 System Hardening (SCADA enabled circuit breakers)		d. Qualitative Goal/Target	PG&E will enable SCADA capability on remaining circuit breakers within HFTD areas (excluding 4kV).	Provide documentation including number of circuit breakers enabled with SCADA targeted for installation in 2020, and number actually installed in 2020.
5.3.03 Grid Design & System Hardening	# of Replacements	5.3.3.9-2 - Replacement of Legacy 4C Controllers (reclosers)		d. Qualitative Goal/Target	PG&E will pursue additional system automation initiatives including the installation of transmission SCADA switches, replacement of legacy 4C controllers and installation of additional sectionalization devices. PG&E is also evaluating new proposed protection schemes that it will deploy in the future when and if appropriate.	Provide documentation including number of controllers replaced in 2020, and number of controllers targeted for replacement in 2020
5.3.03 Grid Design & System Hardening	# of generation equipment facilities installed	5.3.3.11 - Mitigation of impact on customers and other residents affected during PSPS event		d. Qualitative Goal/Target	PG&E plans to install and operate local generation equipment at the community or household level, including by building out of microgrids to reduce the number of customers impacted in safe-to-energize areas as well. PG&E also may deploy backup generation to individual facilities in exceptional circumstances	Provide documentation including number of generation equipment facilities targeted for installation and number actually installed in 2020.
5.3.3.17 Updates to Grid Topology to Minimize Risk of Ignition to HFTDs	Revised transmission program	5.3.3.17.5 - Transmission Line System Hardening Overview and Strategy		d. Qualitative Goal/Target	PG&E will continue to conduct Operability Assessments of transmission lines in HFTD areas and adjust its transmission program accordingly.	Provide transmission program document and provide revised transmission program document.
5.3.3.18 Other/Not listed	Before and after relay settings. Before and after relay elements.	5.3.3.18.1-2 - Increased Protection Sensitivity		d. Qualitative Goal/Target	PG&E is evaluating the use of more sensitive protection settings and use faster tripping elements on reclosers and circuit breakers. The proposed settings and use of instantaneous elements that reduce the duration and energy delivered at a fault location.	Indicate if an overall relay setting study or evaluation was conducted in 2020, and provide study results.
5.3.06 Grid Operations & Operating Protocols	Standard TD-1464B-002 with revisions indicated.	5.3.6.4 - F.2 - Protocols for PSPS Re-Energization		d. Qualitative Goal/Target	Update standard (TD-1464B-002) to include lessons learned from 2019 PSPS events and latest meteorology inputs, update the existing DCC Operator training materials to incorporate revisions to the standard, and confirm that required PG&E personnel complete annual TD-1464S training.	Please provide Standard TD-1464B-002 with revisions indicated.



DATA REQUEST

Data Request Number: 014

Name: Marc Underwood on behalf of Tom Lyons

Title: Project Manager

Company: BV

Data Request Date: 06.02.2021

Email: marc.underwood@bureauveritas.com

Phone #: 916-761-2416

Preferred Point of Contact: Email or Phone

Program Target	Work Type (MAT Code)	Asset Wildfire Tier	Equipment #	EAM Checklist	Checklist Creat	Lat	Long	Method	Data Request
1. Distribution Structure Inspections	BFB	Tier3 Wildfire – Extreme	101035895	140000075464	02/25/20	38.0339	-120.2287	Review of inspection records	Documentation (PDF or other available format) of the HFTD inspection records for 315 towers from the Tier 3 and Tier 2 Zones. If intrusive inspections, model of the test instrument used if other than drill and probe method.
	BFB	Tier3 Wildfire – Extreme	101035841	140000075801	02/26/20	38.0365	-120.2273		
	BFB	Tier3 Wildfire – Extreme	100487182	140000076107	02/28/20	37.8670	-122.2007		
	BFB	Tier3 Wildfire – Extreme	101023148	140000076691	02/29/20	37.4032	-119.6226		
	BFB	Tier3 Wildfire – Extreme	100078129	140000077070	03/02/20	39.1267	-120.9922		
	BFB	Tier3 Wildfire – Extreme	101342060	140000077252	03/02/20	37.7800	-122.1395		
	BFB	Tier3 Wildfire – Extreme	101054864	140000077315	03/03/20	38.0443	-120.2594		
	BFB	Tier3 Wildfire – Extreme	101024466	140000077388	03/03/20	37.3311	-119.6195		
	BFB	Tier3 Wildfire – Extreme	101360010	140000078278	03/06/20	37.8092	-122.1908		
	BFB	Tier3 Wildfire – Extreme	101018509	140000079125	03/12/20	37.3181	-119.6177		
	BFB	Tier3 Wildfire – Extreme	101268016	140000079328	03/13/20	38.2303	-120.3413		
	BFB	Tier3 Wildfire – Extreme	101267956	140000079330	03/13/20	38.2299	-120.3432		
	BFB	Tier3 Wildfire – Extreme	101023131	140000079889	03/19/20	37.3894	-119.6329		
	BFB	Tier3 Wildfire – Extreme	101025045	140000080012	03/20/20	37.4149	-119.6274		
	BFB	Tier3 Wildfire – Extreme	101017989	140000080317	03/25/20	37.3016	-119.6186		
	BFB	Tier2 Wildfire – High	103652495	140000090226	04/14/20	39.8092	-121.6012		
	BFB	Tier2 Wildfire – High	103342946	140000090409	04/14/20	37.3158	-119.6113		
	BFB	Tier3 Wildfire – Extreme	101258384	140000091951	04/15/20	38.4176	-120.6134		
	BFB	Tier3 Wildfire – Extreme	101270755	140000094014	04/16/20	38.2519	-120.3456		
	BFB	Tier3 Wildfire – Extreme	101269689	140000094197	04/16/20	38.2384	-120.3393		
	BFB	Tier3 Wildfire – Extreme	101256972	140000094346	04/16/20	38.4013	-120.6624		
	BFB	Tier3 Wildfire – Extreme	101009533	140000098284	04/19/20	40.3705	-123.7355		
	BFB	Tier3 Wildfire – Extreme	101258625	140000099194	04/20/20	38.4112	-120.6168		
	BFB	Tier3 Wildfire – Extreme	100353946	140000099572	04/20/20	39.8221	-121.5955		
	BFB	Tier3 Wildfire – Extreme	100439372	140000100355	04/20/20	39.8376	-121.5897		
	BFB	Tier3 Wildfire – Extreme	101483683	140000104998	04/22/20	40.4932	-122.0425		
	BFB	Tier3 Wildfire – Extreme	100677866	140000105221	04/22/20	37.1097	-119.4258		
	BFB	Tier3 Wildfire – Extreme	100677813	140000107897	04/23/20	37.1017	-119.4324		
	BFB	Tier3 Wildfire – Extreme	101006524	140000108052	04/23/20	40.3443	-124.0411		
	BFB	Tier3 Wildfire – Extreme	100353638	140000108625	04/24/20	39.8406	-121.5977		
	BFB	Tier3 Wildfire – Extreme	101256074	140000109034	04/24/20	38.4074	-120.6528		
	BFB	Tier3 Wildfire – Extreme	101269885	140000112590	04/27/20	38.2430	-120.3311		
	BFB	Tier3 Wildfire – Extreme	101245421	140000112969	04/27/20	38.4494	-120.5141		
	BFB	Tier3 Wildfire – Extreme	101009264	140000118472	04/26/20	40.4263	-123.7628		
	BFB	Tier3 Wildfire – Extreme	100336781	140000118747	04/29/20	39.8341	-121.5888		
	BFB	Tier3 Wildfire – Extreme	100441422	140000119434	04/29/20	39.8318	-121.5883		
	BFB	Tier3 Wildfire – Extreme	100357627	140000119584	04/29/20	39.7897	-121.6592		
	BFB	Tier3 Wildfire – Extreme	101276079	140000119763	04/29/20	38.2515	-120.3704		
	BFB	Tier3 Wildfire – Extreme	100680945	140000119771	04/29/20	37.0730	-119.4443		
	BFB	Tier3 Wildfire – Extreme	100353660	140000121760	04/30/20	39.8335	-121.5982		
	BFB	Tier2 Wildfire – High	10329363	140000122121	04/30/20	38.2300	-120.3772		
	BFB	Tier3 Wildfire – Extreme	101276052	140000122905	04/30/20	38.2493	-120.3725		
	BFB	Tier3 Wildfire – Extreme	101264075	140000124310	05/01/20	38.4144	-120.5906		
	BFB	Tier3 Wildfire – Extreme	100325368	140000124585	05/01/20	39.7649	-121.6308		
	BFB	Tier3 Wildfire – Extreme	100911432	140000128291	05/04/20	37.7039	-122.0400		
	BFB	Tier3 Wildfire – Extreme	101473446	140000128808	05/04/20	40.5557	-122.4333		
	BFB	Tier3 Wildfire – Extreme	100899418	140000129205	05/04/20	37.7875	-122.0563		
	BFB	Tier3 Wildfire – Extreme	101473593	140000132389	05/05/20	40.5669	-122.4372		
	BFB	Tier2 Wildfire – High	102212467	140000134379	05/05/20	39.0594	-123.4421		
	BFB	Tier3 Wildfire – Extreme	100349813	140000134974	05/05/20	39.7369	-121.6995		
	BFB	Tier3 Wildfire – Extreme	100259086	140000137312	05/06/20	37.3919	-122.2422		
	BFB	Tier3 Wildfire – Extreme	100958478	140000138030	05/06/20	37.6123	-121.8976		
	BFB	Tier3 Wildfire – Extreme	101259532	140000138139	05/06/20	38.2168	-120.3593		
	BFB	Tier3 Wildfire – Extreme	101494303	140000138190	05/06/20	40.5376	-122.4732		
	BFB	Tier3 Wildfire – Extreme	101259353	140000140032	05/07/20	38.2085	-120.3686		
	BFB	Tier3 Wildfire – Extreme	101493580	140000140717	05/07/20	40.5251	-122.4859		
	BFB	Tier3 Wildfire – Extreme	100956448	140000141377	05/07/20	37.6145	-121.9003		
	BFB	Tier3 Wildfire – Extreme	100271940	140000142681	05/08/20	37.3851	-122.2704		
	BFB	Tier3 Wildfire – Extreme	100271891	140000143220	05/08/20	37.3878	-122.2681		
	BFB	Tier2 Wildfire – High	103939692	140000143849	05/08/20	39.7667	-121.6095		
	BFB	Tier3 Wildfire – Extreme	101372035	140000143865	05/08/20	37.8375	-122.1908		
	BFB	Tier3 Wildfire – Extreme	101493842	140000144741	05/08/20	40.5355	-122.4802		
	BFB	Tier3 Wildfire – Extreme	101460747	140000145059	05/08/20	40.5177	-122.4743		
	BFB	Tier2 Wildfire – High	103958700	140000150135	05/11/20	39.7620	-121.6417		
	BFB	Tier3 Wildfire – Extreme	101280115	140000150510	05/11/20	38.2171	-120.5375		
	BFB	Tier3 Wildfire – Extreme	100913702	140000150648	05/11/20	37.7094	-122.0432		
	BFB	Tier3 Wildfire – Extreme	101266948	140000150879	05/11/20	38.4227	-120.5718		
	BFB	Tier2 Wildfire – High	101935303	140000151051	05/11/20	35.4588	-120.7479		
	BFB	Tier3 Wildfire – Extreme	101361691	140000152083	05/11/20	37.8329	-122.1987		
	BFB	Tier3 Wildfire – Extreme	100295641	140000152244	05/11/20	37.3723	-122.2645		
	BFB	Tier3 Wildfire – Extreme	101392409	140000152713	05/11/20	38.7438	-120.5665		
	BFB	Tier3 Wildfire – Extreme	101281570	140000153584	05/11/20	38.1906	-120.4377		
	BFB	Tier3 Wildfire – Extreme	100016459	140000153697	05/11/20	39.1223	-120.9144		
	BFB	Tier3 Wildfire – Extreme	100338717	140000154748	05/12/20	39.6816	-121.5051		

BFB	Tier3 Wildfire – Extreme	101262576	140000158508	05/13/20	38.4206	-120.6114
BFB	Tier3 Wildfire – Extreme	101484223	140000159575	05/13/20	40.4811	-121.9886
BFB	Tier3 Wildfire – Extreme	101267130	140000160156	05/13/20	38.4371	-120.5753
BFB	Tier3 Wildfire – Extreme	101251435	140000161616	05/14/20	38.1903	-120.6204
BFB	Tier3 Wildfire – Extreme	101262534	140000161667	05/14/20	38.4210	-120.6220
BFB	Tier3 Wildfire – Extreme	101466884	140000162258	05/14/20	40.6221	-122.4936
BFB	Tier3 Wildfire – Extreme	101266367	140000162898	05/14/20	38.4462	-120.5516
BFB	Tier2 Wildfire – High	102197178	140000163595	05/14/20	39.4719	-123.2710
BFB	Tier2 Wildfire – High	102171928	140000163843	05/14/20	39.2912	-123.5769
BFB	Tier3 Wildfire – Extreme	101057541	140000163940	05/14/20	38.0184	-120.2669
BFB	Tier3 Wildfire – Extreme	101281749	140000165007	05/15/20	38.2145	-120.5170
BFB	Tier3 Wildfire – Extreme	101476259	140000166327	05/15/20	40.6919	-121.9161
BFB	Tier2 Wildfire – High	103107033	140000166543	05/15/20	38.4883	-120.5375
BFB	Tier3 Wildfire – Extreme	100099078	140000167541	05/16/20	38.9930	-121.0273
BFB	Tier3 Wildfire – Extreme	100357909	140000168828	05/16/20	39.7762	-121.7325
BFB	Tier3 Wildfire – Extreme	100312790	140000169198	05/16/20	37.4665	-122.2630
BFB	Tier3 Wildfire – Extreme	101456861	140000169310	05/16/20	40.7026	-121.9186
BFB	Tier3 Wildfire – Extreme	100337421	140000169380	05/16/20	39.7880	-121.5143
BFB	Tier3 Wildfire – Extreme	101479263	140000169420	05/16/20	40.7163	-122.0404
BFB	Tier3 Wildfire – Extreme	101251610	140000169454	05/16/20	38.3750	-120.4545
BFB	Tier3 Wildfire – Extreme	100326407	140000172266	05/18/20	39.7468	-121.5796
BFB	Tier3 Wildfire – Extreme	101272303	140000174986	05/19/20	38.3932	-120.6999
BFB	Tier3 Wildfire – Extreme	101251475	140000175272	05/19/20	38.3763	-120.4819
BFB	Tier3 Wildfire – Extreme	101472018	140000175862	05/19/20	40.5747	-122.4602
BFB	Tier2 Wildfire – High	102198706	140000175986	05/19/20	39.3739	-123.1227
BFB	Tier3 Wildfire – Extreme	101057312	140000177626	05/19/20	38.0150	-120.2801
BFB	Tier3 Wildfire – Extreme	101475589	140000177879	05/19/20	40.6905	-121.9309
BFB	Tier3 Wildfire – Extreme	101257213	140000178976	05/20/20	38.4184	-120.6623
BFB	Tier3 Wildfire – Extreme	100334825	140000179123	05/20/20	39.6749	-121.5271
BFB	Tier3 Wildfire – Extreme	100334812	140000179174	05/20/20	39.6768	-121.5277
BFB	Tier3 Wildfire – Extreme	100334939	140000180438	05/20/20	39.7225	-121.4921
BFB	Tier3 Wildfire – Extreme	101273219	140000180470	05/20/20	38.2332	-120.4921
BFB	Tier3 Wildfire – Extreme	101484030	140000182991	05/21/20	40.5038	-121.9949
BFB	Tier2 Wildfire – High	101900788	140000184011	05/21/20	35.5505	-120.8174
BFB	Tier3 Wildfire – Extreme	100021588	140000184439	05/21/20	39.0079	-121.0290
BFB	Tier3 Wildfire – Extreme	100335017	140000184468	05/21/20	39.8834	-121.5834
BFB	Tier3 Wildfire – Extreme	100025694	140000184790	05/21/20	39.0066	-121.0284
BFB	Tier3 Wildfire – Extreme	101265623	140000188303	05/22/20	38.4282	-120.5562
BFB	Tier3 Wildfire – Extreme	101457753	140000188365	05/22/20	40.7239	-121.9173
BFB	Tier3 Wildfire – Extreme	101280635	140000188550	05/22/20	38.1945	-120.5816
BFB	Tier3 Wildfire – Extreme	100092315	140000188779	05/22/20	38.9214	-121.1553
BFB	Tier3 Wildfire – Extreme	100334231	140000189657	05/23/20	39.6877	-121.4593
BFB	Tier3 Wildfire – Extreme	100338960	140000190694	05/23/20	39.7038	-121.5491
BFB	Tier3 Wildfire – Extreme	101267333	140000190930	05/23/20	38.2413	-120.5474
BFB	Tier3 Wildfire – Extreme	101265919	140000191292	05/23/20	38.4413	-120.5418
BFB	Tier3 Wildfire – Extreme	101490095	140000192051	05/23/20	40.4997	-121.8516
BFB	Tier3 Wildfire – Extreme	100899483	140000192341	05/25/20	37.7738	-121.7330
BFB	Tier3 Wildfire – Extreme	101047025	140000192352	05/25/20	38.0131	-120.3099
BFB	Tier3 Wildfire – Extreme	101479116	140000193808	05/26/20	40.7277	-122.0318
BFB	Tier3 Wildfire – Extreme	100083303	140000193977	05/26/20	39.2615	-121.0247
BFB	Tier3 Wildfire – Extreme	100030186	140000194299	05/26/20	38.9726	-121.0676
BFB	Tier3 Wildfire – Extreme	101281035	140000194799	05/26/20	38.1481	-120.5836
BFB	Tier2 Wildfire – High	103929666	140000195191	05/26/20	38.9526	-121.1680
BFB	Tier3 Wildfire – Extreme	100067216	140000196242	05/26/20	39.2607	-121.0082
BFB	Tier3 Wildfire – Extreme	100035579	140000196542	05/26/20	38.9366	-121.1751
BFB	Tier3 Wildfire – Extreme	100273943	140000196932	05/27/20	37.4235	-122.2780
BFB	Tier3 Wildfire – Extreme	100355596	140000197064	05/27/20	39.8135	-121.6258
BFB	Tier3 Wildfire – Extreme	101390594	140000197919	05/27/20	38.6983	-120.8688
BFB	Tier3 Wildfire – Extreme	101457198	140000198095	05/27/20	40.7180	-121.9177
BFB	Tier3 Wildfire – Extreme	101390688	140000199464	05/27/20	38.7122	-120.8659
BFB	Tier3 Wildfire – Extreme	101455751	140000200159	05/27/20	40.8619	-122.3448
BFB	Tier3 Wildfire – Extreme	100082112	140000201014	05/27/20	38.9384	-121.1632
BFB	Tier3 Wildfire – Extreme	101251772	140000201422	05/28/20	38.3947	-120.4740
BFB	Tier3 Wildfire – Extreme	100047378	140000201914	05/28/20	38.8832	-121.1612
BFB	Tier3 Wildfire – Extreme	100426697	140000202053	05/28/20	39.9422	-121.7241
BFB	Tier3 Wildfire – Extreme	100402834	140000202155	05/28/20	39.9347	-121.7339
BFB	Tier3 Wildfire – Extreme	101414954	140000202497	05/28/20	38.6962	-120.8591
BFB	Tier3 Wildfire – Extreme	100339528	140000202721	05/28/20	39.9453	-121.7075
BFB	Tier3 Wildfire – Extreme	101386308	140000202806	05/28/20	38.7413	-120.8145
BFB	Tier3 Wildfire – Extreme	101489613	140000202920	05/28/20	40.4931	-121.8786
BFB	Tier2 Wildfire – High	102040905	140000205740	05/29/20	38.1659	-120.8841
BFB	Tier3 Wildfire – Extreme	100431537	140000205944	05/29/20	39.9067	-121.6493
BFB	Tier3 Wildfire – Extreme	100899565	140000206234	05/29/20	37.7756	-121.9979
BFB	Tier3 Wildfire – Extreme	101276895	140000206266	05/29/20	38.3493	-120.5626
BFB	Tier3 Wildfire – Extreme	100083345	140000206862	05/29/20	39.2674	-121.0125
BFB	Tier3 Wildfire – Extreme	100081592	140000206906	05/29/20	39.2351	-121.1040
BFB	Tier3 Wildfire – Extreme	100034333	140000206914	05/29/20	38.9736	-121.0505
BFB	Tier3 Wildfire – Extreme	100077252	140000207284	05/29/20	39.2621	-121.0654
BFB	Tier3 Wildfire – Extreme	101268081	140000208469	05/29/20	38.2304	-120.5385
BFB	Tier2 Wildfire – High	102037115	140000208722	05/29/20	38.4684	-123.0117
BFB	Tier3 Wildfire – Extreme	101445613	140000209854	05/30/20	37.9154	-122.2805
BFB	Tier3 Wildfire – Extreme	101438762	140000210454	05/30/20	37.9119	-122.2794
BFB	Tier3 Wildfire – Extreme	100375518	140000213385	06/01/20	39.4357	-121.5060
BFB	Tier3 Wildfire – Extreme	101489308	140000213434	06/01/20	40.4958	-121.9093
BFB	Tier3 Wildfire – Extreme	100105175	140000213810	06/01/20	38.8863	-121.1635
BFB	Tier3 Wildfire – Extreme	101405185	140000214425	06/01/20	38.7161	-120.8224
BFB	Tier3 Wildfire – Extreme	100409170	140000215504	06/01/20	39.4191	-121.3704
BFB	Tier3 Wildfire – Extreme	100361163	140000216011	06/01/20	39.9054	-121.5271
BFB	Tier3 Wildfire – Extreme	100361367	140000217345	06/02/20	39.9280	-121.6425
BFB	Tier3 Wildfire – Extreme	100045618	140000217422	06/02/20	38.8965	-121.0948
BFB	Tier3 Wildfire – Extreme	101247442	140000218640	06/02/20	38.2871	-120.5795
BFB	Tier3 Wildfire – Extreme	100047773	140000218914	06/02/20	38.8896	-121.1270
BFB	Tier3 Wildfire – Extreme	100425213	140000218931	06/02/20	39.4349	-121.5077
BFB	Tier3 Wildfire – Extreme	100335185	140000220154	06/02/20	39.8930	-121.5700

BFB	Tier3 Wildfire – Extreme	101391842	140000220180	06/02/20	38.7201	-120.8684
BFB	Tier3 Wildfire – Extreme	101047933	140000220844	06/02/20	38.0299	-120.2973
BFB	Tier3 Wildfire – Extreme	101481456	140000220914	06/02/20	40.5254	-121.9586
BFB	Tier3 Wildfire – Extreme	101421985	140000221781	06/03/20	38.7674	-121.0402
BFB	Tier2 Wildfire – High	103209390	140000223380	06/03/20	37.3040	-119.6101
BFB	Tier3 Wildfire – Extreme	101482358	140000223411	06/03/20	40.5247	-121.8366
BFB	Tier3 Wildfire – Extreme	101482323	140000223421	06/03/20	40.5259	-121.8351
BFB	Tier2 Wildfire – High	103628700	140000223570	06/03/20	37.9658	-122.1402
BFB	Tier3 Wildfire – Extreme	101390904	140000223654	06/03/20	38.7090	-120.8577
BFB	Tier3 Wildfire – Extreme	101275066	140000223748	06/03/20	38.3563	-120.2120
BFB	Tier3 Wildfire – Extreme	100360673	140000224433	06/03/20	39.4287	-121.3620
BFB	Tier2 Wildfire – High	103349337	140000224701	06/03/20	37.5248	-119.9089
BFB	Tier3 Wildfire – Extreme	100099832	140000225042	06/03/20	39.3070	-121.0299
BFB	Tier3 Wildfire – Extreme	101387529	140000226226	06/03/20	38.7439	-120.7982
BFB	Tier3 Wildfire – Extreme	101394108	140000226836	06/04/20	38.7586	-120.5937
BFB	Tier3 Wildfire – Extreme	101275748	140000227165	06/04/20	38.1721	-120.3753
BFB	Tier3 Wildfire – Extreme	101264278	140000227288	06/04/20	38.2981	-120.2717
BFB	Tier3 Wildfire – Extreme	100076110	140000227588	06/03/20	39.2307	-120.9972
BFB	Tier3 Wildfire – Extreme	101394323	140000227916	06/04/20	38.7538	-120.5934
BFB	Tier3 Wildfire – Extreme	100029667	140000228170	06/04/20	38.9978	-121.0192
BFB	Tier2 Wildfire – High	101882520	140000228186	06/03/20	35.4801	-120.8440
BFB	Tier3 Wildfire – Extreme	101482385	140000229238	06/04/20	40.5300	-121.8304
BFB	Tier3 Wildfire – Extreme	101377030	140000229251	06/04/20	38.7154	-121.0689
BFB	Tier3 Wildfire – Extreme	101048626	140000230124	06/04/20	38.0299	-120.3151
BFB	Tier3 Wildfire – Extreme	100005954	140000230693	06/04/20	39.2325	-121.1099
BFB	Tier3 Wildfire – Extreme	101420138	140000230823	06/04/20	38.7611	-120.6691
BFB	Tier3 Wildfire – Extreme	100005951	140000230952	06/04/20	39.2335	-121.1100
BFB	Tier3 Wildfire – Extreme	101249756	140000231436	06/05/20	38.2527	-120.7159
BFB	Tier3 Wildfire – Extreme	100075109	140000231649	06/05/20	38.9078	-120.8539
BFB	Tier3 Wildfire – Extreme	100072685	140000231664	06/05/20	39.2533	-120.9985
BFB	Tier3 Wildfire – Extreme	100375864	140000232043	06/05/20	39.4372	-121.4763
BFB	Tier3 Wildfire – Extreme	101394157	140000233189	06/05/20	38.7562	-120.5940
BFB	Tier3 Wildfire – Extreme	101494604	140000234479	06/05/20	40.4851	-122.5364
BFB	Tier3 Wildfire – Extreme	100004192	140000234680	06/05/20	39.2839	-121.1228
BFB	Tier3 Wildfire – Extreme	100032648	140000235429	06/06/20	38.9954	-121.0119
BFB	Tier3 Wildfire – Extreme	101407360	140000235888	06/06/20	38.7340	-120.6397
BFB	Tier2 Wildfire – High	103972867	140000236134	06/06/20	38.7496	-120.6076
BFB	Tier2 Wildfire – High	103840724	140000236441	06/06/20	38.9888	-121.2238
BFB	Tier3 Wildfire – Extreme	101393858	140000236535	06/06/20	38.7719	-120.5938
BFB	Tier3 Wildfire – Extreme	101277479	140000236634	06/06/20	38.3089	-120.5620
BFB	Tier2 Wildfire – High	102231566	140000236998	06/06/20	37.9374	-122.5409
BFB	Tier3 Wildfire – Extreme	101278134	140000237091	06/06/20	38.3424	-120.5753
BFB	Tier3 Wildfire – Extreme	101264153	140000237500	06/06/20	38.2992	-120.2716
BFB	Tier3 Wildfire – Extreme	100395702	140000238421	06/06/20	39.4572	-121.4896
BFB	Tier2 Wildfire – High	103894480	140000238853	06/06/20	39.0195	-120.8936
BFB	Tier3 Wildfire – Extreme	100003772	140000238868	06/06/20	39.2769	-121.1293
BFB	Tier3 Wildfire – Extreme	100988085	140000239261	06/06/20	39.8786	-123.7284
BFB	Tier3 Wildfire – Extreme	100968981	140000239937	06/07/20	40.9421	-123.6319
BFB	Tier3 Wildfire – Extreme	101376356	140000240091	06/07/20	38.6170	-121.0080
BFB	Tier2 Wildfire – High	102237875	140000242586	06/08/20	37.9808	-122.5921
BFB	Tier3 Wildfire – Extreme	100958396	140000242608	06/08/20	37.5747	-121.6793
BFB	Tier3 Wildfire – Extreme	100360829	140000242917	06/08/20	39.4400	-121.3392
BFB	Tier3 Wildfire – Extreme	100980719	140000244239	06/08/20	40.9611	-123.8362
BFB	Tier2 Wildfire – High	102002898	140000245115	06/09/20	38.5635	-122.6864
BFB	Tier3 Wildfire – Extreme	100024976	140000245394	06/10/20	39.0097	-120.8511
BFB	Tier3 Wildfire – Extreme	101280881	140000246018	06/09/20	38.3168	-120.2594
BFB	Tier3 Wildfire – Extreme	100937558	140000246100	06/09/20	37.5936	-121.6659
BFB	Tier3 Wildfire – Extreme	100030751	140000246312	06/09/20	38.9711	-120.8866
BFB	Tier3 Wildfire – Extreme	101261694	140000246404	06/08/20	38.4408	-120.6667
BFB	Tier3 Wildfire – Extreme	100960800	140000247864	06/09/20	37.7143	-122.0125
BFB	Tier3 Wildfire – Extreme	100070250	140000248007	06/09/20	39.2680	-121.0774
BFB	Tier3 Wildfire – Extreme	101420129	140000248158	06/09/20	38.7531	-120.6441
BFB	Tier3 Wildfire – Extreme	101259063	140000249948	06/09/20	38.2751	-120.3279
BFB	Tier2 Wildfire – High	103648439	140000250189	06/10/20	39.4721	-121.3164
BFB	Tier2 Wildfire – High	102262320	140000250583	06/10/20	38.5208	-122.4662
BFB	Tier3 Wildfire – Extreme	100410291	140000251531	06/10/20	39.4380	-121.3868
BFB	Tier3 Wildfire – Extreme	100086299	140000251929	06/10/20	39.2752	-121.0268
BFB	Tier3 Wildfire – Extreme	101055630	140000251977	06/10/20	38.0033	-120.2580
BFB	Tier2 Wildfire – High	102220490	140000252284	06/10/20	38.0889	-122.5920
BFB	Tier3 Wildfire – Extreme	100679516	140000252451	06/10/20	37.0696	-119.4943
BFB	Tier3 Wildfire – Extreme	101056045	140000252513	06/10/20	38.0317	-120.2647
BFB	Tier3 Wildfire – Extreme	100445100	140000252844	06/09/20	37.9903	-122.1452
BFB	Tier3 Wildfire – Extreme	100360544	140000253616	06/10/20	39.4268	-121.3327
BFB	Tier3 Wildfire – Extreme	101264515	140000254135	06/10/20	38.2865	-120.2721
BFB	Tier3 Wildfire – Extreme	101261112	140000254699	06/10/20	38.4282	-120.6554
BFB	Tier3 Wildfire – Extreme	100395289	140000256663	06/11/20	39.4847	-121.4431
BFB	Tier3 Wildfire – Extreme	101039862	140000257120	06/11/20	38.0072	-120.2719
BFB	Tier3 Wildfire – Extreme	100376339	140000258357	06/11/20	39.4901	-121.3846
BFB	Tier3 Wildfire – Extreme	100429844	140000258932	06/11/20	39.5029	-121.4034
BFB	Tier3 Wildfire – Extreme	101376003	140000259428	06/11/20	38.6014	-121.0128
BFB	Tier3 Wildfire – Extreme	100101353	140000259981	06/11/20	39.2569	-121.1052
BFB	Tier3 Wildfire – Extreme	101293423	140000259987	06/11/20	39.3292	-121.4063
BFB	Tier3 Wildfire – Extreme	101418976	140000260154	06/11/20	38.7577	-120.5166
BFB	Tier2 Wildfire – High	102352372	140000260513	06/11/20	39.2977	-120.9591
BFB	Tier3 Wildfire – Extreme	101291307	140000260629	06/11/20	39.3424	-121.2767
BFB	Tier3 Wildfire – Extreme	101445462	140000261979	06/12/20	37.8874	-122.2448
BFB	Tier3 Wildfire – Extreme	100375636	140000262196	06/12/20	39.5131	-121.4463
BFB	Tier3 Wildfire – Extreme	101397424	140000263653	06/12/20	38.7598	-120.5189
BFB	Tier2 Wildfire – High	101529891	140000264233	06/12/20	40.0190	-122.4487
BFB	Tier3 Wildfire – Extreme	100609565	140000265234	06/12/20	37.0861	-121.6771
BFB	Tier3 Wildfire – Extreme	100459081	140000266280	06/13/20	37.9671	-122.1329
BFB	Tier3 Wildfire – Extreme	101262499	140000266294	06/13/20	38.4049	-120.7245
BFB	Tier3 Wildfire – Extreme	101421158	140000266345	06/13/20	38.7595	-120.5635
BFB	Tier3 Wildfire – Extreme	101248111	140000266506	06/13/20	38.3819	-120.5201

BFB	Tier3 Wildfire – Extreme	101275257	140000266822	06/13/20	38.4255	-120.1020
BFB	Tier3 Wildfire – Extreme	100112677	140000268245	06/13/20	39.2474	-121.0980
BFB	Tier3 Wildfire – Extreme	101277181	140000268352	06/12/20	38.1073	-120.6935
BFB	Tier3 Wildfire – Extreme	100036271	140000268363	06/13/20	38.9541	-121.2188
BFB	Tier2 Wildfire – High	103836608	140000268485	06/13/20	38.3404	-122.4699
BFB	Tier3 Wildfire – Extreme	100112156	140000268586	06/13/20	39.0173	-120.8040
BFB	Tier3 Wildfire – Extreme	101033954	140000268748	06/13/20	37.9861	-120.2815
BFB	Tier3 Wildfire – Extreme	101292268	140000269157	06/13/20	39.3368	-121.3787
BFB	Tier3 Wildfire – Extreme	100034072	140000269402	06/13/20	39.0000	-120.8671
BFB	Tier3 Wildfire – Extreme	100019516	140000269997	06/13/20	39.0499	-120.7797
BFB	Tier2 Wildfire – High	101556242	140000270132	06/13/20	40.4443	-121.8191
BFB	Tier2 Wildfire – High	101556306	140000270144	06/13/20	40.4405	-121.8271
BFB	Tier3 Wildfire – Extreme	101292915	140000270205	06/13/20	39.3318	-121.4144
BFB	Tier3 Wildfire – Extreme	101274989	140000270413	06/13/20	38.3783	-120.1932
BFB	Tier3 Wildfire – Extreme	100381058	140000271468	06/15/20	39.5194	-121.3891
BFB	Tier3 Wildfire – Extreme	100271809	140000272132	06/15/20	37.3153	-122.2729
BFB	Tier3 Wildfire – Extreme	100048241	140000273535	06/15/20	38.9050	-120.8401
BFB	Tier3 Wildfire – Extreme	101279703	140000273551	06/15/20	38.3087	-120.2596
BFB	Tier3 Wildfire – Extreme	101512855	140000273793	06/15/20	40.5587	-121.7219
BFB	Tier3 Wildfire – Extreme	100060205	140000274006	06/15/20	38.8111	-121.0521
BFB	Tier3 Wildfire – Extreme	101245769	140000274053	06/15/20	38.4083	-120.4644
BFB	Tier3 Wildfire – Extreme	101400360	140000274458	06/15/20	38.7662	-120.7285
BFB	Tier3 Wildfire – Extreme	101248957	140000274664	06/15/20	38.3864	-120.5496
BFB	Tier3 Wildfire – Extreme	101398118	140000274977	06/15/20	38.7671	-120.3561
BFB	Tier3 Wildfire – Extreme	101481498	140000275186	06/15/20	40.5066	-121.7389
BFB	Tier3 Wildfire – Extreme	100987829	140000275305	06/15/20	39.8459	-123.7097
BFB	Tier3 Wildfire – Extreme	101396126	140000275430	06/15/20	38.7383	-120.6036
BFB	Tier3 Wildfire – Extreme	100651670	140000276418	06/15/20	36.9766	-119.3683
BFB	Tier3 Wildfire – Extreme	100425635	140000276459	06/15/20	39.5048	-121.4291
BFB	Tier3 Wildfire – Extreme	101056125	140000276679	06/16/20	38.0302	-120.2523
BFB	Tier3 Wildfire – Extreme	101057165	140000277198	06/16/20	38.0230	-120.2650
BFB	Tier3 Wildfire – Extreme	100396135	140000278268	06/16/20	39.5066	-121.2758
BFB	Tier3 Wildfire – Extreme	101479692	140000279018	06/16/20	40.7937	-121.9456
BFB	Tier3 Wildfire – Extreme	100004953	140000279325	06/16/20	39.2940	-120.9640
BFB	Tier3 Wildfire – Extreme	100421381	140000279701	06/16/20	39.5247	-121.2924
BFB	Tier3 Wildfire – Extreme	100676412	140000280491	06/16/20	36.9901	-119.4893
BFB	Tier3 Wildfire – Extreme	101251792	140000281036	06/16/20	38.2501	-120.7210
BFB	Tier3 Wildfire – Extreme	101007471	140000281238	06/16/20	40.2976	-123.3612
BFB	Tier3 Wildfire – Extreme	100483604	140000282545	06/17/20	37.9228	-121.9121
BFB	Tier3 Wildfire – Extreme	101271947	140000282586	06/17/20	38.4043	-120.6970
BFB	Tier3 Wildfire – Extreme	101278668	140000283266	06/17/20	38.3105	-120.6642
BFB	Tier3 Wildfire – Extreme	101037797	140000283565	06/17/20	38.0110	-120.2297
BFB	Tier3 Wildfire – Extreme	101033860	140000284250	06/17/20	37.9817	-120.2834
BFB	Tier3 Wildfire – Extreme	101292558	140000284891	06/17/20	39.3349	-121.3924
BFB	Tier3 Wildfire – Extreme	101292543	140000285206	06/17/20	39.3308	-121.3937
BFB	Tier3 Wildfire – Extreme	100100362	140000285220	06/17/20	39.3048	-120.9549
BFB	Tier3 Wildfire – Extreme	101259398	140000285473	06/16/20	38.2371	-120.3174
BFB	Tier3 Wildfire – Extreme	100359639	140000286216	06/17/20	39.4291	-121.4333
BFB	Tier3 Wildfire – Extreme	101051274	140000287140	06/18/20	37.9855	-120.4080
BFB	Tier2 Wildfire – High	102167248	140000287456	06/17/20	38.8166	-122.7161
BFB	Tier3 Wildfire – Extreme	101481581	140000287833	06/17/20	40.5031	-121.7395
BFB	Tier3 Wildfire – Extreme	101413822	140000288096	06/18/20	38.7872	-120.7748
BFB	Tier3 Wildfire – Extreme	100676092	140000288543	06/18/20	37.0367	-119.4379
BFB	Tier3 Wildfire – Extreme	100005210	140000288749	06/17/20	39.2991	-120.9725
BFB	Tier3 Wildfire – Extreme	101413695	140000288856	06/18/20	38.8112	-120.7519
BFB	Tier3 Wildfire – Extreme	101263694	140000288989	06/18/20	38.5018	-120.7208
BFB	Tier3 Wildfire – Extreme	100396307	140000289477	06/18/20	39.5168	-121.2665
BFB	Tier3 Wildfire – Extreme	100037667	140000289616	06/18/20	38.9132	-120.9635
BFB	Tier3 Wildfire – Extreme	101037001	140000289654	06/18/20	38.0289	-120.2280
BFB	Tier3 Wildfire – Extreme	100006416	140000289906	06/18/20	39.2607	-121.2155
BFB	Tier3 Wildfire – Extreme	100398691	140000289988	06/18/20	39.4258	-121.4427
BFB	Tier2 Wildfire – High	102229900	140000290131	06/18/20	38.0517	-122.6586
BFB	Tier3 Wildfire – Extreme	100348040	140000290858	06/19/20	39.4853	-121.2271
BFB	Tier3 Wildfire – Extreme	101049016	140000291514	06/18/20	38.0496	-120.3210
BFB	Tier3 Wildfire – Extreme	100680233	140000292061	06/18/20	37.0058	-119.4055
BFB	Tier3 Wildfire – Extreme	100652965	140000292121	06/18/20	36.9669	-119.3199
BFB	Tier2 Wildfire – High	102352334	140000292253	06/18/20	39.0516	-120.7521
BFB	Tier3 Wildfire – Extreme	101386104	140000292544	06/18/20	38.7952	-120.7250
BFB	Tier2 Wildfire – High	103848516	140000292580	06/19/20	39.2276	-121.2346
BFB	Tier3 Wildfire – Extreme	100650512	140000292732	06/19/20	36.9823	-119.3805
BFB	Tier3 Wildfire – Extreme	100006665	140000292775	06/18/20	39.2682	-121.1758
BFB	Tier3 Wildfire – Extreme	100083916	140000293282	06/16/20	38.9935	-120.9246
BFB	Tier3 Wildfire – Extreme	100092804	140000293285	06/18/20	38.9930	-120.9176
BFB	Tier3 Wildfire – Extreme	101035568	140000294425	06/19/20	38.0291	-120.2361
BFB	Tier3 Wildfire – Extreme	101335356	140000294979	06/19/20	39.4296	-121.2557
BFB	Tier3 Wildfire – Extreme	101056720	140000295149	06/19/20	38.0026	-120.3949
BFB	Tier2 Wildfire – High	102199444	140000295419	06/19/20	39.3913	-123.3313
BFB	Tier3 Wildfire – Extreme	101052840	140000295524	06/19/20	38.0608	-120.2713
BFB	Tier3 Wildfire – Extreme	100675911	140000295534	06/19/20	37.0291	-119.4449
BFB	Tier3 Wildfire – Extreme	100083099	140000296263	06/19/20	39.2352	-121.2601
BFB	Tier3 Wildfire – Extreme	101261176	140000296714	06/19/20	38.4794	-120.6991
BFB	Tier3 Wildfire – Extreme	100376184	140000296849	06/19/20	39.4806	-121.3586
BFB	Tier2 Wildfire – High	102167543	140000297456	06/19/20	38.7744	-122.6998
BFB	Tier3 Wildfire – Extreme	101419649	140000297511	06/19/20	38.7699	-120.4385
BFB	Tier2 Wildfire – High	102253233	140000297705	06/19/20	38.6339	-122.4193
BFB	Tier3 Wildfire – Extreme	101051212	140000298390	06/20/20	38.0250	-120.3793
BFB	Tier3 Wildfire – Extreme	100352920	140000299037	06/20/20	39.4509	-121.2806
BFB	Tier3 Wildfire – Extreme	101282708	140000299134	06/20/20	37.9425	-120.6325
BFB	Tier3 Wildfire – Extreme	101387039	140000299152	06/20/20	38.7968	-120.7545
BFB	Tier3 Wildfire – Extreme	100006803	140000299377	06/20/20	39.2613	-121.2110
BFB	Tier3 Wildfire – Extreme	101412943	140000299704	06/20/20	38.7990	-120.8577
BFB	Tier3 Wildfire – Extreme	100038047	140000300387	06/20/20	38.9135	-120.9422
BFB	Tier3 Wildfire – Extreme	101006327	140000300396	06/20/20	40.4933	-123.9886
BFB	Tier3 Wildfire – Extreme	100482694	140000300539	06/20/20	37.8970	-122.0028

BFB	Tier3 Wildfire – Extreme	101418147	140000300575	06/20/20	38.7445	-120.7855
BFB	Tier3 Wildfire – Extreme	100079869	140000300675	06/20/20	39.1708	-120.9354
BFB	Tier3 Wildfire – Extreme	100396325	140000301065	06/20/20	39.5176	-121.2596
BFB	Tier3 Wildfire – Extreme	101010242	140000301985	06/20/20	40.5085	-123.9909
BFB	Tier3 Wildfire – Extreme	101248175	140000302251	06/20/20	38.3759	-120.5627
BFB	Tier3 Wildfire – Extreme	100651158	140000302708	06/20/20	36.9727	-119.3914
BFB	Tier3 Wildfire – Extreme	100003412	140000302948	06/21/20	39.2921	-120.7184
BFB	Tier3 Wildfire – Extreme	100495737	140000303680	06/17/20	37.8592	-121.8493
BFB	Tier3 Wildfire – Extreme	101418283	140000305419	06/22/20	38.7969	-120.7000
BFB	Tier3 Wildfire – Extreme	101413793	140000305669	06/22/20	38.7960	-120.7563
BFB	Tier3 Wildfire – Extreme	100483731	140000306702	06/22/20	37.9088	-121.9047
BFB	Tier3 Wildfire – Extreme	100096751	140000307245	06/22/20	38.9321	-120.9000
BFB	Tier3 Wildfire – Extreme	100096743	140000307246	06/22/20	38.9339	-120.9011
BFB	Tier3 Wildfire – Extreme	101261056	140000308032	06/22/20	38.4854	-120.7004
BFB	Tier3 Wildfire – Extreme	100396172	140000308830	06/23/20	39.5038	-121.2784
BFB	Tier2 Wildfire – High	103803411	140000308894	06/22/20	37.4689	-122.2695
BFB	Tier3 Wildfire – Extreme	100396530	140000309196	06/23/20	39.5379	-121.1693
BFB	Tier2 Wildfire – High	103377255	140000309383	06/22/20	40.3428	-121.8858
BFB	Tier3 Wildfire – Extreme	100376199	140000311101	06/23/20	39.4809	-121.3674
BFB	Tier3 Wildfire – Extreme	101250503	140000312349	06/23/20	38.3958	-120.5817
BFB	Tier3 Wildfire – Extreme	101250492	140000312363	06/23/20	38.3908	-120.5830
BFB	Tier2 Wildfire – High	102186221	140000313370	06/22/20	39.2386	-123.6823
BFB	Tier3 Wildfire – Extreme	101261398	140000314246	06/23/20	38.4859	-120.6780
BFB	Tier3 Wildfire – Extreme	101261384	140000314247	06/23/20	38.4904	-120.6790
BFB	Tier3 Wildfire – Extreme	100414989	140000314384	06/24/20	39.5360	-121.1594
BFB	Tier3 Wildfire – Extreme	101415632	140000316481	06/24/20	38.7942	-120.6975
BFB	Tier3 Wildfire – Extreme	101265750	140000316498	06/24/20	38.4407	-120.5571
BFB	Tier3 Wildfire – Extreme	100415620	140000317152	06/24/20	39.4579	-121.2176
BFB	Tier3 Wildfire – Extreme	101031999	140000317337	06/24/20	38.0353	-120.3560
BFB	Tier3 Wildfire – Extreme	101283697	140000317627	06/24/20	37.9106	-120.6037
BFB	Tier3 Wildfire – Extreme	100083262	140000317903	06/24/20	38.9135	-120.8111
BFB	Tier3 Wildfire – Extreme	100076305	140000317953	06/24/20	39.1871	-120.8398
BFB	Tier3 Wildfire – Extreme	100007771	140000319159	06/24/20	39.2372	-121.1137
BFB	Tier3 Wildfire – Extreme	100679248	140000320228	06/25/20	37.0807	-119.4629
BFB	Tier3 Wildfire – Extreme	101247916	140000321689	06/25/20	38.1936	-120.8881
BFB	Tier3 Wildfire – Extreme	100007106	140000325802	06/23/20	39.2581	-120.7245
BFB	Tier3 Wildfire – Extreme	100060960	140000325946	06/25/20	38.8169	-121.0006
BFB	Tier3 Wildfire – Extreme	101329757	140000326297	06/25/20	39.3777	-121.2285
BFB	Tier3 Wildfire – Extreme	100007866	140000326395	06/25/20	39.2398	-121.1121
BFB	Tier3 Wildfire – Extreme	101030760	140000326650	06/25/20	38.0153	-120.3263
BFB	Tier3 Wildfire – Extreme	100039155	140000327246	06/25/20	38.9407	-120.7289
BFB	Tier3 Wildfire – Extreme	100009854	140000328534	06/24/20	39.1845	-120.8083
BFB	Tier3 Wildfire – Extreme	100079866	140000329025	06/25/20	39.1699	-120.9364
BFB	Tier3 Wildfire – Extreme	100650515	140000330260	06/26/20	36.9805	-119.3806
BFB	Tier2 Wildfire – High	103186683	140000330519	06/26/20	38.4138	-120.6951
BFB	Tier3 Wildfire – Extreme	100089135	140000330676	06/25/20	38.9224	-120.9054
BFB	Tier3 Wildfire – Extreme	101045476	140000331037	06/26/20	38.0589	-120.1880
BFB	Tier3 Wildfire – Extreme	101053963	140000331343	06/26/20	38.0514	-120.2633
BFB	Tier3 Wildfire – Extreme	100074971	140000331780	06/26/20	38.9116	-120.8256
BFB	Tier3 Wildfire – Extreme	101359847	140000331964	06/26/20	37.8308	-122.2012
BFB	Tier3 Wildfire – Extreme	101013459	140000332053	06/26/20	38.1564	-120.0517
BFB	Tier3 Wildfire – Extreme	100430548	140000332063	06/26/20	40.0375	-121.6181
BFB	Tier3 Wildfire – Extreme	100374678	140000332465	06/26/20	39.5465	-121.2921
BFB	Tier3 Wildfire – Extreme	100416740	140000332547	06/26/20	39.5418	-121.1492
BFB	Tier3 Wildfire – Extreme	101420027	140000333456	06/26/20	38.7787	-120.4266
BFB	Tier3 Wildfire – Extreme	101051068	140000334242	06/26/20	38.2358	-119.9857
BFB	Tier3 Wildfire – Extreme	100002665	140000334861	06/26/20	39.3189	-121.1228
BFB	Tier3 Wildfire – Extreme	101422259	140000335518	06/27/20	38.7455	-120.9996
BFB	Tier3 Wildfire – Extreme	101032375	140000335603	06/27/20	38.0402	-120.3450
BFB	Tier3 Wildfire – Extreme	101051038	140000335970	06/27/20	38.2403	-119.9921
BFB	Tier3 Wildfire – Extreme	101054059	140000336944	06/27/20	38.0578	-120.2575
BFB	Tier3 Wildfire – Extreme	100038750	140000337139	06/27/20	38.9431	-120.7201
BFB	Tier3 Wildfire – Extreme	101419256	140000337350	06/27/20	38.6848	-120.6660
BFB	Tier3 Wildfire – Extreme	101396520	140000338857	06/28/20	38.6809	-120.6641
BFB	Tier3 Wildfire – Extreme	100962460	140000339562	06/24/20	40.8713	-123.5881
BFB	Tier2 Wildfire – High	103678464	140000341236	06/29/20	39.3122	-121.2752
BFB	Tier3 Wildfire – Extreme	100048773	140000343310	06/29/20	38.9071	-120.8239
BFB	Tier3 Wildfire – Extreme	100413268	140000343597	06/29/20	39.6814	-121.3446
BFB	Tier3 Wildfire – Extreme	101388053	140000345087	06/29/20	38.7353	-120.7937
BFB	Tier3 Wildfire – Extreme	101038196	140000346921	06/30/20	38.1556	-120.0571
BFB	Tier3 Wildfire – Extreme	100391802	140000347105	06/30/20	40.0103	-121.2284
BFB	Tier3 Wildfire – Extreme	101054800	140000347359	06/30/20	38.0408	-120.2638
BFB	Tier3 Wildfire – Extreme	100422033	140000348278	06/30/20	39.4741	-121.3054
BFB	Tier3 Wildfire – Extreme	100006077	140000348417	06/30/20	39.2466	-120.7311
BFB	Tier3 Wildfire – Extreme	100495625	140000349568	06/30/20	37.8697	-121.9276
BFB	Tier3 Wildfire – Extreme	101038219	140000349750	06/30/20	38.1625	-120.0534
BFB	Tier3 Wildfire – Extreme	101419027	140000350534	06/30/20	38.6834	-120.6389
BFB	Tier3 Wildfire – Extreme	101039233	140000350900	06/30/20	38.1561	-120.0566
BFB	Tier3 Wildfire – Extreme	100348077	140000352011	06/30/20	39.6534	-121.4013
BFB	Tier3 Wildfire – Extreme	100096368	140000352577	06/30/20	39.4408	-121.0744
BFB	Tier3 Wildfire – Extreme	100008442	140000352796	07/01/20	39.2326	-121.1521
BFB	Tier3 Wildfire – Extreme	101037561	140000353610	07/01/20	38.0867	-120.1541
BFB	Tier3 Wildfire – Extreme	101254816	140000353686	07/01/20	38.3884	-120.6735
BFB	Tier3 Wildfire – Extreme	100495596	140000353997	07/01/20	37.8675	-121.9341
BFB	Tier2 Wildfire – High	102241559	140000354894	07/01/20	38.4995	-122.4839
BFB	Tier3 Wildfire – Extreme	100495607	140000355554	07/01/20	37.8590	-121.9308
BFB	Tier3 Wildfire – Extreme	101243541	140000355922	07/01/20	38.4245	-120.4929
BFB	Tier2 Wildfire – High	101691178	140000356316	07/01/20	36.9973	-121.8937
BFB	Tier3 Wildfire – Extreme	101008738	140000357855	07/01/20	40.2821	-123.3935
BFB	Tier2 Wildfire – High	102007085	140000358270	07/01/20	38.3736	-122.9620
BFB	Tier3 Wildfire – Extreme	101243527	140000358475	07/01/20	38.4284	-120.4930
BFB	Tier3 Wildfire – Extreme	101293164	140000358764	07/01/20	39.3323	-121.3954
BFB	Tier3 Wildfire – Extreme	101402719	140000359009	07/01/20	38.6567	-120.6097
BFB	Tier3 Wildfire – Extreme	101039271	140000359660	07/02/20	38.0402	-120.2320

BFB	Tier3 Wildfire – Extreme	100086720	140000359762	07/01/20	39.4356	-121.0851
BFB	Tier3 Wildfire – Extreme	100056162	140000360761	07/02/20	38.8583	-120.8634
BFB	Tier3 Wildfire – Extreme	100487255	140000363918	07/02/20	37.8883	-122.1954
BFB	Tier3 Wildfire – Extreme	101087511	140000364838	07/02/20	37.5747	-119.8491
BFB	Tier3 Wildfire – Extreme	100046729	140000365395	07/03/20	38.8990	-120.9457
BFB	Tier3 Wildfire – Extreme	100086858	140000365445	07/02/20	39.2053	-120.8079
BFB	Tier3 Wildfire – Extreme	101045180	140000365919	07/03/20	38.0601	-120.1951
BFB	Tier3 Wildfire – Extreme	100369996	140000366085	07/03/20	39.6911	-121.3359
BFB	Tier3 Wildfire – Extreme	100347888	140000366702	07/03/20	39.6300	-121.4318
BFB	Tier3 Wildfire – Extreme	100073485	140000367224	07/03/20	38.8798	-120.8311
BFB	Tier3 Wildfire – Extreme	100971442	140000368768	07/03/20	40.9170	-123.6113
BFB	Tier3 Wildfire – Extreme	100488791	140000369122	07/03/20	37.8569	-122.1718
BFB	Tier3 Wildfire – Extreme	100108327	140000369406	07/03/20	38.8476	-120.7791
BFB	Tier3 Wildfire – Extreme	100009572	140000369444	07/03/20	39.2087	-120.8098
BFB	Tier3 Wildfire – Extreme	100971025	140000369608	07/03/20	40.8641	-123.5003
BFB	Tier3 Wildfire – Extreme	100004241	140000370301	07/05/20	39.2733	-120.7018
BFB	Tier2 Wildfire – High	102227666	140000370868	07/06/20	38.5640	-122.5676
BFB	Tier3 Wildfire – Extreme	100075027	140000374081	07/06/20	38.8598	-120.8452
BFB	Tier3 Wildfire – Extreme	100057146	140000374417	07/06/20	38.8270	-121.0311
BFB	Tier2 Wildfire – High	101852892	140000374628	07/06/20	35.2389	-120.7584
BFB	Tier3 Wildfire – Extreme	101383442	140000375145	07/06/20	38.6411	-120.8615
BFB	Tier3 Wildfire – Extreme	101243494	140000375958	07/06/20	38.4341	-120.4912
BFB	Tier2 Wildfire – High	101523112	140000376957	07/06/20	40.0096	-122.4171
BFB	Tier3 Wildfire – Extreme	101402637	140000377073	07/06/20	38.6610	-120.6215
BFB	Tier3 Wildfire – Extreme	101403202	140000377837	07/07/20	38.5938	-120.6598
BFB	Tier3 Wildfire – Extreme	100357339	140000378496	07/06/20	39.4894	-121.2465
BFB	Tier3 Wildfire – Extreme	101387062	140000378689	07/07/20	38.7518	-120.7593
BFB	Tier3 Wildfire – Extreme	101030931	140000379034	07/07/20	37.9484	-120.3888
BFB	Tier2 Wildfire – High	102020547	140000379885	07/07/20	38.4531	-122.6857
BFB	Tier3 Wildfire – Extreme	100075030	140000380282	07/07/20	38.8617	-120.8749
BFB	Tier2 Wildfire – High	102258584	140000381021	07/07/20	38.0092	-122.6382
BFB	Tier3 Wildfire – Extreme	100539822	140000381241	07/07/20	37.2035	-122.0060
BFB	Tier3 Wildfire – Extreme	100107045	140000382017	07/07/20	39.2355	-121.1738
BFB	Tier3 Wildfire – Extreme	100962518	140000382102	07/07/20	40.8916	-123.5846
BFB	Tier3 Wildfire – Extreme	101392347	140000382417	07/07/20	38.7463	-120.5583
BFB	Tier3 Wildfire – Extreme	100002403	140000383106	07/07/20	39.3382	-121.1003
BFB	Tier3 Wildfire – Extreme	100056159	140000384232	07/08/20	38.8375	-120.8544
BFB	Tier3 Wildfire – Extreme	101260821	140000385135	07/08/20	38.4227	-120.6721
BFB	Tier3 Wildfire – Extreme	101474253	140000385205	07/08/20	40.7678	-121.9717
BFB	Tier2 Wildfire – High	103972773	140000385626	07/08/20	39.3997	-121.2242
BFB	Tier3 Wildfire – Extreme	100093728	140000387072	07/08/20	39.3990	-120.7875
BFB	Tier3 Wildfire – Extreme	101039501	140000387225	07/08/20	38.1383	-120.0652
BFB	Tier3 Wildfire – Extreme	100103552	140000387735	07/08/20	39.4051	-120.7868
BFB	Tier3 Wildfire – Extreme	100495857	140000387752	07/08/20	37.8914	-121.8503
BFB	Tier3 Wildfire – Extreme	101399661	140000387956	07/08/20	38.6327	-120.5669
BFB	Tier3 Wildfire – Extreme	100681706	140000388582	07/08/20	37.0362	-119.3291
BFB	Tier3 Wildfire – Extreme	101075642	140000388617	07/08/20	37.5821	-119.9583
BFB	Tier3 Wildfire – Extreme	100055998	140000392915	07/09/20	38.8367	-120.8569
BFB	Tier3 Wildfire – Extreme	100500240	140000393745	07/09/20	37.8221	-122.0190
BFB	Tier3 Wildfire – Extreme	101400650	140000393751	07/09/20	38.6342	-120.5322
BFB	Tier3 Wildfire – Extreme	101287253	140000394433	07/09/20	39.3817	-121.2515
BFB	Tier3 Wildfire – Extreme	100110440	140000394917	07/09/20	38.8431	-120.8431
BFB	Tier3 Wildfire – Extreme	101287222	140000395230	07/09/20	39.3848	-121.2532
BFB	Tier3 Wildfire – Extreme	100102911	140000396082	07/09/20	39.4851	-120.8683
BFB	Tier3 Wildfire – Extreme	100091862	140000397001	07/09/20	39.2357	-120.9581
BFB	Tier3 Wildfire – Extreme	100969948	140000397343	07/09/20	40.8771	-123.5179
BFB	Tier3 Wildfire – Extreme	100103585	140000397404	07/09/20	39.4170	-120.7875
BFB	Tier3 Wildfire – Extreme	100046272	140000397873	07/09/20	38.9081	-120.9731
BFB	Tier3 Wildfire – Extreme	101400571	140000398256	07/10/20	38.6405	-120.5323
BFB	Tier3 Wildfire – Extreme	101029312	140000399896	07/10/20	37.8898	-120.3724
BFB	Tier3 Wildfire – Extreme	101029314	140000399898	07/10/20	37.8898	-120.3749
BFB	Tier3 Wildfire – Extreme	101043983	140000401515	07/10/20	37.9965	-120.4154
BFB	Tier3 Wildfire – Extreme	100056491	140000401641	07/10/20	38.8655	-120.7931
BFB	Tier3 Wildfire – Extreme	100424775	140000403431	07/10/20	39.6239	-121.4361
BFB	Tier2 Wildfire – High	101843432	140000404494	07/11/20	35.3264	-120.6233
BFB	Tier3 Wildfire – Extreme	100473326	140000405365	07/13/20	37.9056	-122.2191
BFB	Tier3 Wildfire – Extreme	101372229	140000405409	07/12/20	37.8358	-122.1959
BFB	Tier3 Wildfire – Extreme	100519340	140000407212	07/13/20	37.1325	-122.0009
BFB	Tier2 Wildfire – High	102010614	140000408006	07/13/20	38.3662	-123.0056
BFB	Tier3 Wildfire – Extreme	101075051	140000409049	07/13/20	37.4849	-119.8028
BFB	Tier3 Wildfire – Extreme	101403165	140000409475	07/13/20	38.5970	-120.6632
BFB	Tier3 Wildfire – Extreme	100046225	140000411550	07/13/20	38.9006	-120.9777
BFB	Tier3 Wildfire – Extreme	100110634	140000412244	07/13/20	38.8286	-120.8449
BFB	Tier3 Wildfire – Extreme	100108184	140000412391	07/13/20	38.8482	-120.8100
BFB	Tier3 Wildfire – Extreme	101274252	140000413860	07/14/20	38.2666	-120.5078
BFB	Tier3 Wildfire – Extreme	101029777	140000415079	07/14/20	37.8475	-120.2818
BFB	Tier3 Wildfire – Extreme	101029819	140000415338	07/14/20	37.8466	-120.2792
BFB	Tier3 Wildfire – Extreme	101029694	140000416353	07/14/20	37.8825	-120.3073
BFB	Tier3 Wildfire – Extreme	100108725	140000417853	07/14/20	38.8447	-120.8616
BFB	Tier2 Wildfire – High	103109982	140000418578	07/14/20	38.0341	-120.3940
BFB	Tier3 Wildfire – Extreme	100099174	140000420055	07/14/20	39.2513	-121.1323
BFB	Tier3 Wildfire – Extreme	100347435	140000420571	07/15/20	39.6376	-121.3937
BFB	Tier3 Wildfire – Extreme	100550540	140000421686	07/15/20	37.1019	-121.9406
BFB	Tier3 Wildfire – Extreme	100419490	140000422215	07/15/20	39.6312	-121.3616
BFB	Tier3 Wildfire – Extreme	100486674	140000423199	07/15/20	37.8914	-122.2105
BFB	Tier3 Wildfire – Extreme	101381843	140000424289	07/15/20	38.8146	-120.9055
BFB	Tier3 Wildfire – Extreme	100969849	140000426380	07/15/20	40.8756	-123.5201
BFB	Tier3 Wildfire – Extreme	100108783	140000428828	07/16/20	38.8620	-120.8285
BFB	Tier3 Wildfire – Extreme	101409405	140000429824	07/16/20	38.7414	-120.9845
BFB	Tier3 Wildfire – Extreme	101074877	140000430756	07/16/20	37.4775	-119.8292
BFB	Tier3 Wildfire – Extreme	101042249	140000431269	07/16/20	38.0257	-120.4057
BFB	Tier3 Wildfire – Extreme	101383456	140000431920	07/16/20	38.5957	-120.8611
BFB	Tier3 Wildfire – Extreme	100519547	140000432042	07/16/20	37.1043	-121.9065
BFB	Tier2 Wildfire – High	103350969	140000432062	07/16/20	37.8291	-120.2527

BFB	Tier3 Wildfire – Extreme	101086092	140000433235	07/16/20	37.4481	-119.9828
BFB	Tier3 Wildfire – Extreme	101412097	140000433724	07/16/20	38.8153	-120.9037
BFB	Tier3 Wildfire – Extreme	100550871	140000434004	07/16/20	37.1320	-121.9803
BFB	Tier3 Wildfire – Extreme	101401745	140000434867	07/16/20	38.5814	-120.5786
BFB	Tier3 Wildfire – Extreme	100509385	140000437020	07/17/20	37.1335	-121.9810
BFB	Tier3 Wildfire – Extreme	100365630	140000438356	07/17/20	39.6512	-121.4472
BFB	Tier3 Wildfire – Extreme	101379625	140000441942	07/17/20	38.7280	-120.9359
BFB	Tier3 Wildfire – Extreme	100973957	140000443392	07/19/20	40.8195	-123.5128
BFB	Tier3 Wildfire – Extreme	100969550	140000443560	07/18/20	40.8766	-123.5258
BFB	Tier3 Wildfire – Extreme	100013392	140000444470	07/17/20	39.1783	-121.2483
BFB	Tier3 Wildfire – Extreme	101068079	140000445527	07/20/20	37.4409	-119.9844
BFB	Tier3 Wildfire – Extreme	101046601	140000447369	07/20/20	37.9420	-120.2484
BFB	Tier3 Wildfire – Extreme	101088154	140000447576	07/20/20	37.4673	-119.9383
BFB	Tier2 Wildfire – High	101953562	140000447966	07/20/20	38.3352	-122.6166
BFB	Tier3 Wildfire – Extreme	101414780	140000448159	07/20/20	38.6074	-120.7184
BFB	Tier3 Wildfire – Extreme	101374977	140000449072	07/20/20	38.7775	-120.9464
BFB	Tier3 Wildfire – Extreme	100079375	140000450645	07/20/20	39.2045	-121.0202
BFB	Tier3 Wildfire – Extreme	100067495	140000450919	07/20/20	39.1680	-121.0386
BFB	Tier3 Wildfire – Extreme	100007351	140000450933	07/21/20	39.2523	-121.1552
BFB	Tier2 Wildfire – High	102231660	140000452957	07/21/20	37.9510	-122.5245
BFB	Tier3 Wildfire – Extreme	100419983	140000454958	07/21/20	39.6527	-121.3553
BFB	Tier3 Wildfire – Extreme	101389015	140000455450	07/21/20	38.7842	-120.9472
BFB	Tier3 Wildfire – Extreme	101393457	140000456080	07/21/20	38.5481	-120.7061
BFB	Tier3 Wildfire – Extreme	100080448	140000456736	07/21/20	39.1927	-121.0073
BFB	Tier3 Wildfire – Extreme	100075782	140000457236	07/21/20	39.2131	-121.0149
BFB	Tier3 Wildfire – Extreme	101409236	140000458321	07/21/20	38.7106	-120.9501
BFB	Tier3 Wildfire – Extreme	100013216	140000458446	07/21/20	39.1698	-121.2984
BFB	Tier3 Wildfire – Extreme	100518351	140000459523	07/22/20	37.1657	-122.0406
BFB	Tier3 Wildfire – Extreme	101076730	140000459798	07/22/20	37.5051	-119.7892
BFB	Tier3 Wildfire – Extreme	101034810	140000459850	07/22/20	37.8257	-120.2340
BFB	Tier3 Wildfire – Extreme	100487046	140000460809	07/22/20	37.8845	-122.2068
BFB	Tier3 Wildfire – Extreme	101066836	140000461741	07/22/20	37.4697	-119.7319
BFB	Tier3 Wildfire – Extreme	101036171	140000462234	07/22/20	38.0314	-120.2437
BFB	Tier3 Wildfire – Extreme	100067468	140000462596	07/22/20	39.1775	-121.0429
BFB	Tier3 Wildfire – Extreme	100391135	140000462678	07/22/20	39.9261	-121.0677
BFB	Tier3 Wildfire – Extreme	100075831	140000464643	07/22/20	39.2108	-121.0132
BFB	Tier3 Wildfire – Extreme	101414638	140000466050	07/22/20	38.8073	-120.9241
BFB	Tier3 Wildfire – Extreme	101077254	140000466625	07/23/20	37.4531	-119.7667
BFB	Tier3 Wildfire – Extreme	101043225	140000467466	07/23/20	37.8070	-120.2033
BFB	Tier2 Wildfire – High	102004333	140000467766	07/23/20	38.3648	-122.5262
BFB	Tier3 Wildfire – Extreme	100110491	140000468959	07/23/20	39.1753	-120.9673
BFB	Tier3 Wildfire – Extreme	101065694	140000469584	07/23/20	37.4300	-119.9277
BFB	Tier3 Wildfire – Extreme	101040751	140000469834	07/23/20	37.8504	-120.1851
BFB	Tier3 Wildfire – Extreme	100103460	140000470218	07/23/20	39.1609	-121.2057
BFB	Tier3 Wildfire – Extreme	101374762	140000470747	07/23/20	38.7760	-120.9486
BFB	Tier3 Wildfire – Extreme	100425843	140000471462	07/23/20	39.6240	-121.4337
BFB	Tier3 Wildfire – Extreme	100679415	140000472318	07/23/20	37.0395	-119.3415
BFB	Tier3 Wildfire – Extreme	100360983	140000472464	07/23/20	39.5794	-121.4153
BFB	Tier3 Wildfire – Extreme	101007007	140000474858	07/24/20	40.2764	-123.3419
BFB	Tier3 Wildfire – Extreme	101382286	140000474954	07/24/20	38.7913	-120.8801
BFB	Tier3 Wildfire – Extreme	100012888	140000476770	07/24/20	39.1678	-121.1486
BFB	Tier2 Wildfire – High	101806130	140000477561	07/24/20	37.0200	-122.1278
BFB	Tier3 Wildfire – Extreme	101401418	140000477623	07/24/20	38.6370	-120.7296
BFB	Tier3 Wildfire – Extreme	101400283	140000477916	07/24/20	38.7231	-120.6033
BFB	Tier2 Wildfire – High	101674523	140000478448	07/24/20	37.0780	-122.1374
BFB	Tier3 Wildfire – Extreme	101410060	140000478884	07/24/20	38.6046	-120.9937
BFB	Tier3 Wildfire – Extreme	100067786	140000480955	07/23/20	39.1598	-121.0195
BFB	Tier3 Wildfire – Extreme	100106577	140000481076	07/24/20	39.1653	-120.9678
BFB	Tier3 Wildfire – Extreme	100097132	140000481109	07/24/20	39.1736	-120.9962
BFB	Tier3 Wildfire – Extreme	101059210	140000483121	07/27/20	37.2292	-119.4577
BFB	Tier2 Wildfire – High	102021262	140000484061	07/23/20	38.4779	-123.0561
BFB	Tier3 Wildfire – Extreme	100391181	140000484406	07/27/20	39.9214	-121.0927
BFB	Tier3 Wildfire – Extreme	100010158	140000485236	07/27/20	39.2159	-120.8055
BFB	Tier3 Wildfire – Extreme	100004107	140000485841	07/27/20	39.2928	-120.6752
BFB	Tier3 Wildfire – Extreme	101026105	140000491181	07/28/20	37.3972	-119.6997
BFB	Tier3 Wildfire – Extreme	101057416	140000491561	07/28/20	38.0142	-120.2730
BFB	Tier3 Wildfire – Extreme	100373566	140000491610	07/28/20	39.5558	-121.3585
BFB	Tier3 Wildfire – Extreme	101057418	140000491842	07/28/20	38.0141	-120.2736
BFB	Tier3 Wildfire – Extreme	101190325	140000492548	07/28/20	37.7034	-120.3415
BFB	Tier3 Wildfire – Extreme	100050345	140000493869	07/28/20	38.9078	-121.1264
BFB	Tier3 Wildfire – Extreme	100403466	140000494022	07/28/20	39.8660	-121.1694
BFB	Tier3 Wildfire – Extreme	101011580	140000494429	07/28/20	41.1844	-123.7042
BFB	Tier3 Wildfire – Extreme	101190249	140000494459	07/28/20	37.7008	-120.3364
BFB	Tier3 Wildfire – Extreme	100961544	140000495244	07/28/20	41.3241	-123.5185
BFB	Tier3 Wildfire – Extreme	100323084	140000495359	07/28/20	37.2376	-122.3218
BFB	Tier3 Wildfire – Extreme	100093883	140000496095	07/28/20	39.5684	-120.6193
BFB	Tier3 Wildfire – Extreme	100525416	140000497492	07/29/20	37.2164	-121.9724
BFB	Tier3 Wildfire – Extreme	100106401	140000497815	07/29/20	39.2509	-120.9363
BFB	Tier3 Wildfire – Extreme	100525626	140000500285	07/29/20	37.2287	-122.0057
BFB	Tier3 Wildfire – Extreme	101190359	140000500775	07/29/20	37.7078	-120.3459
BFB	Tier3 Wildfire – Extreme	101027264	140000501753	07/29/20	37.2978	-119.5376
BFB	Tier3 Wildfire – Extreme	101016530	140000501768	07/29/20	37.5483	-119.6377
BFB	Tier3 Wildfire – Extreme	100518027	140000501853	07/29/20	37.1699	-122.0665
BFB	Tier2 Wildfire – High	101674031	140000502747	07/29/20	37.0504	-122.1517
BFB	Tier3 Wildfire – Extreme	100312894	140000502956	07/29/20	37.3251	-122.2049
BFB	Tier3 Wildfire – Extreme	101009371	140000503222	07/29/20	40.4187	-123.4781
BFB	Tier3 Wildfire – Extreme	101016520	140000504670	07/30/20	37.5481	-119.6350
BFB	Tier3 Wildfire – Extreme	101059612	140000504826	07/30/20	37.2292	-119.4694
BFB	Tier3 Wildfire – Extreme	101411217	140000505424	07/30/20	38.7495	-120.9007
BFB	Tier3 Wildfire – Extreme	101023064	140000507801	07/30/20	37.3791	-119.6402
BFB	Tier3 Wildfire – Extreme	101057715	140000508425	07/30/20	37.3081	-119.5083
BFB	Tier3 Wildfire – Extreme	100385105	140000509522	07/30/20	39.8741	-121.1741
BFB	Tier3 Wildfire – Extreme	100373671	140000511212	07/30/20	39.5663	-121.3848
BFB	Tier3 Wildfire – Extreme	101058175	140000512352	07/31/20	37.2623	-119.5058

BFB	Tier3 Wildfire – Extreme	101053057	140000516008	07/31/20	37.2091	-119.5321
BFB	Tier2 Wildfire – High	103127653	140000516143	07/31/20	37.1283	-122.1668
BFB	Tier3 Wildfire – Extreme	100091337	140000516341	07/31/20	39.5582	-120.8318
BFB	Tier3 Wildfire – Extreme	100068070	140000517894	07/31/20	39.3624	-121.1212
BFB	Tier3 Wildfire – Extreme	100373611	140000518052	07/31/20	39.5537	-121.3699
BFB	Tier3 Wildfire – Extreme	100266505	140000518556	08/01/20	37.3482	-122.1971
BFB	Tier2 Wildfire – High	103785485	140000519019	08/01/20	38.7128	-120.9457
BFB	Tier2 Wildfire – High	103315412	140000519254	08/01/20	41.2253	-123.7698
BFB	Tier3 Wildfire – Extreme	100553844	140000520334	08/03/20	37.1593	-121.9878
BFB	Tier3 Wildfire – Extreme	101376702	140000521363	08/03/20	38.5905	-120.9688
BFB	Tier3 Wildfire – Extreme	101075602	140000523572	08/03/20	37.5759	-119.9533
BFB	Tier3 Wildfire – Extreme	101057761	140000525088	08/03/20	37.2277	-119.4878
BFB	Tier3 Wildfire – Extreme	100267620	140000526325	08/03/20	37.2064	-122.3318
BFB	Tier2 Wildfire – High	103794427	140000526413	08/03/20	39.3088	-123.7479
BFB	Tier3 Wildfire – Extreme	101377688	140000526820	08/03/20	38.6340	-120.9308
BFB	Tier3 Wildfire – Extreme	101412292	140000528742	08/04/20	38.7051	-120.9852
BFB	Tier3 Wildfire – Extreme	101038278	140000530528	08/04/20	37.8003	-120.1200
BFB	Tier3 Wildfire – Extreme	101380091	140000531175	08/03/20	38.7068	-120.9190
BFB	Tier3 Wildfire – Extreme	100084684	140000532210	08/04/20	39.2359	-120.9815
BFB	Tier3 Wildfire – Extreme	101188554	140000532465	08/04/20	37.6450	-120.3184
BFB	Tier3 Wildfire – Extreme	100093246	140000534119	08/04/20	39.4226	-121.0167
BFB	Tier3 Wildfire – Extreme	101189910	140000535024	08/05/20	37.6648	-120.3200
BFB	Tier3 Wildfire – Extreme	100109504	140000535645	08/05/20	39.2219	-121.2134
BFB	Tier3 Wildfire – Extreme	100551503	140000535727	08/05/20	37.1088	-121.9459
BFB	Tier3 Wildfire – Extreme	100388815	140000535795	08/04/20	39.9706	-120.9480
BFB	Tier3 Wildfire – Extreme	100268338	140000536261	08/05/20	37.1362	-122.3037
BFB	Tier3 Wildfire – Extreme	101192897	140000537239	08/05/20	37.7138	-120.3294
BFB	Tier3 Wildfire – Extreme	101190136	140000538537	08/05/20	37.6997	-120.3309
BFB	Tier3 Wildfire – Extreme	101063593	140000538732	08/05/20	37.1826	-119.5558
BFB	Tier3 Wildfire – Extreme	101057657	140000539953	08/05/20	37.2312	-119.4991
BFB	Tier3 Wildfire – Extreme	100319922	140000541046	08/05/20	37.3756	-122.3787
BFB	Tier3 Wildfire – Extreme	100961467	140000541206	08/05/20	41.3569	-123.5085
BFB	Tier3 Wildfire – Extreme	101190054	140000541798	08/06/20	37.6803	-120.3227
BFB	Tier3 Wildfire – Extreme	100268445	140000541888	08/05/20	37.2427	-122.3376
BFB	Tier2 Wildfire – High	103893635	140000542287	08/06/20	37.6389	-120.3364
BFB	Tier3 Wildfire – Extreme	101075209	140000543409	08/06/20	37.5664	-119.9503
BFB	Tier3 Wildfire – Extreme	100969594	140000543617	08/06/20	41.1109	-123.7120
BFB	Tier3 Wildfire – Extreme	100538347	140000544393	08/06/20	37.1634	-121.9754
BFB	Tier3 Wildfire – Extreme	100518551	140000544613	08/06/20	37.1756	-121.9887
BFB	Tier3 Wildfire – Extreme	101190976	140000545963	08/06/20	37.7262	-120.3272
BFB	Tier2 Wildfire – High	103523642	140000546955	08/06/20	37.7338	-122.0289
BFB	Tier3 Wildfire – Extreme	100360998	140000547327	08/06/20	39.5765	-121.4150
BFB	Tier2 Wildfire – High	101798998	140000548318	08/06/20	37.0324	-122.0898
BFB	Tier3 Wildfire – Extreme	100555783	140000550718	08/07/20	37.2445	-122.0160
BFB	Tier3 Wildfire – Extreme	100100688	140000551887	08/07/20	39.3709	-121.1037
BFB	Tier3 Wildfire – Extreme	100549681	140000555119	08/07/20	37.1953	-122.0239
BFB	Tier3 Wildfire – Extreme	100100702	140000555204	08/07/20	39.3982	-121.1044
BFB	Tier3 Wildfire – Extreme	101291537	140000556534	08/10/20	39.3348	-121.3245
BFB	Tier3 Wildfire – Extreme	100069138	140000566274	08/10/20	39.1917	-121.2322
BFB	Tier3 Wildfire – Extreme	101038513	140000566447	08/10/20	37.8267	-119.9700
BFB	Tier3 Wildfire – Extreme	100555230	140000566594	08/10/20	37.1583	-122.0135
BFB	Tier3 Wildfire – Extreme	100111525	140000567595	08/10/20	39.3983	-121.0988
BFB	Tier2 Wildfire – High	103926036	140000568243	08/10/20	38.6870	-120.7787
BFB	Tier3 Wildfire – Extreme	100441977	140000568965	08/10/20	37.9953	-122.1769
BFB	Tier3 Wildfire – Extreme	100067863	140000569696	08/11/20	39.1679	-121.0371
BFB	Tier3 Wildfire – Extreme	101392947	140000570044	08/11/20	38.6770	-120.8156
BFB	Tier2 Wildfire – High	101672974	140000571236	08/11/20	37.1908	-122.1401
BFB	Tier3 Wildfire – Extreme	100482828	140000571814	08/11/20	37.9222	-121.9890
BFB	Tier3 Wildfire – Extreme	100086004	140000572337	08/11/20	39.2200	-121.1624
BFB	Tier3 Wildfire – Extreme	100004880	140000573519	08/11/20	39.2837	-120.9438
BFB	Tier3 Wildfire – Extreme	100104962	140000573876	08/11/20	39.3410	-121.1090
BFB	Tier3 Wildfire – Extreme	101404223	140000574112	08/11/20	38.6963	-120.7908
BFB	Tier3 Wildfire – Extreme	101393928	140000574702	08/11/20	38.6821	-120.7645
BFB	Tier3 Wildfire – Extreme	101393789	140000574709	08/11/20	38.6785	-120.7710
BFB	Tier3 Wildfire – Extreme	100106814	140000575583	08/11/20	39.2430	-120.9824
BFB	Tier3 Wildfire – Extreme	101399348	140000576256	08/12/20	38.6930	-120.6090
BFB	Tier3 Wildfire – Extreme	101286819	140000577069	08/12/20	39.3728	-121.1952
BFB	Tier3 Wildfire – Extreme	101400196	140000577183	08/12/20	38.6876	-120.6266
BFB	Tier3 Wildfire – Extreme	100002334	140000577759	08/12/20	39.3497	-121.0714
BFB	Tier3 Wildfire – Extreme	100525615	140000581281	08/12/20	37.2132	-121.9653
BFB	Tier3 Wildfire – Extreme	100080868	140000582299	08/12/20	39.1863	-120.9936
BFB	Tier3 Wildfire – Extreme	100084717	140000582907	08/12/20	39.1831	-120.9408
BFB	Tier3 Wildfire – Extreme	101379014	140000584313	08/13/20	38.7168	-120.9576
BFB	Tier3 Wildfire – Extreme	100108898	140000584406	08/13/20	38.8777	-120.8667
BFB	Tier3 Wildfire – Extreme	100962245	140000589072	08/13/20	41.0242	-123.6600
BFB	Tier3 Wildfire – Extreme	101420753	140000592041	08/14/20	38.7080	-120.6105
BFB	Tier3 Wildfire – Extreme	100080392	140000592416	08/14/20	39.2123	-121.0071
BFB	Tier3 Wildfire – Extreme	101377878	140000593414	08/14/20	38.5964	-120.9872
BFB	Tier3 Wildfire – Extreme	100011174	140000595559	08/14/20	39.1883	-121.2447
BFB	Tier3 Wildfire – Extreme	100609635	140000597184	08/15/20	37.0400	-121.7149
BFB	Tier3 Wildfire – Extreme	100010581	140000599393	08/15/20	39.1927	-121.2447
BFB	Tier3 Wildfire – Extreme	101416172	140000603846	08/17/20	38.6933	-120.7650
BFB	Tier3 Wildfire – Extreme	100553708	140000603890	08/17/20	37.2520	-122.0474
BFB	Tier3 Wildfire – Extreme	101006962	140000603927	08/17/20	40.4615	-123.6975
BFB	Tier3 Wildfire – Extreme	100112112	140000605345	08/17/20	39.5563	-120.7912
BFB	Tier3 Wildfire – Extreme	101394270	140000606020	08/17/20	38.6713	-120.7640
BFB	Tier3 Wildfire – Extreme	101393136	140000608769	08/18/20	38.6796	-120.7935
BFB	Tier3 Wildfire – Extreme	100520616	140000609286	08/18/20	37.0869	-121.9456
BFB	Tier3 Wildfire – Extreme	100077482	140000609828	08/18/20	39.2089	-121.0448
BFB	Tier3 Wildfire – Extreme	100004816	140000610619	08/17/20	39.3083	-120.9071
BFB	Tier3 Wildfire – Extreme	101388903	140000610845	08/18/20	38.8047	-120.9155
BFB	Tier3 Wildfire – Extreme	100984491	140000615909	08/19/20	40.0827	-123.9501
BFB	Tier3 Wildfire – Extreme	101402138	140000616464	08/19/20	38.7282	-120.6748
BFB	Tier2 Wildfire – High	103666845	140000618101	08/19/20	38.6960	-120.6889

BFB	Tier3 Wildfire – Extreme	101392753	140000619097	08/20/20	38.7214	-120.7191
BFB	Tier3 Wildfire – Extreme	100073851	140000624868	08/21/20	39.1520	-121.0256
BFB	Tier3 Wildfire – Extreme	100094200	140000625581	08/21/20	39.2623	-120.9606
BFB	Tier3 Wildfire – High	103453596	140000627732	08/21/20	37.0414	-121.6577
BFB	Tier3 Wildfire – Extreme	100010359	140000628343	08/21/20	39.2209	-120.9636
BFB	Tier3 Wildfire – Extreme	101403925	140000629072	08/21/20	38.6896	-120.7585
BFB	Tier3 Wildfire – Extreme	101420537	140000631836	08/22/20	38.7032	-120.6923
BFB	Tier3 Wildfire – Extreme	101401373	140000632399	08/21/20	38.7143	-120.6826
BFB	Tier3 Wildfire – Extreme	100066744	140000632727	08/22/20	39.2032	-120.9501
BFB	Tier3 Wildfire – Extreme	100111260	140000634501	08/24/20	39.1686	-120.9934
BFB	Tier3 Wildfire – Extreme	101383615	140000636123	08/21/20	38.6682	-120.9398
BFB	Tier3 Wildfire – Extreme	100075568	140000638908	08/24/20	39.2086	-121.0596
BFB	Tier3 Wildfire – Extreme	101381547	140000638958	08/24/20	38.6735	-120.8987
BFB	Tier3 Wildfire – Extreme	100085541	140000640562	08/25/20	38.8788	-120.8874
BFB	Tier3 Wildfire – Extreme	100047070	140000640853	08/25/20	38.8802	-120.8874
BFB	Tier3 Wildfire – Extreme	100003473	140000641004	08/24/20	39.2885	-121.1919
BFB	Tier3 Wildfire – Extreme	101404591	140000642498	08/25/20	38.6628	-120.7417
BFB	Tier3 Wildfire – Extreme	101381907	140000644285	08/26/20	38.7254	-121.0043
BFB	Tier3 Wildfire – High	101806532	140000644724	08/25/20	37.0840	-122.0280
BFB	Tier3 Wildfire – Extreme	100435870	140000647417	08/26/20	40.2939	-121.0547
BFB	Tier3 Wildfire – Extreme	101397162	140000648050	08/26/20	38.6905	-120.7446
BFB	Tier3 Wildfire – Extreme	101398499	140000649014	08/26/20	38.7087	-120.6306
BFB	Tier3 Wildfire – Extreme	101117409	140000650724	08/27/20	37.2512	-119.5154
BFB	Tier3 Wildfire – Extreme	100071888	140000652429	08/26/20	39.1870	-121.2768
BFB	Tier3 Wildfire – Extreme	101381935	140000652442	08/27/20	38.6833	-120.8939
BFB	Tier3 Wildfire – Extreme	100386663	140000652493	08/27/20	40.2583	-121.0801
BFB	Tier2 Wildfire – High	103329149	140000653538	08/27/20	37.7186	-120.3131
BFB	Tier3 Wildfire – Extreme	100073871	140000659080	08/29/20	39.1468	-121.0303
BFB	Tier3 Wildfire – Extreme	100386467	140000665737	08/31/20	40.2495	-121.1450
BFB	Tier3 Wildfire – Extreme	101514856	140000665985	08/31/20	41.0010	-121.7241
BFB	Tier3 Wildfire – Extreme	100105210	140000667140	09/01/20	39.1669	-120.9977
BFB	Tier3 Wildfire – Extreme	100011434	140000667261	08/29/20	39.1972	-120.9632
BFB	Tier3 Wildfire – Extreme	100111507	140000668649	09/01/20	38.8799	-120.8646
BFB	Tier3 Wildfire – Extreme	100098790	140000670868	08/31/20	39.3111	-120.8834
BFB	Tier3 Wildfire – Extreme	101382737	140000672191	09/02/20	38.6483	-120.9249
BFB	Tier3 Wildfire – Extreme	100005403	140000673693	09/02/20	39.2798	-120.9314
BFB	Tier3 Wildfire – Extreme	101415120	140000677329	09/03/20	38.6466	-120.9238
BFB	Tier3 Wildfire – Extreme	101381457	140000677970	09/03/20	38.6984	-121.0205
BFB	Tier3 Wildfire – Extreme	101398441	140000679392	09/04/20	38.7146	-120.6053
BFB	Tier3 Wildfire – Extreme	101408673	140000679551	09/03/20	38.6991	-120.6706
BFB	Tier3 Wildfire – Extreme	101382668	140000679930	09/04/20	38.6530	-120.9314
BFB	Tier3 Wildfire – Extreme	100436590	140000680434	09/04/20	40.3076	-121.1696
BFB	Tier3 Wildfire – Extreme	100436042	140000681736	09/04/20	40.2731	-121.1282
BFB	Tier3 Wildfire – Extreme	101514543	140000683037	09/04/20	40.9852	-121.7791
BFB	Tier3 Wildfire – Extreme	100437188	140000686728	09/05/20	40.2627	-121.1401
BFB	Tier3 Wildfire – Extreme	101390045	140000688017	09/04/20	38.7714	-120.5892
BFB	Tier3 Wildfire – Extreme	101382279	140000692561	09/10/20	38.6603	-120.8806
BFB	Tier3 Wildfire – Extreme	101382342	140000694615	09/12/20	38.7189	-121.0185
BFB	Tier3 Wildfire – Extreme	101413198	140000695612	09/12/20	38.6685	-120.9019
BFB	Tier3 Wildfire – Extreme	101410465	140000695629	09/12/20	38.6468	-120.8870
BFB	Tier3 Wildfire – Extreme	101415748	140000696451	09/12/20	38.6785	-120.6908
BFB	Tier3 Wildfire – Extreme	100090823	140000699798	09/14/20	39.5661	-120.6371
BFB	Tier3 Wildfire – Extreme	100513832	140000700064	09/15/20	37.2434	-122.0275
BFB	Tier3 Wildfire – Extreme	100069827	140000703428	09/15/20	39.2167	-120.8315
BFB	Tier2 Wildfire – High	103217298	140000704309	09/16/20	37.5477	-119.6420
BFB	Tier3 Wildfire – Extreme	100548277	140000712908	09/18/20	37.2608	-122.0961
BFB	Tier3 Wildfire – Extreme	100048842	140000715671	09/18/20	38.8906	-120.8497
BFB	Tier2 Wildfire – High	103471053	140000720876	09/21/20	37.0658	-121.6896
BFB	Tier3 Wildfire – Extreme	101517374	140000722093	09/21/20	41.0166	-121.6615
BFB	Tier3 Wildfire – Extreme	100075851	140000722236	09/21/20	39.1564	-121.0296
BFB	Tier3 Wildfire – Extreme	101517322	140000733247	09/24/20	41.0463	-121.6767
BFB	Tier3 Wildfire – Extreme	100606896	140000739134	09/26/20	37.0842	-121.7910
BFB	Tier3 Wildfire – Extreme	100390127	140000739612	09/26/20	40.2847	-121.1130
BFB	Tier3 Wildfire – Extreme	101377283	140000746691	09/30/20	38.7320	-120.9652
BFB	Tier2 Wildfire – High	102028937	140000747230	09/30/20	38.6242	-122.8333
BFB	Tier3 Wildfire – Extreme	101264205	140000771486	10/08/20	38.3058	-120.2775
BFB	Tier3 Wildfire – Extreme	100071167	140000786729	10/12/20	39.1404	-121.0501
BFB	Tier3 Wildfire – Extreme	101516520	140000791859	10/14/20	41.0041	



DATA REQUEST

Data Request Number: 015

Name: Marc Underwood

Title: Project Manager

Company: BV

Data Request Date: 06.02.2021

Email: marc.underwood@bureauveritas.com

Phone #: 916-761-2416

Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Method	Data Request
				in the plot data provided in Attachment 01 2020 EVM Complete Vegetation Point Data 05 24 2021_CONF", the fields "PRESCRIP" and "TW_ACT_WORK" have more than 30 codes which need definitions. Please provide documentation containing definitions for all codes used in these fields, including: BC_Br Rmv BCS_Br Rmv+Trt BT_Br Trim F1A_FP-Rmv1 A F1B_FP-Rmv1 B F1D_FS-R1B+Trt F2B_FP-Rmv2 B F2D_FS-R2B+Trt F3B_FP-Rmv3 B F3D_FS-R3B+Trt F4B_FP-Rmv4 B F4D_FS-R4B+Trt FAA_FP-Trim A FAB_FP-Trim B FBB_FP-Major B FOA_FP-Ov A FOB_FP-Ov B OV_Overhang R1A_Rmv 1-A R1B_Rmv 1-B R1D_Rmv1-B+Trt R2A_Rmv 2 A
1. EVM (enhanced veg. management)	Document	E.1 - 5.3.5.2/ 5.3.5.15 / 5.3.5.16/5. 3.5.17	Document	Provide Documentation of location and type of trees targeted and where work was performed as part of 2020 CEMA inspection program.
2. Other discretionary inspections of vegetation around distribution electric lines and equipment	Document	5.3.5.9	Document	



DATA REQUEST

Data Request Number: 016

Name: Marc Underwood on behalf of Tom Lyons

Title: Project Manager

Company: BV

Data Request Date: 06.03.2021

Email: marc.underwood@bureauveritas.com

Phone #: 916-761-2416

Preferred Point of Contact: Email or Phone

Program Target	Line Name	Number of Structures	Rated kV	Method	Data Request
Transmission Line Evaluation for PSPS Scoping, 5.3.3.8	ARCO-POLONIO PASS PP	121	70	Review of inspection records	Documentation (PDF or other available format) of the studies (or the study summaries) for 80 Transmission Lines that were analyzed for PSPS scoping.
	BOTTLE ROCK TAP D.W.R.	7	230		
	BRIDGEVILLE-COTTONWOOD	585	115		
	BUELLTON TAP	25	115		
	CARIBOU-PALERMO	416	115		
	CHRISTIE-FRANKLIN #2	21	60		
	CLEAR LAKE-HOPLAND	87	60		
	CLOVER CREEK TAP	1	60		
	COLEMAN-SOUTH	279	60		
	CORDELIA #1 TAP	65	60		
	COTTONWOOD #2	60	60		
	COTTONWOOD-BENTON #2	104	60		
	COTTONWOOD-PANORAMA	30	115		
	COTTONWOOD-RED BLUFF	202	60		
	DELEVAN-VACA #2	8	230		
	DIABLO UNIT #1	5	500		
	DONNELLS-MI-WUK	228	115		
	DRUM-HIGGINS	258	115		
	DRUM-RIO OSO #1	245	115		
	DUTCH FLAT #2 TAP	7	115		
	EL DORADO-MISSOURI FLAT #2	109	115		
	ELECTRA-BELLOTA	99	230		
	FROGTOWN #2 TAP	2	115		
	FULTON-HOPLAND	271	60		
	FULTON-MOLINO-COTATI	34	60		
	FULTON-PUEBLO	215	115		
	GEYSERS #3-EAGLE ROCK	20	115		
	GEYSERS #9-LAKEVILLE	356	230		
	GOLD HILL #1	257	60		
	HAT CREEK #1-PIT #1	89	60		
	HUMBOLDT #1	120	60		
	IGNACIO-ALTO	40	60		
	IGNACIO-BOLINAS #1	173	60		
	JEFFERSON-HILLSDALE JCT	18	60		
	JESSUP TAP	9	115		
	KERCKHOFF-CLOVIS-SANGER #2	49	115		
	LAKEVILLE-IGNACIO #1	4	230		
	LAKEWOOD-CLAYTON	7	115		
	LIMESTONE TAP	30	60		
	LONE TREE-CAYETANO	116	230		
	MAPLE CREEK-HOOPA	250	60		
	MARTIN-SNEATH LANE	3	60		
	MENDOCINO-WILLITS	110	60		
	MENDOCINO-WILLITS-FORT BRAGG	428	60		
	METCALF-EDENVALE #1	8	115		
	METCALF-MOSS LANDING #2	68	230		
	MIDDLE FORK #1	132	60		
	MIDWAY-SANTA MARIA	336	115		
	MISSOURI FLAT-GOLD HILL #2	66	115		
	MONTICELLO PH TAP	17	115		
	MORAGA-OAKLAND J	63	115		
	MORGAN HILL-LLAGAS	22	115		
	MORRO BAY-SAN LUIS OBISPO #1	64	115		
	MORRO BAY-SOLAR SW STA #1	154	230		
	OROVILLE-TABLE MTN (CDWR)	12	230		
	PALERMO-PEASE	7	115		
	PARADISE-BUTTE	91	115		
	PARADISE-TABLE MTN	212	115		
	PIT #3-PIT #1	159	230		
	PIT #7 TAP	36	230		
	PITTSBURG-COLUMBIA STEEL	7	115		

PITTSBURG-MARTINEZ #2	3	115
PITTSBURG-TESLA #2	82	230
PLUMAS-SIERRA TAP	2	60
RIO DELL JCT-BRIDGEVILLE	169	60
ROLLINS TAP	14	60
ROUND MTN-TABLE MTN #1	313	500
SALT SPRINGS-TIGER CREEK	129	115
SPI (BURNEY) TAP	2	230
SPRING GAP TAP	17	115
STANISLAUS-MELONES SW STA-MANTECA #1	195	115
STANISLAUS-MELONES SW STA-RIVERBANK JCT SW STA	188	115
TEMBLOR-SAN LUIS OBISPO	159	115
TEMPLETON-ATASCADERO	87	70
TESLA-SALADO #1	12	115
VALLEY SPRINGS #2	159	60
VASONA-METCALF	16	230
VEDDER TAP	53	115
WEST POINT-VALLEY SPRINGS	208	60
WOODLEAF-PALERMO	182	115



DATA REQUEST

Data Request Number: 017

Name: Marc Underwood on behalf of Lisa Beaver

Title: PM

Company: Bureau Veritas

Data Request Date: 06.08.2021

Email: marc.underwood@bureauveritas.com

Phone #: 916-761-2416

Preferred Point of Contact: Email or Phone

Program Target	Units	Sections	Target	Actual	Method	Data Request
Substation Inspections	N/A	5.3.5.17 / 5.3.5.18	N/A	N/A	Document	Provide a copy of policy, procedure, guideline that directly describes the limitations or exclusion of storage or accumulation of combustible materials or vegetation in and around distribution substations.
Detailed Inspections of Vegetation around Transmission Electric Lines and equipment	N/A	5.3.5.12 / 5.3.5.3	N/A	N/A	Document	Provide a copy of policy, procedure, guideline that directly describes the limitations or exclusion of storage or accumulation of combustible materials or vegetation in and around transmission electric lines and equipment.



Appendix D - SME Interview Summary

Item No.	2020 WMP Activities	Initiative Category	Initiative Name	SME Name, Title	Interview Date	Summary
1	3.d. Qualitative Goal/Target	5.3.1 Risk Assessment & Mapping	5.3.1.1 - A summarized risk map that shows the overall ignition probability and estimated wildfire consequence along the electric lines and equipment	Paul McGregor, Director Risk Management & Jon Eric Thalman, Risk Analytics	06/07/21	Demonstration was provided of the interactive electric risk mapping tool that demonstrates the ignition probability along circuits and the consequences of ignition. The interactive electric risk mapping tool uses a color scale to visualize probabilities and threat levels, allows the user to zoom in and out of regions and specific circuit sections, and includes an 8-hour simulation based on the likely size of a fire.
2	3.d. Qualitative Goal/Target	5.3.1 Risk Assessment & Mapping	5.3.1.2 - Climate-driven risk map and modelling based on various relevant weather scenarios	Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meterology Operations and Fire Science	06/07/21	Demonstration was provided of maps of future climate hazards based on external data sources and explained how PG&E uses the data to inform current asset management and operational decisions. PG&E's Climate Resilience team analyzes long-term regional trends for the service territory and relies on independent research.
3	3.d. Qualitative Goal/Target	5.3.1 Risk Assessment & Mapping	5.3.1.3 - Ignition probability mapping showing the probability of ignition along the electric lines and equipment	Paul McGregor, Director Risk Management & Jon Eric Thalman, Risk Analytics	06/07/21	Demonstration was provided the interactive electric risk mapping tool that demonstrates the ignition probability along circuits and the consequences of ignition. The interactive electric risk mapping tool uses a color scale to visualize probabilities and threat levels, allows the user to zoom in and out of regions and specific circuit sections, and segments distribution circuit sections by sectionalizing devices.
4	3.d. Qualitative Goal/Target	5.3.1 Risk Assessment & Mapping	5.3.1.4 - Initiative mapping and estimation of wildfire and PSPS risk-reduction impact	Paul McGregor, Director Risk Management & Jon Eric Thalman, Risk Analytics	06/07/21	The interactive electric risk mapping tool ranks circuits based on various risk factors. Asset management, planning, and engineering teams then utilize these rankings to prioritize asset hardening projects.
5	3.d. Qualitative Goal/Target	5.3.1 Risk Assessment & Mapping	5.3.1.5 - Match drop simulations showing the potential wildfire consequence of ignitions that occur along the electric lines and equipment	Paul McGregor, Director Risk Management & Jon Eric Thalman, Risk Analytics	06/07/21	Demonstration was provided of the interactive electric risk mapping tool that demonstrates the ignition probability along circuits and the consequences of ignition. The interactive electric risk mapping tool uses a color scale to visualize probabilities and threat levels, allows the user to zoom in and out of regions and specific circuit sections, and segments distribution circuit sections by sectionalizing devices.
6	3.d. Qualitative Goal/Target	5.3.1 Risk Assessment & Mapping	5.3.1.6 - Weather-driven risk map and modelling based on various relevant weather scenarios	Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meterology Operations and Fire Science	06/07/21	Demonstration was provided of the interactive model that uses 30 years of modeled weather data to study weather patterns across PG&E's service territory. The weather patterns inform where future weather event types will occur and the likely severity.
7	3.d. Qualitative Goal/Target	5.3.10 Stakeholder Cooperation & Community Engagement	5.3.10.1 - Community engagement	Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy	06/07/21	PG&E staff that supports community outreach to educate customers and property owners on wildfire safety programs works closely with the PG&E staff that performs customer outreach for PSPS events. The dedicated staff communicates through traditional mail, text message, email, and phone for work in their area and property and through community events, such as webinars during COVID-19. Matrixed into the team is the customer contact center (answering direct customer phone calls) and public affairs (supporting outreach and coordination with municipalities).
8	3.d. Qualitative Goal/Target	5.3.10 Stakeholder Cooperation & Community Engagement	5.3.10.2 - Cooperation and best practice sharing with agencies outside CA	Matthew Pender, Director, Community Wildfire Safety Program PMO & Joscelyn Wong, Electric Program Manager, Asset Risk Management	06/04/21	High level outline provided of the main organizations and consortiums that PG&E participates in to share best practices with other utilities and agencies, both inside and outside of California. One of these organizations is the International Wildfire Risk Mitigation Consortium (IWRMC), which PG&E co-founded in 2019. PG&E participates in other organizations that help them benchmark their wildfire mitigation activities, including EUCI and EEI. To date, the majority of the best practice sharing has been between California utilities and Australian utilities.
9	3.d. Qualitative Goal/Target	5.3.10 Stakeholder Cooperation & Community Engagement	5.3.10.3 - Cooperation with suppression agencies	Robert Cupp, Director, Emergency Preparedness and Response, Field Operations	06/03/21	The Emergency Preparedness and Response Field operations team collaborates with Public Safety Specialists and the Local Public Affairs team, in conjunction with the review of the analytics developed by the PSPS PMO, to prepare for the PSPS season and re-issue training documents that incorporate the latest changes to personnel participating in the PSPS events from their positions within the organization.

10	3.d. Qualitative Goal/Target	5.3.10 Stakeholder Cooperation & Community Engagement	5.3.10.4 - Forest service and fuel reduction cooperation and joint roadmap	Mariano Mandler, Senior Director, Environmental Health and Safety & Jon Wilcox, Environmental Resources & Mitigation Manager	06/07/21	An outline was provided of the programmatic operations and maintenance permit with the USFS and the short-term agreements with State Parks, the BLM, and National Park Service. The fuel reduction program between the USFS and PG&E is the first in California. The USFS provides proposals for "shovel ready" fuel reduction projects that an internal PG&E team reviews and approves.
11	General WMP Overview	General WMP Overview	General WMP Overview	Sumeet Singh, Chief Risk Officer	06/02/21	An overview was provided of the progression of the WMP activities/initiatives from 2019 through 2021 and the following years that PG&E plans to continue improving on and implement. Discussion also walked through the various technologies, best practices of vegetation management, safety observations, and risk management to reduce wildfire risk and minimize PSPS event impacts on PG&E customers.
12	3.d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.6 - Improvement of Inspections	Sumeet Singh, Chief Risk Officer	06/02/21	Wildfire command center is where all wildfire planning and execution comes to gether and acts as the primary department to bring visibility across all departments involved with wildfire safety. The intent is to identify gaps in controls and work to make them more robust.
13	3.d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.7 - LiDAR Inspections of Vegetation Around Distribution Electric Lines and Equipment	Sumeet Singh, Chief Risk Officer	06/02/21	Enhanced vegetation management inspections in 2020 included a greater emphasis on LiDAR to help identify strike potential tree ignition sources. Ground based LiDAR is being piloted in addition to aerial lidar.
14	3.d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.8 - LiDAR Inspections of Vegetation Around Transmission Electric Lines and Equipment	Sumeet Singh, Chief Risk Officer	06/02/21	Enhanced vegetation management inspections in 2020 included a greater emphasis on LiDAR to help identify strike potential tree ignition sources. Ground based LiDAR is being piloted in addition to aerial lidar.
15	3.d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.4 - Forecast of a fire risk index, fire potential index, or similar	Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science	06/07/21	The USFS and Calfire trained PG&E SIPT staff to collect samples for live fuel sampling, which is critical for calculating the Fire Potential Index. PG&E's lab at its San Ramon facility determines the seasonal live fuel moisture for various shrub and plant species in different areas of the service territory. This information directly feeds into a live fuel moisture model and ultimately into PG&E's FPI model. PG&E uses its own FPI model instead of USFS's FPI model to have more granularity in the fire risk assessment.
16	3.d. Qualitative Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.2.5.2 - Data collection	Ben Almario, Director, Wildfire Safety Operations	06/04/21	The interview included a live preview of the mapping system, demonstrating how it is used to identify and monitor all wildfire hazard information coming from different sources and notify the rest of the organization of the potential fire threat.
17	3.d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.7 - Wildfire Safety Operations Center (WSOC)	Angie Gibson, Director, Emergency Preparedness and Response, Strategy and Execution	06/04/21	The Emergency Preparedness and Response department works closely with the WSOC to be on standby when periodic updates and notifications for a fire threat are received. This team is responsible for all emergency responses (not just Wildfire Safety Planning & Training) and developing, training, exercising and improving emergency plans. The team is also responsible for the Emergency Operating Center (EOC), the staffing and activation in case of a level 4 or level 5 incident, and managing the 18 EOC team rotation and staffing.
18	3.d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.7 - Wildfire Safety Operations Center (WSOC)	Ben Almario, Director, Wildfire Safety Operations	06/04/21	In 2021, the WSOC is transitioning to a Hazard Awareness and Warning Center (HAWC) to handle all types of hazards, such as rain causing landslides, debris flow due to flooding, not just wildfire prevention. The HAWC will support routine electric, generation, and gas operations entail couching on defensible spaces and providing on-site fire mitigation capabilities if the risk is identified as high at that time. Additionally, the HAWC will work with the engineering groups to perform some of the day-to-day activities such as field safety re-assessment tags, fire mitigation work, and Electric Corrective (EC) tag work associated with vegetation (within the qualifications of the team).
19	3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.6 - B.5 - Live Fuel Moisture (LFM) Sampling	Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meteorology Operations and Fire Science	06/07/21	PSPS, 30-years of data: first federal, from NOAA, observations, satellite information. Two external experts to dynamically downscale the data to be used, hour by hour output 2-3 kms, same model for forecast mode. Technosylva models to simulate fire spreads across historical data sets. Improve live fuel sampling - improve the program where PG&E SIPT crews take samples, PG&E trained by the USFS and Calfire to collect samples, and ship to lab in San Ramon, weights taken - determine the seasonal live fuel measure for different species and areas.
20	3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.5.1 - F.1 - Safety and Infrastructure Protection Teams (SIPT)	Ben Almario, Director, Wildfire Safety Operations	06/04/21	Deployment of resources and first responders to the agency holding jurisdiction incident commander, activating an annex to support the public, and mobilize crews to clear and dedicate an agency representative. 40 two-man units that include 12 to 15 relief crews.

21	3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.8-3 - C.1 - SCADA Transmission Switching (switches)	Maria Ly, Manager, Electric Networks and Michelle Sakamoto	06/07/21	Adding SCADA switches on transmission lines allow for flexibility for sectionalizing lines for isolating portions of the line to minimize impact to the tranmission grid operations. 2020 WMP commitments for the number of switches installed was exceeded in 2020. In 2020, PG&E looked to maximize the number of switches in the HFTD areas by targeting HFTD at junction points and substations at change of power flow or direction.
22	3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.8-6 - I.6 - Microgrids for PSPS Mitigation (operationalized units)	Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy	06/07/21	Different types of microgrid generation including temporary generation for substations, temporary distribution microgrids to power major portions of a community, and individual temporary generation for operating community resource centers were implemented during PSPS events.
23	3.d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.11 - Mitigation of impact on customers and other residents affected during PSPS event	Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy	06/07/21	Different types of microgrid generation including temporary generation for substations, temporary distribution microgrids to power major portions of a community, and individual temporary generation for operating community resource centers were implemented during PSPS event.
24	Not Used					
25	Not Used					
26	3.d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.1 - Additional efforts to manage community and environmental impacts	Steven Fischer II, Senior Director Enhanced Vegetation Management and Joey Perez Jr., Senior Manager Vegetation Management	06/02/21	Outreach is carried out through phone calls, in person at the door, or by leaving a door hanger if the resident is not home. The intent is to answer questions and provide phone/email/website for public information. PG&E also carries out social media campaigns and town halls with questions/answers for the community.
27	3.d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.13 - Quality assurance / quality control of vegetation inspections	Joanne Martin, Director of Quality Management and Stephen Simon, Interim Director of Vegetation Management	06/02/21	Work verification inspection is completed for 100% of EVM vegetation management activities. Inspection data is collected using an electronic platform, Collector, that captures data including observed conditions and point data. Collector serves as central storage for the captured inspection data. The PG&E Quality Management team audits a sample of the EVM work sites to determine compliance levels. The compliance rate determined by the quality management department for 2020 was greater than 96%.
28	3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.6.2 - F.1 - SIPT Crews and Engines Resourcing	Ben Almario, Director, Wildfire Safety Operations	06/04/21	Currently, the total team consists of 102 staff members who are responsible for: 1. Real-time (24-7) operations and monitoring of wildfires and their risk to PG&E assets 2. Utilization of ESRI/Map to communicate the location of potential hazard and mobilize the field operations team under Robert Cupp to confirm the public safety and fire hazard. 3. Initiation of notifications to other operational groups and the rest of the organization and continue monitoring the progression of the risk. 4. 40 two-man units that include 12 to 15 relief crews
29	3.d. Qualitative Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.6.3 - F.5 - Implement SafetyNet Observation Cards	Ben Almario, Director, Wildfire Safety Operations	06/04/21	SafetyNet Observations is an enterprise-wide program and continues to be implemented. The SIPT provided feedback from the field that additional education to employees to understand that the TD 1464 standard is a year-round requirement.
30	3.d. Qualitative Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.6.4 - F.2 - Protocols for PSPS Re-Energization	Ben Almario, Director, Wildfire Safety Operations	06/04/21	During PSPS Re-energization: Partnering with the meteorology team, when input is received and their staff triggers an event, the SIPT is strategically situated at locations to validate, and field verifies the emergency conditions and reports it back to WSOC to make informed decisions.
31	3.d. Qualitative Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.6.5 - PSPS events and mitigation of PSPS impacts	Shawn Holder, Manager, PSPS PMO	06/04/21	The PSPS PMO (21 total staff members) focuses on process improvement and cross-functional efforts working closely with asset management, taking the lead on strategy related to system hardening, and providing content for the WMP reports. The team develops tools to execute the PSPS process; it starts with the meteorology team defining the area of risk initially, which the team further analyzes with a lot of consideration to risk and impact to customers and determines the areas of the grid that need to be de-energized. Knowledge and tracking of the events to help with situational awareness in the EOC [size of the event, the customers involved, producing notifications for customers].

32	3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.6.6 - Stationed and on-call ignition prevention and suppression resources and services	Ben Almario, Director, Wildfire Safety Operations	06/04/21	The interview included presentation of a map of the locations of all stationed personnel and the on-call resources (relief crews) available to ensure complete staffing on all 40 sites in tier 2 and 3 areas.
33	3.d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.6 - Improvement of Inspections	Joanne Martin, Director of Quality Management and Stephen Simon, Interim Director of Vegetation Management	06/02/21	Quality assessments completed by the Quality Management team have identified a compliance rate of more than 96% for the Enhanced Vegetation Management Program.
34	3.d. Qualitative Goal/Target	5.3.7 Data Governance	5.3.7.1 - Consolidate Data Into Single Repository	Shawn Holder, Manager, PSPS PMO	06/04/21	Live preview of the Foundry platform was provided during the interview. The PSPS PMO is responsible for managing the data and its transfer to a portal that public safety partners can access and utilize to see the impacts of the PSPS event. Ongoing Management of the PSPS portal also includes providing access to external stakeholders, managing the tool's users, and integrating the datasets that PG&E has into the PSPS Situation Intelligent Platform (PSIP), which in 2021 started to produce notifications to customers.
35	3.d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.1 - Adequate and trained workforce for service restoration	Robert Cupp, Director, Emergency Preparedness and Response, Field Operations	06/03/21	Training documents for PSPS events and has been developed and is updated yearly. PG&E personnell are required to complete training annually prior to the start of fire season. Mutual aid personnell provided online training.
36	3.d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.2-1 - Community outreach, public awareness, and communications efforts	Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy	06/07/21	The 2020 community outreach events were 100% virtual due to COVID-19. The events covered how PG&E prepares and mitigates for wildfires, and have been translated to ASL and 16 other languages for custome reach. PG&E focuses efforts on the customers with the highest potential of being impacted by PSPS events, and also communicates through post cards, brochures, bill inserts, and electronic means. Municipalities and partner CBOs also serve as communication channels to customers.
37	3.b. Large Volume Quantifiable Goal/Target – Not Field Verifiable	5.3.9 Emergency Planning & Preparedness	5.3.9.2-2 - I.4 - Community Based Organizations (CBOs) Coordination	Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy	06/07/21	The PSPS Customer Engagement and Strategy team leads the coordination and outreach with Community Based Organizations (CBOs) (non-municipalities) to establish relationships with CBOs who are ready to partner with PG&E to provide necessary services during PSPS events, particularly services for medical baseline customers and seniors, in counties most likely to have a PSPS event. Vanessa went into detail of the CBO contracts established, the services they provide, the target customer type, and the new partnerships they're looking to establish.
38	3.d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.3-1 - Customer support in emergencies	Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy	06/07/21	PG&E's revised Emergency Consumer Protection Plan outlines the emergency disaster relief available for utility customers when such disasters are declared. In addition to bill related support, Tracy and Vanessa confirmed the outage reporting available through PG&E's website and customer notification system and customers' access to utility representatives through multiple means before, during and after an event.
39	3.d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.3-2 - I.8 CRC Mitigate PSPS Customer Impacts	Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy	06/07/21	The PG&E PSPS team coordinates the planning and installation of Community Resource Centers during PSPS events. Per the interview with Tracy and Vanessa, the number of sites increased in 2020 from 2019, and the PG&E government affairs team helped with collecting feedback on locations for future events. Many of the sites have temporary generation capabilities. The PG&E staff responsible for siting and installing the Centers also considers accessibility of the site and proximity to public transportation during the site selection process.
40	3.d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.3-3 - I.7 - PSPS - 24/7 Information Updates	Tracy Maratukulam, Director, Public Safety Power Shutoff and Vanessa Bryan, Senior Manager, PSPS Customer Engagement and Strategy	06/07/21	In 2020 the PG&E website moved to the cloud, to minimize a repeat of the failures that occured in 2019. The PG&E website during PSPS events provides broad and detailed information about the events, including expected restoration timelines. PG&E customers can provide more than one preferred notification point of contact (cell phone, email, land line, etc.). Medical baseline customers can acknowledge notifications, and are proactively reached out to if the notification is not acknowledged. Notifications are sent out in multiple languages, and customers can indicate their preferred language. The PG&E website is consistently assessed for accessibility enhancements.

41	3.d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.4 - I.5 - Company Emergency Response Plan (CERP) (Update and Publish)	Angie Gibson, Director, Emergency Preparedness and Response, Strategy & Execution	06/04/21	<p>This organization consists of 26 staff members responsible for planning, training, executing emergency response exercises, and developing the first PSPS Annex in partnership with PSPS PMO in 2020.</p> <p>Initiation of the first series of exercises in 2020, a total of 3 full-scale exercises were conducted: two (2) were 3-day exercises, and one (1) 5-day exercise. The activities were designed and executed with the support of Cadmus - an emergency and crisis simulation contractor. In 2021, the scope of work was transferred in-house and performed by Angie's team.</p>
42	3.d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.5-1 - I.1 - Emergency Preparation and Restoration	Robert Cupp, Director, Emergency Preparedness and Response, Field Operations	06/03/21	<p>Use of Technologies for PSPS Patrol:</p> <p>1.Fixed Wing [fitted with Infrared cameras for Transmission Lines that have to be restored before Distribution lines]</p> <p>2.Rotary Wing [Total of 65 contracted aircraft with time extension capabilities/flexibilities in their contract to be utilized as needed, even if beyond the pre-determined PSPS season dates]</p> <p>3.Drones [Still in R&D stages, where phase 1 demo was completed last year, and phase 2 demo is scheduled for next week to test the capabilities of the patrol being real-time.</p>
43	3.d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.5-2 - I.2 - PSPS - Service Restoration	Robert Cupp, Director, Emergency Preparedness and Response, Field Operations	06/03/21	<p>The process of restoration during a PSPS event entails Segmentation before the event taking place, then Patrol segment by segment, then finally giving the all-clear to restore the specific segment.</p>
44	3.d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.9.5-3 - I.3 - PSPS Customer Impact Mitigation	Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meterology Operations and Fire Science	06/07/21	<p>PG&E's Meterological team utilizes weather modeling tools, based on 30 years of weather data, to forecast wildfire risk conditions, on a 7 day a week basis, and 24 hour basis during weather events. The team also forecasts weather approximately 10 days in the future to help operations with planning for weather events. Historical weather data, along with input from the Meterological team on live conditions helps to inform decisions related to PSPS events, in an effort to mitigate impacts to customers.</p>
45	3.d. Qualitative Goal/Target	5.3.9 Emergency Planning & Preparedness	5.3.3.9-1 - C.5 System Hardening (SCADA enabled circuit breakers)	Maria Ly, Manager, Electric Networks and Michelle Sakamoto	06/07/21	<p>Confirmed the completion of the goal of installing SCADA on transmission switches and on distribution circuit breakers, to improve sectionalizing during wildfire events.</p>
46	4. Verification of Funding	N/A	N/A	Christopher Wong, Principal, Business Finance & Jack Liu, Business Planning Expert	06/03/21	<p>The IE requested clarification from PG&E’s Business Finance team to discuss and clarify spending trends associated with WMP activities/initiatives for the two WMP categories, 5.3.2 - Situational Awareness and Forecasting and 5.3.5 Vegetation Management and Inspections that the IE identified as the beginning of its funding audit discussion. The IE inquired about PG&E’s extensive realignment of actual costs among the sub initiatives under 5.3.2 - Situational Awareness and Forecasting. PG&E explained that the 2020 WMP spend focused on HFTD zones and stripped out the non HFTD work. In the 2021 WMP, PG&E changed the approach and updated the costs to include the entire service territory. The IE brought up the HD Cameras as a sampling initiative to track the spend, and PG&E explained that there is not one complete and ready document. The consolidation, split or entire shift of costs had to follow the WMP narrative change from 2020 to 2021.</p> <p>Next, the IE inquired about PG&E’s reported spend for sub initiatives under 5.3.5 Vegetation Management and Inspections. The IE requested PG&E to provide the breakdowns of spend across the four major categories: Routine Distribution, Routine Transmission, Tree Mortality, and Enhanced, as reported in the ARC Report, as percentage allocations of actual costs spread across all 20 sub initiatives under section 5.3.5 Vegetation Management and Inspections. PG&E explained a slight increase of 2 percent across the three years of filing. However, for this audit consisting of the forecasted and actual spend for 2020, PG&E indicated that they would follow up on the IE’s request for further clarification and provide their response to a previous WSD data request food a more detailed explanation on Vegetation Management costs.</p>

47	3.d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.2 - B.4 - Wildfire Spread Model - Operational Impacts	Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meterology Operations and Fire Science	06/07/21	Technosylva models to simulate fire spreads across historical data sets. PG&E developed 10-year look back models to determine previous years that would've required PSPS events and run various models to inform PSPS decision making.
48	3.d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.7 - Addressing Weather Forecast Model Uncertainty	Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meterology Operations and Fire Science	06/07/21	Incorporated 30-year historical data weather hour by hour, relative humidity, dead fuel moisture, live fuel moisture with 2 KM resolution integrated into the historic climetology given to Technosylva and simulated worse fire days and ran billions of fire simulations every day every 200 meters along assets, and results used by distribution asset risk team.
49	3.d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.1 - B.1 - Upgrade POMMS Model to 2km	Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meterology Operations and Fire Science	06/07/21	POMMs Model transitioned 3x3 KM resolution to 2 KM resolution in 2020.
50	3.d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.1 - B.3 - Wind Event Forecasting Tool (Diablo)	Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meterology Operations and Fire Science	06/07/21	Designing criteria around modeling a Diablo wind event adapted by the literature and developed forecasting tool with varying parameters to help identify areas prone to Diablo events.
51	3.d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.1 - B.6 - Re-calibrate the OPW and FPI models	Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meterology Operations and Fire Science	06/07/21	Incorporated 30-year historical data weather hour by hour, relative humidity, dead fuel moisture, live fuel moisture with 2 KM resolution integrated into the historic climetology given to Technosylva and simulated worse fire days and ran billions of fire simulations every day every 200 meters along assets, and results used by distribution asset risk team.
52	3.d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.1.5 - B.2 - NOAA-20 Satellite Data	Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meterology Operations and Fire Science	06/07/21	Incorporated NOAA Satellite Data and national center of environmental prediction, combination of observations, baloon launches, airplane collected data to create a re-analysis of the atmospheric states within the climetology models.
53	3.d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.3 - Covered conductor installation	Mike Theide, Manager, Electric Distribution Field QA-QC	06/10/21	PG&E distribution quality control department is dedicated to auditing distribution construction activities related to wildfire mitigation efforts. Audits are performed on construction work executed by PG&E crews and contractor crews. Audits are performed for 50% of surge arrester replacements and 100% of other WMP related construction activities. The quality control department maintains a proactive on-site presence for 100% of system hardening wire pull activities and conducts post construction walk of 100% of circuits for system hardening installation.
54	3.d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.6 - Distribution pole replacement and reinforcement, including with composite poles	Mike Theide, Manager, Electric Distribution Field QA-QC	06/10/21	PG&E distribution quality control department is dedicated to auditing distribution construction activities related to wildfire mitigation efforts. Audits are performed on construction work executed by PG&E crews and contractor crews. Audits are performed for 50% of surge arrester replacements and 100% of other WMP related construction activities. The quality control department maintains a proactive on-site presence for 100% of system hardening wire pull activities and conducts post construction walk of 100% of circuits for system hardening installation.
55	3.a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.3 Grid Design & System Hardening	5.3.3.7 - C.12 - Expulsion Fuse Replacement (non-exempt equipment)	Mike Theide, Manager, Electric Distribution Field QA-QC	06/10/21	PG&E distribution quality control department is dedicated to auditing distribution construction activities related to wildfire mitigation efforts. Audits are performed on construction work executed by PG&E crews and contractor crews. Audits are performed for 50% of surge arrester replacements and 100% of other WMP related construction activities. The quality control department maintains a proactive on-site presence for 100% of system hardening wire pull activities and conducts post construction walk of 100% of circuits for system hardening installation.
56	3.a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.3 Grid Design & System Hardening	5.3.3.8-1 - C.2 - Distribution Sectionalizing (automated devices)	Mike Theide, Manager, Electric Distribution Field QA-QC	06/10/21	PG&E distribution quality control department is dedicated to auditing distribution construction activities related to wildfire mitigation efforts. Audits are performed on construction work executed by PG&E crews and contractor crews. Audits are performed for 50% of surge arrester replacements and 100% of other WMP related construction activities. The quality control department maintains a proactive on-site presence for 100% of system hardening wire pull activities and conducts post construction walk of 100% of circuits for system hardening installation.

57	3.a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.3 Grid Design & System Hardening	5.3.3.8-1 - C.2 - Distribution Sectionalizing (automated devices)	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit validates 100% of metrics tied to employee incentive compensation plans. Wildfire metrics included in incentive compensation in 2020 included line miles of system hardening and installation of distribution sectionalizing devices. Internal audit reviews documentation for all installations to ensure that quantities claimed are supported by records.
58	3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.8-3 - C.1 - SCADA Transmission Switching (switches)	Steven Zubiri, Transmission Construction Manager	06/10/21	Transmission construction has multiple layers of QAQC. Installation contractors are required by PG&E to have a QAQC plan for construction activities. Construction is overseen and inspected by PG&E construction management. Construction completion is verified and documented by PG&E as-built team. Construction quality is audited by PG&E Quality Management department.
59	3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.8-6 - I.6 - Microgrids for PSPS Mitigation (operationalized units)	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit department performed audit of PSPS in 2020 and engaged in control advisory work to validate, review, and provide guidance for development of business processes. Control advisory initiatives in 2020 included temporary generation, comparison of reduction of customer impact to 2019 PSPS, validation of improved customer contact data, and validation of transformer mapping.
60	3.d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.11 - Mitigation of impact on customers and other residents affected during PSPS event	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit department performed audit of PSPS in 2020 and engaged in control advisory work to validate, review, and provide guidance for development of business processes. Control advisory initiatives in 2020 included temporary generation, comparison of reduction of customer impact to 2019 PSPS, validation of improved customer contact data, and validation of transformer mapping.
61	3.d. Qualitative Goal/Target	5.3.3.17 Updates to Grid Topology to Minimize Risk of Ignition to HFTDs	5.3.3.17.2-1 - C.10 System Hardening (line miles)	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit validates 100% of metrics tied to employee incentive compensation plans. Wildfire metrics included in incentive compensation in 2020 included line miles of system hardening and installation of distribution sectionalizing devices. Internal audit reviews documentation for all installations to ensure that quantities claimed are supported by records.
62	3.d. Qualitative Goal/Target	5.3.3.17 Updates to Grid Topology to Minimize Risk of Ignition to HFTDs	5.3.3.17.2-1 - C.10 System Hardening (line miles)	Mike Theide, Manager, Electric Distribution Field QA-QC	06/10/21	PG&E distribution quality control department is dedicated to auditing distribution construction activities related to wildfire mitigation efforts. Audits are performed on construction work executed by PG&E crews and contractor crews. Audits are performed for 50% of surge arrester replacements and 100% of other WMP related construction activities. The quality control department maintains a proactive on-site presence for 100% of system hardening wire pull activities and conducts post construction walk of 100% of circuits for system hardening installation.
63	3.c. Small (less than 100 items) Volume Quantifiable Goal/Target	5.3.3.17 Updates to Grid Topology to Minimize Risk of Ignition to HFTDs	5.3.3.17.2-2 - C.11 Butte County Rebuild (UG de-energized miles)	Mike Theide, Manager, Electric Distribution Field QA-QC	06/10/21	PG&E distribution quality control department is dedicated to auditing distribution construction activities related to wildfire mitigation efforts. Audits are performed on construction work executed by PG&E crews and contractor crews. Audits are performed for 50% of surge arrester replacements and 100% of other WMP related construction activities. The quality control department maintains a proactive on-site presence for 100% of system hardening wire pull activities and conducts post construction walk of 100% of circuits for system hardening installation.
64	3.a. Large Volume Quantifiable Goal/Target - Field Verifiable	5.3.3.17 Updates to Grid Topology to Minimize Risk of Ignition to HFTDs	5.3.3.17.4 - C.6 Non-Exempt Surge Arrester Replacement Program	Mike Theide, Manager, Electric Distribution Field QA-QC	06/10/21	PG&E distribution quality control department is dedicated to auditing distribution construction activities related to wildfire mitigation efforts. Audits are performed on construction work executed by PG&E crews and contractor crews. Audits are performed for 50% of surge arrester replacements and 100% of other WMP related construction activities. The quality control department maintains a proactive on-site presence for 100% of system hardening wire pull activities and conducts post construction walk of 100% of circuits for system hardening installation.
65	3.d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.1 - Distribution WSIP 2019 FMEA expansion	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit department was embedded in the development of WSIP inspection in 2019 providing audits on an ongoing basis. Audit findings were released in report May of 2020. Internal audit worked with lines of business to create action plans to address issues and tracked the progress toward completion of the action plans. Follow up audit was performed for lidar inspections to confirm that processes implemented following previous audit were in place and continuing to be effective.

66	3.d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.2-2 - Transmission WSIP 2019 FMEA expansion	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit department was embedded in the development of WSIP inspection in 2019 providing audits on an ongoing basis. Audit findings were released in report May of 2020. Internal audit worked with lines of business to create action plans to address issues and tracked the progress toward completion of the action plans. Follow up audit was performed for lidar inspections to confirm that processes implemented following previous audit were in place and continuing to be effective.
67	3.d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.3 - D.1 - Ultrasonic Inspections Pilot	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit department was embedded in the development of WSIP inspection in 2019 providing audits on an ongoing basis. Audit findings were released in report May of 2020. Internal audit worked with lines of business to create action plans to address issues and tracked the progress toward completion of the action plans. Follow up audit was performed for lidar inspections to confirm that processes implemented following previous audit were in place and continuing to be effective.
68	3.d. Qualitative Goal/Target	5.3.4 Asset Management & Inspections	5.3.4.7 - LiDAR inspections of distribution electric lines and equipment	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit department was embedded in the development of WSIP inspection in 2019 providing audits on an ongoing basis. Audit findings were released in report May of 2020. Internal audit worked with lines of business to create action plans to address issues and tracked the progress toward completion of the action plans. Follow up audit was performed for lidar inspections to confirm that processes implemented following previous audit were in place and continuing to be effective.
69	3.d. Qualitative Goal/Target	5.3.5 Vegetation Management & Inspections	5.3.5.6 - Improvement of inspections	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit department was embedded in the development of WSIP inspection in 2019 providing audits on an ongoing basis. Audit findings were released in report May of 2020. Internal audit worked with lines of business to create action plans to address issues and tracked the progress toward completion of the action plans. Follow up audit was performed for lidar inspections to confirm that processes implemented following previous audit were in place and continuing to be effective.
70	3.d. Qualitative Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.6.5 - PSPS events and mitigation of PSPS impacts	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit department performed audit of PSPS in 2020 and engaged in control advisory work to validate, review, and provide guidance for development of business processes. Control advisory initiatives in 2020 included temporary generation, comparison of reduction of customer impact to 2019 PSPS, validation of improved customer contact data, and validation of transformer mapping.
71	3.d. Qualitative Goal/Target	5.3.9.3 Customer Support in Emergencies	5.3.9.3-2 - I.8 CRC Mitigate PSPS Customer Impacts	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit department performed audit of PSPS in 2020 and engaged in control advisory work to validate, review, and provide guidance for development of business processes. Control advisory initiatives in 2020 included temporary generation, comparison of reduction of customer impact to 2019 PSPS, validation of improved customer contact data, and validation of transformer mapping.
72	3.d. Qualitative Goal/Target	5.3.9.5 Preparedness and Planning for Service Restoration	5.3.9.5-2 - I.2 - PSPS - Service Restoration	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit department performed audit of PSPS in 2020 and engaged in control advisory work to validate, review, and provide guidance for development of business processes. Control advisory initiatives in 2020 included temporary generation, comparison of reduction of customer impact to 2019 PSPS, validation of improved customer contact data, and validation of transformer mapping.
73	3.d. Qualitative Goal/Target	5.3.9.5 Preparedness and Planning for Service Restoration	5.3.9.5-3 - I.3 - PSPS Customer Impact Mitigation	Christopher Pezzola, Director, Internal Auditing	06/10/21	Internal audit department performed audit of PSPS in 2020 and engaged in control advisory work to validate, review, and provide guidance for development of business processes. Control advisory initiatives in 2020 included temporary generation, comparison of reduction of customer impact to 2019 PSPS, validation of improved customer contact data, and validation of transformer mapping.
74	3.d. Qualitative Goal/Target	5.3.2 Situational Awareness & Forecasting	5.3.2.6 - Weather forecasting and estimating impacts on electric lines and equipment	Heather Rock, Director, Climate Resilience and Scott Strenfel, Interim Director, Meterology Operations and Fire Science	06/07/21	Weather model is segmented into a 2x2 km grid with each cell mapped to transmission circuit. Provides the ability to review weather conditions and potential impacts by transmission line.

75	3.d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.11 - Mitigation of impact on customers and other residents affected during PSPS event	Shawn Holder, Manager, PSPS PMO	06/04/21	<p>The PSPS PMO (21 total staff members) focuses on process improvement and cross-functional efforts working closely with asset management, taking the lead on strategy related to system hardening, and providing content for the WMP reports.</p> <p>The team develops tools to execute the PSPS process; it starts with the meteorology team defining the area of risk initially, which the team further analyzes with a lot of consideration to risk and impact to customers and determines the areas of the grid that need to be de-energized.</p> <p>Knowledge and tracking of the events to help with situational awareness in the EOC [size of the event, the customers involved, producing notifications for customers].</p>
76	3.d. Qualitative Goal/Target	5.3.6 Grid Operations & Operating Protocols	5.3.6.4 - F.2 - Protocols for PSPS Re-Energization	Robert Cupp, Director, Emergency Preparedness and Response, Field Operations	06/03/21	<p>The process of restoration during a PSPS event entails Segmentation before the event taking place, then Patrol segment by segment, then finally giving the all-clear to restore the specific segment.</p>
77	3.d. Qualitative Goal/Target	5.3.9.5 Preparedness and Planning for Service Restoration	5.3.9.5-1 - I.1 - Emergency Preparation and Restoration	Angie Gibson, Director, Emergency Preparedness and Response, Strategy and Execution	06/04/21	<p>The Emergency Preparedness and Response department works closely with the WSOC to be on standby when periodic updates and notifications for a fire threat are received and are responsible for the following:</p> <p>1. All emergency responses (not just Wildfire Safety Planning & Training), developing emergency plans, training and exercising emergency plans, and continuously improving those plans.</p> <p>2. The Emergency Operating Center (EOC), the staffing and activation in case of a level 4 or level 5 incident and managing the 18 EOC team rotation and staffing.</p>
78	3.d. Qualitative Goal/Target	5.3.9.5 Preparedness and Planning for Service Restoration	5.3.9.5-2 - I.2 - PSPS - Service Restoration	Shawn Holder, Manager, PSPS PMO	06/04/21	<p>The PSPS PMO (21 total staff members) focuses on process improvement and cross-functional efforts working closely with asset management, taking the lead on strategy related to system hardening, and providing content for the WMP reports.</p> <p>The team develops tools to execute the PSPS process; it starts with the meteorology team defining the area of risk initially, which the team further analyzes with a lot of consideration to risk and impact to customers and determines the areas of the grid that need to be de-energized.</p> <p>Knowledge and tracking of the events to help with situational awareness in the EOC [size of the event, the customers involved, producing notifications for customers].</p>
79	3.d. Qualitative Goal/Target	5.3.9.5 Preparedness and Planning for Service Restoration	5.3.9.5-3 - I.3 - PSPS Customer Impact Mitigation	Maria Ly, Manager, Electric Networks and Michelle Sakamoto	06/07/21	<p>Goal of installing SCADA on transmission switches and on distribution circuit breakers was completed. Added SCADA switches improve sectionalizing and reduce transmission grid impacts during PSPS events.</p>
80	3.d. Qualitative Goal/Target	5.3.9.5 Preparedness and Planning for Service Restoration	5.3.9.5-3 - I.3 - PSPS Customer Impact Mitigation	Paul McGregor, Director Risk Management & Jon Eric Thalman, Risk Analytics	06/07/21	<p>Live demonstration was provided of the interactive electric risk map that shows the ignition probability along circuits, as well as the consequence. Probabilities and threat levels are visualized with a color scale, and the tool has the capability to zoom in and out of regions and specific circuit sections. Distribution circuit sections are segmented by sectionalizing devices.</p>
81	3.d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.17.5 - Transmission Line System Hardening Overview and Strategy	Paul McGregor, Director Risk Management & Jon Eric Thalman, Risk Analytics	06/07/21	<p>OA (Operability Assessment) Model for Transmission connected to Technosylva model to rank transmission circuits to inform repairs and inspections.</p>
82	3.d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.18.2 - Transmission Line Modeling	Paul McGregor, Director Risk Management & Jon Eric Thalman, Risk Analytics	06/07/21	<p>OA (Operability Assessment) Model for Transmission connected to Technosylva model to rank transmission circuits to inform repairs and inspections.</p>
83	3.d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.5 - Crossarm maintenance, repair, and replacement	Mike Theide, Manager, Electric Distribution Field QA-QC	06/10/21	<p>PG&E distribution quality control department is dedicated to auditing distribution construction activities related to wildfire mitigation efforts. Audits are performed on construction work executed by PG&E crews and contractor crews. Audits are performed for 50% of surge arrester replacements and 100% of other WMP related construction activities. The quality control department maintains a proactive on-site presence for 100% of system hardening wire pull activities and conducts post construction walk of 100% of circuits for system hardening installation.</p>

84	3.d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.10 - Maintenance, repair, and replacement of connectors, including hotline clamps	Mike Theide, Manager, Electric Distribution Field QA-QC	06/10/21	PG&E distribution quality control department is dedicated to auditing distribution construction activities related to wildfire mitigation efforts. Audits are performed on construction work executed by PG&E crews and contractor crews. Audits are performed for 50% of surge arrester replacements and 100% of other WMP related construction activities. The quality control department maintains a proactive on-site presence for 100% of system hardening wire pull activities and conducts post construction walk of 100% of circuits for system hardening installation.
85	3.d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.12-2 - Transmission Line Initiatives	Steven Zubiri, Transmission Construction Manager	06/10/21	Transmission construction has multiple layers of QAQC. Installation contractors are required by PG&E to have a QAQC plan for construction activities. Construction is overseen and inspected by PG&E construction management. Construction completion is verified and documented by PG&E as-built team. Construction quality is audited by PG&E Quality Management department.
86	3.d. Qualitative Goal/Target	5.3.3 Grid Design & System Hardening	5.3.3.15 - Transmission tower maintenance and replacement	Steven Zubiri, Transmission Construction Manager	06/10/21	Transmission construction has multiple layers of QAQC. Installation contractors are required by PG&E to have a QAQC plan for construction activities. Construction is overseen and inspected by PG&E construction management. Construction completion is verified and documented by PG&E as-built team. Construction quality is audited by PG&E Quality Management department.
87	3.d. Qualitative Goal/Target	5.3.3.17 Updates to Grid Topology to Minimize Risk of Ignition to HFTDs	5.3.3.17.3 - Relationship Between System Hardening and Enhanced Vegetation Management	Paul McGregor, Director Risk Management & Jon Eric Thalman, Risk Analytics	06/07/21	Risk management department developed improved risk models in 2020. Risk models developed for both vegetation risk and conductor risk. Vegetation risks and conductor risk models combine with the wildfire consequence model, powered by the TechnoSylva engine, to produce prioritized segments for mitigation for both system hardening and vegetation management.
88	4. Verification of Funding	N/A	N/A	Christopher Wong, Principal, Business Finance & Jack Liu, Business Planning Expert	06/08/21	<p>As a follow-up to IE’s email dated June 4th, 2021, to request the information discussed in the SME interview conducted on June 3rd with Christopher Wong, Principal, Business Finance, and Jack Liu, Business Planning Expert per Appendix D Item No. 46, and inquire about the spend of additional 2020 WMP activities/initiatives in advance of the second interview date.</p> <p>Chris screen shared a variance explanation spreadsheet that PG&E prepared to discuss specifics at the interview, which PG&E provided on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2. Chris walked through the list of activities shown on the spreadsheet having underspend of \$5 million and above in the meeting.</p> <p>This discussion confirmed that the observed trend of cost realignment between initiatives is an ongoing process summarized only once a year in the ARC Report or upon request of auditors or WSD.</p>



Appendix E - Verification of Funding Analysis

					2020 ARC Report (Expense and Capital Costs)				PG&E IE Analysis 2020 Actual vs 2020 Plan				Detail on funding discrepancy	Finding	Detail on Finding
SOW Category	Initiative Category	2020 Initiative Number	Initiative Name	2020 WMP Page Number	Budget	Actual	Funding Discrepancy Amount	ARC % Variance over Budget	IE Budget	IE Actual	IE Variance	IE % Variance over Budget			
Verification of funding	Vegetation Management & Inspections	5.3.5.20	Vegetation management to achieve clearances around electric lines and equipment	Table 25, Pg 5-200	\$ 438,311	\$ -	\$ (438,311)	-100%	\$ -	\$ -	\$ -		No spend was allocated to this \$438.31 million 2020 WMP Activity/Initiative per the 2020 ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, this item was realigned in the 2021 WMP to initiative 7.3.5.20 Vegetation Management to Achieve Clearances Around Electric Lines and Equipment.	Unused Budget of \$438.31 million, 100% of the total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$438.31 million in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$438.31 million initiative/activity.
Verification of funding	Grid Design & System Hardening	5.3.3.15	Transmission tower maintenance and replacement	Table 23, Pg 5-137	\$ 284,012	\$ 92,163	\$ (191,849)	-68%	\$ 108,441	\$ 92,163	\$ (16,278)	-15%	This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget underspent of \$191.85 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was reduced from \$284.01 million to \$108.44 million, still resulting in an underspent amount by \$16.28 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, PG&E stated that lower unit costs primarily drove the lower spend due to enhanced program management oversight, and the drive to gain efficiency. Additionally, notifications were assigned to a program but ended up being completed in another program due to lower volume.	Budget Underspent by \$191.85 million, 68% of total budget (2020 ARC Report). Budget Underspent by \$16.28 million, 15% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$92.16 million in 2020, less than the \$284.01 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$284.01 million to \$108.44 million, still resulting in an underspend amount of \$16.28 million.
Verification of funding	Grid Operations & Operating Protocols	5.3.6.5-1, 5.3.6.5-2, and 5.3.6.5-3	PSPS events and mitigation of PSPS impacts	Table 26, Pg 5-210	\$ 210,358	\$ 80,812	\$ (129,546)	-62%	\$ 153,613	\$ 80,812	\$ (72,801)	-47%	This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspent of \$129.55 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was reduced from \$210.36 million to \$153.61 million, resulting in an underspent amount of \$72.80 million. PG&E stated that they incurred less than planned PSPS event costs and have attributed those reductions in costs per event to the investments made to mitigate PSPS events, such as fire risk modeling, system hardening, sectionalizing devices. In addition, a portion of PSPS event work was booked to distribution orders.	Budget Underspent by \$129.55 million, 62% of the total budget (2020 ARC Report).	PG&E spent \$80.81 million in 2020, less than the \$210.36 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$210.36 million to \$153.61, resulting in an underspend amount of \$72.80 million.
Verification of funding	Vegetation Management & Inspections	5.3.5.11	Patrol inspections of vegetation around distribution electric lines and equipment	Table 25, Pg 5-191	\$ 105,349	\$ -	\$ (105,349)	-100%	\$ -	\$ -	\$ -		No spend was allocated to this \$105.35 million 2020 WMP Activity/Initiative per the 2020 ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, there are no-cost allocations for this initiative. Per 2020 WMP Section 5.3.5.11 Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment and 2021 WMP Section 7.3.5.11 Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment, there is no specific program to perform "patrols" around distribution lines unique from the inspections described in Sections 5.3.5.11 (2020 WMP)and 7.3.5.2. (2021 WMP).	Unused Budget of \$105.35 million, 100% of the total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$105.35 million activity/initiative in the 2020 ARC Report for the 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$105.35 million initiative/activity.
Verification of funding	Asset Management & Inspections	5.3.4.9	D.1 - Ultrasonic Inspections Pilot	Table 24, Pg 5-165	\$ 93,178	\$ -	\$ (93,178)	-100%	\$ -	\$ -	\$ -		No spend was allocated to this \$93.18 million 2020 WMP Activity/Initiative per the 2020 ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, this item was realigned in the 2021 WMP to initiative 7.3.4.9 Other discretionary inspection of distribution electric lines and equipment, beyond inspections mandated by rules and regulations. In 2021 WMP, PG&E stated that they are not planning discretionary inspection activities beyond those described in Sections 7.3.4.1 and 7.3.4.4 in 2021.	Unused Budget of \$93.18 million, 100% of the total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$93.18 million activity/initiative in the 2020 ARC Report for 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$93.18 million initiative/activity.

SOW Category	Initiative Category	2020 Initiative Number	Initiative Name	2020 WMP Page Number	Budget	Actual	Funding Discrepancy Amount	ARC % Variance over Budget	IE Budget	IE Actual	IE Variance	IE % Variance over Budget	Detail on funding discrepancy	Finding	Detail on Finding
Verification of funding	Asset Management & Inspections	5.3.4.10	Other discretionary inspection of transmission electric lines and equipment, beyond inspections mandated by rules and regulations	Table 24, Pg 5-166	\$ 60,052	\$ 347	\$ (59,705)	-99%	\$ 347	\$ 347	\$ -	0%	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$59.71 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was decreased from 60.05 million to \$347 thousand, matching the actual spend of \$347 thousand and resulting in a full spend. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Sections 7.3.4.2 and 7.3.4.10 have been switched in the 2021 WMP. 7.3.4.2 is now the Enhanced Inspections Program for Transmission, wherein the 2020 WMP 5.3.4.2 consisted of MATs BFU, BFW, and BFY (non-enhanced inspections). For the activities described in 7.3.4.10, activities are not discreetly tracked in MATs, work was estimated.</p> <p>Enhanced Inspections 2020 WMP plan units: 21,558 at \$2,786 per unit; 2020 actuals: 27,399 at \$1,488 per unit.</p>	<p>Budget Underspent by \$59.71 million, 99% of the total budget (2020 ARC Report).</p> <p>Budget Fully Spent (PG&E Analysis 2020 Actual vs. 2020 Plan).</p>	<p>PG&E spent \$347 thousand in 2020, less than the \$60.05 million budget in the 2020 ARC Report for 2020 WMP.</p> <p>According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$60.05 million to \$347 thousand, resulting in a full spend for the activity/initiative.</p>
Verification of funding	Vegetation Management & Inspections	5.3.5.12	Patrol inspections of vegetation around transmission electric lines and equipment	Table 25, Pg 5-191	\$ 35,893	\$ -	\$ (35,893)	-100%	\$ -	\$ -	\$ -		<p>No spend was allocated to this 2020 WMP Activity/Initiative with a budget of 35.89 million, per the ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, there are no-cost allocations for this initiative.</p> <p>Per 2020 WMP Section 5.3.5.12 Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment and 2021 WMP Section 7.3.5.12 Patrol Inspections of Vegetation Around Transmission Electric Lines and Equipment, there is no specific program to perform "patrols" around distribution lines unique from the inspections described in Sections 5.3.5.3 (2020 WMP)and 7.3.5.3. (2021 WMP).</p>	<p>Unused Budget of \$35.89 million, 100% of total budget (2020 ARC Report).</p>	<p>PG&E did not spend or record any allocation of costs spent for this \$35.89 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity.</p> <p>According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E decreased the budget by the full budget amount of \$35.89, resulting in a no spend.</p>
Verification of funding	Grid Design & System Hardening	5.3.3.10	Maintenance, repair, and replacement of connectors, including hotline clamps	Table 23, Pg 5-129	\$ 41,906	\$ 9,165	\$ (32,741)	-78%	\$ 4,702	\$ 9,165	\$ 4,464	95%	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$32.74 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was decreased from \$41.91 million to \$4.70 million, resulting in an overspend amount of \$4.46 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per the ARC Report, PG&E self-reported that System Hardening components will no longer be tracked at the asset component level.</p>	<p>Budget Underspent by \$32.74 million, 78% of the total budget (2020 ARC Report).</p> <p>Budget Overspent by \$4.46 million, 95% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).</p>	<p>PG&E spent \$9.17 million in 2020, less than the \$41.91 million budget in the 2020 ARC Report for 2020 WMP.</p> <p>According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$41.91 million to \$4.70 million, resulting in an overspend of 4.46 million. The actual spend of \$9.17 million did not change in both reports.</p>
Verification of funding	Grid Design & System Hardening	5.3.3.5	Crossarm maintenance, repair, and replacement	Table 23, Pg 5-118	\$ 90,495	\$ 67,920	\$ (22,575)	-25%	\$ 78,505	\$ 67,920	\$ (10,584)	-13%	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget underspent of \$22.58 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was reduced from \$90.50 million to \$78.51 million, resulting in an underspent amount of \$10.58 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per PG&E's Analysis 2020 Actual vs. 2020 Plan, dated 06.09.21 - Underspend primarily driven by Covid 19 impacts and resources diverted to emergency response efforts related to fires</p>	<p>Budget Underspent by \$22.58 million, 25% of the total budget (2020 ARC Report).</p> <p>Budget Underspent by \$10.58 million, 13% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).</p>	<p>PG&E spent 67.92 million in 2020, less than the \$90.50 million budget in the 2020 ARC Report for the 2020 WMP.</p> <p>According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$90.50 million to \$78.51 million, resulting in an underspend amount of \$10.58 million. The actual spend of \$67.92 million did not change in both reports.</p>
Verification of funding	Emergency Planning & Preparedness	5.3.9.4	I.5 - CERP (Update and Publish)	Table 29, Pg 5-243	\$ 25,710	\$ 4,529	\$ (21,181)	-82%	\$ 986	\$ 4,529	\$ 3,543	359%	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget underspent of \$21.18 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was reduced from \$25.71 million to \$986 thousand, resulting in an overspend amount by \$3.54 million. The actual spend amount of \$4.53 million did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per the 2020 ARC Report, PG&E self-reported the 2020 actuals associated with the Field Ops group instead of all of the Disaster and Emergency Preparedness (EP&R) larger team/group mapped to this initiative.</p>	<p>Budget Underspent by \$21.18 million, 82% of total budget (2020 ARC Report).</p> <p>Budget Overspend by \$3.54 million, 359% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).</p>	<p>PG&E spent \$18.61 million in 2020, \$19.40 million less than the \$38.0 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity.</p> <p>According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced the budget from \$38.0 million to \$14.20 million, resulting in an overspend amount of \$4.40 million.</p>
Verification of funding	Asset Management & Inspections	5.3.4.13	Pole Loading Calculations and Desktop Validation	Table 24, Pg 5-169	\$ 38,000	\$ 18,604	\$ (19,396)	-51%	\$ 14,201	\$ 18,604	\$ 4,404	31%	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget underspent of \$19.40 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was reduced from \$38.0 million to \$14.20 million, resulting in an overspend amount by \$4.40 million. The actual spend amount of \$18.61 million did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per the 2020 ARC Report, PG&E self-reported the underspend was attributed to the 2020 WMP activity/initiative falling short of the initially forecasted annual target for 2020 of completing 230 thousand pole loading assessments. PG&E stated that they refined their quality standards, switched vendors, and are still on track to finish all poles in Tier 2 and Tier 3 HFTD areas by the end of 2024 as originally forecasted.</p>	<p>Budget Underspent by \$19.40 million, 51% of total budget (2020 ARC Report).</p> <p>Budget Overspend by \$4.40 million, 31% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).</p>	<p>PG&E spent \$18.61 million in 2020, \$19.40 million less than the \$38.0 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity.</p> <p>According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced the budget from \$38.0 million to \$14.20 million, resulting in an overspend amount of \$4.40 million.</p>

SOW Category	Initiative Category	2020 Initiative Number	Initiative Name	2020 WMP Page Number	Budget	Actual	Funding Discrepancy Amount	ARC % Variance over Budget	IE Budget	IE Actual	IE Variance	IE % Variance over Budget	Detail on funding discrepancy	Finding	Detail on Finding
Verification of funding	Grid Design & System Hardening	5.3.3.3	Covered conductor installation	Table 23, Pg 5-116	\$ 17,017	\$ -	\$ (17,017)	-100%	\$ -	\$ -	\$ -		No spend was allocated to this 2020 WMP Activity/Initiative per the ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, there are no-cost allocations for this initiative. Per 2020 WMP Section 5.3.3.3 Covered Conductor Installation, this initiative was consolidated with the System Hardening program in the 2020 WMP Section 5.3.3.17, and in the 2021 WMP, Section 7.3.3.3 Covered Conductor Installation, PG&E describes the installation of covered conductor and replacement of existing poles, cross-arms, and other equipment as part of their System Hardening, Section 5.3.3.17 (2020 WMP) and Section 7.3.317 (2021 WMP), which is one consolidated program and the item is not tracked down at the asset component level.	Unused Budget of \$17.02 million, 100% of total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$17.02 million activity/initiative in 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$17.02 million initiative/activity.
Verification of funding	Vegetation Management & Inspections	5.3.5.16	Removal and remediation of trees with strike potential to electric lines and equipment	Table 25, Pg 5-197	\$ 14,639	\$ -	\$ (14,639)	-100%	\$ -	\$ -	\$ -		No spend was allocated to this 2020 WMP Activity/Initiative per the ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, there are no-cost allocations for this initiative. Per 2020 WMP Section 5.3.5.16 and 2021 WMP Section 7.3.5.16, PG&E does not perform a separate effort to identify, remove and remediate trees with strike potential. For this activity/initiative, PG&E has referenced Section 5.3.5.3 in 2020 WMP and Sections 7.3.5.2, 7.3.5.3, and 7.3.5.15 in 2021 WMP for work covered under those sections.	Unused Budget of \$14.64 million, 100% of the total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$14.64 million in 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$14.64 million initiative/activity.
Verification of funding	Grid Design & System Hardening	5.3.3.8-1	C.2 - Distribution Sectionalizing (automated devices)	Table 23, Pg 5-122	\$ 83,390	\$ 70,045	\$ (13,345)	-16%	\$ 63,372	\$ 70,045	\$ 6,673	11%	This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$13.35 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was decreased from \$83.39 million to \$63.37 million, resulting in an overspend amount of \$6.67 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.	Budget Underspent by \$13.35 million, 16% of the total budget (2020 ARC Report). Budget Overspent by \$6.67 million, 11% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$70.05 million in 2020, less than the \$83.39 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$83.39 million to \$63.37 million, resulting in an overspend of 6.67 million. The actual spend of \$70.05 million did not change in both reports.
Verification of funding	Grid Design & System Hardening	5.3.3.18.1	C.7 - System Protection deploy DCD (reclosers)	Table 23, Pg 5-148	\$ 11,299	\$ -	\$ (11,299)	-100%	\$ -	\$ -	\$ -		No spend was allocated to this 2020 WMP Activity/Initiative per the ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, there are no-cost allocations for this initiative. Per 2020 WMP Section 5.3.3.18.1 Evaluating New Protection Technologies, PG&E piloted the downed conductor detection (DCD) feature (200 plus reclosers). In the 2021 WMP Section 7.3.3.9.1 Installation of System Automation Equipment, PG&E addressed this activity/initiative as part of the larger effort to replace existing oil-filled reclosers and controllers with a solid dielectric recloser and new micro-processor controller with protection elements like Downed Conductor Detection (DCD), Sensitive Ground Fault, and platforms that allow for future protection elements.	Unused Budget of \$11.30 million, 100% of total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$11.30 million activity/initiative in 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$11.30 million initiative/activity.
Verification of funding	Grid Design & System Hardening	5.3.3.8-3	C.1 - SCADA Transmission Switching (switches)	Table 23, Pg 5-122	\$ 11,178	\$ 119	\$ (11,059)	-99%	\$ -	\$ -	\$ -		This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$11.06 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was decreased from \$11.18 million to \$0 (no budget), the actual spend was also decreased to \$0 (no spend).	Budget Underspent by \$11.06 million, 99% of the total budget (2020 ARC Report).	PG&E spent \$119 thousand in 2020, less than the \$11.18 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$11.18 million to \$0, (no budget), and the actual spend was also decreased to \$0 (no spend).
Verification of funding	Grid Design & System Hardening	5.3.3.1	Capacitor maintenance and replacement program	Table 23, Pg 5-114	\$ 16,742	\$ 8,562	\$ (8,180)	-49%	\$ 7,529	\$ 8,562	\$ 1,033	14%	This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$8.18 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was decreased from \$16.74 million to \$7.53 million, resulting in an overspend amount of \$1.03 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.	Budget Underspent by \$8.18 million, 49% of the total budget (2020 ARC Report). Budget Overspent by \$1.03 million, 14% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$8.56 million in 2020, less than the \$16.74 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$16.74 million to \$7.53 million, resulting in an overspend of 1.03 million. The actual spend of \$8.56 million did not change in both reports.
Verification of funding	Situational Awareness & Forecasting	5.3.2.1.1	Advanced weather monitoring and weather stations, B.1 - Upgrade POMMS Model to 2km	Table 22, Pg 5-60	\$ 8,637	\$ 488	\$ (8,149)	-94%	\$ 8,637	\$ 8,426	\$ (211)	-2%	This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$8.15 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the actual spend was increased from \$488 thousand to \$8.43 million, still resulting in an underspent amount of \$211 thousand, 2% of the total budget. The budget did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2. Per the ARC Report, the 2020 Actuals of this initiative, a subset of costs from the SOPP (Storm Outage Prediction Probability) project was mapped. In the 2020 WMP Plan, Weather Stations were mapped to this initiative. Per the ARC Report, PG&E noted and recorded the Weather Stations' actual costs of \$8.43 to WMP initiative 5.3.2.1.3 - B.10 - Weather Stations that had a budget allocation of \$342 thousand. The 2020 actuals recorded a total count of 404 weather stations at a unit cost of \$20,582 each. However, per recent findings, the IE noted that PG&E listed the actual cost of \$8.43 million, realigning the spend back to the original initiative.	Budget Underspent by \$8.15 million, 94% of total budget (2020 ARC Report). Budget Underspent by \$211 thousand, 2% of total new budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$488 thousand in 2020, \$8.15 million less than the \$8.64 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E increased its overall actual spend from \$488 thousand to \$8.43 million, resulting in an underspend amount of \$211 thousand.

SOW Category	Initiative Category	2020 Initiative Number	Initiative Name	2020 WMP Page Number	Budget	Actual	Funding Discrepancy Amount	ARC % Variance over Budget	IE Budget	IE Actual	IE Variance	IE % Variance over Budget	Detail on funding discrepancy	Finding	Detail on Finding
Verification of funding	Grid Design & System Hardening	5.3.3.12-2	Transmission Line Initiatives	Table 23, Pg 5-131	\$ 10,630	\$ 2,676	\$ (7,954)	-75%	\$ 2,792	\$ 2,676	\$ (115)	-4%	This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget underspend of \$7.95 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was decreased from \$10.63 million to \$2.79 million, resulting in an underspend amount of \$115 thousand. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.	Budget Underspent by \$7.95 million, 75% of the total budget (2020 ARC Report).	PG&E spent \$2.68 million in 2020, less than the \$10.63 million budget in the 2020 ARC Report for 2020 WMP.
Verification of funding	Situational Awareness & Forecasting	5.3.2.7-1 and 5.3.2.7-2	Other, Wildfire Safety Operations Center (WSOC)	Table 22, Pg 5-110	\$ 9,639	\$ 4,083	\$ (5,556)	-58%	\$ 9,639	\$ 5,003	\$ (4,636)	-48%	This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget underspent of \$5.56 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the actual spend amount was increased from \$4.08 million to \$5.0 million, still resulting in an underspend amount by \$4.64 million. The budget amount of \$9.64 million did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2. Per the 2020 ARC Report and reconciliation spreadsheet provided on June 9th, underspend is primarily driven by incorrect overhead planning assumptions, resulting in headcount resourcing deviations related to the WSOC (Wildfire Safety Operations Center).	Budget Underspent by \$5.56 million, 58% of total budget (2020 ARC Report).	PG&E spent \$4.08 million in 2020, \$5.56 million less than the \$9.64 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity.
Verification of funding	Grid Operations & Operating Protocols	5.3.6.2	F.1 - SIPT Crews and Engines Resourcing	Table 26, Pg 5-204	\$ 14,876	\$ 9,957	\$ (4,919)	-33%	\$ 8,926	\$ 9,957	\$ 1,032	12%	Variance Under \$5M		
Verification of funding	Vegetation Management & Inspections	5.3.5.7.1 and 5.3.5.7.2	LIDAR inspections of vegetation around distribution electric lines and equipment	Table 25, Pg 5-188	\$ 7,155	\$ 2,590	\$ (4,565)	-64%	\$ 2,564	\$ 2,590	\$ 26	1%	Variance Under \$5M		
Verification of funding	Vegetation Management & Inspections	5.3.5.6	Improvement of inspections	Table 25, Pg 5-188	\$ 5,688	\$ 1,299	\$ (4,388)	-77%	\$ 976	\$ 1,299	\$ 324	33%	Variance Under \$5M		
Verification of funding	Vegetation Management & Inspections	5.3.5.9	Other discretionary inspections of vegetation around distribution electric lines and equipment	Table 25, Pg 5-190	\$ 4,846	\$ 517	\$ (4,329)	-89%	\$ 688	\$ 517	\$ (172)	-25%	Variance Under \$5M		
Verification of funding	Grid Design & System Hardening	5.3.3.9-3	Installation of system automation equipment	Table 23, Pg 5-127	\$ 4,087	\$ -	\$ (4,087)	-100%	\$ 23,431	\$ 17,236	\$ (6,195)	-26%	No spend was allocated to this \$4.09 million 2020 WMP Activity/Initiative per the 2020 ARC Report. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$4.09 million to \$23.43 million, in addition, a spend amount of 17.24 million was allocated to this activity/initiative. The changes to the budget and spend resulted in an underspend of \$6.20 million. Per the PG&E, June 9th (IE Analysis 2020 vs. 2020 Plan v2) Report, "Primarily driven by project dependencies (gating factors), which includes delay in switchgear replacement, design delays, equipment requirements, lack of resources due to COVID 19 and fire response."	Unused Budget of 4.09 million, 100% of the total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$4.09 million activity/initiative in the 2020 ARC Report for the 2020 WMP initiative/activity.
Verification of funding	Grid Design & System Hardening	5.3.3.17.3	Relationship Between System Hardening and Enhanced Vegetation Management	Table 23, Pg 5-199	\$ 67,471	\$ 63,498	\$ (3,973)	-6%	\$ 5,023	\$ 11,224	\$ 6,201	123%	Variance Under \$5M		
Verification of funding	Grid Design & System Hardening	5.3.3.9-2	Replacement of Legacy 4C Controllers (reclosers)	Table 23, Pg 5-127	\$ 3,487	\$ -	\$ (3,487)	-100%	\$ 3,487	\$ -	\$ (3,487)	-100%	Variance Under \$5M		
Verification of funding	Situational Awareness & Forecasting	5.3.2.1.2	Advanced weather monitoring and weather stations, B.4 - Wildfire Spread Model - Operational Impacts	Table 22, Pg 5-65	\$ 3,509	\$ 45	\$ (3,463)	-99%	\$ 3,509	\$ 6,956	\$ 3,447	98%	Variance Under \$5M		
Verification of funding	Situational Awareness & Forecasting	5.3.2.2.3	B.7 - SmartMeters - Partial Voltage Detection	Table 22, Pg 5-91	\$ 3,919	\$ 750	\$ (3,168)	-81%	\$ 3,919	\$ 2,590	\$ (1,329)	-34%	Variance Under \$5M		
Verification of funding	Stakeholder Cooperation & Community Engagement	5.3.10.3	Cooperation with suppression agencies	Table 30, Pg 5-252	\$ 7,501	\$ 4,529	\$ (2,972)	-40%	\$ 986	\$ 4,529	\$ 3,543	359%	Variance Under \$5M		
Verification of funding	Asset Management & Inspections	5.3.4.14	Quality assurance / quality control of inspections	Table 24, Pg 5-170	\$ 4,389	\$ 1,831	\$ (2,558)	-58%	\$ 133	\$ 1,831	\$ 1,698	1274%	Variance Under \$5M		
Verification of funding	Situational Awareness & Forecasting	5.3.2.3.1	Electric Transmission	Table 22, Pg 5-97	\$ 3,040	\$ 500	\$ (2,540)	-84%	\$ 500	\$ 500	\$ -	0%	Variance Under \$5M		
Verification of funding	Emergency Planning & Preparedness	5.3.9.7	Resource Sharing to Support Inspection Work and Other Aspects of the Wildfire Management Plan	Table 29, Pg 5-247	\$ 2,156	\$ -	\$ (2,156)	-100%	\$ 2,156	\$ 5,878	\$ 3,722	173%	Variance Under \$5M		
Verification of funding	Stakeholder Cooperation & Community Engagement	5.3.10.1	Community engagement	Table 30, Pg 5-249	\$ 11,371	\$ 9,514	\$ (1,857)	-16%	\$ 7,520	\$ 9,514	\$ 1,993	27%	Variance Under \$5M		

SOW Category	Initiative Category	2020 Initiative Number	Initiative Name	2020 WMP Page Number	Budget	Actual	Funding Discrepancy Amount	ARC % Variance over Budget	IE Budget	IE Actual	IE Variance	IE % Variance over Budget	Detail on funding discrepancy	Finding	Detail on Finding
Verification of funding	Vegetation Management & Inspections	5.3.5.14	Recruiting and training of vegetation management personnel	Table 25, Pg 5-193	\$ 1,861	\$ 14	\$ (1,847)	-99%	\$ 10	\$ 14	\$ 4	43%	Variance Under \$5M		
Verification of funding	Situational Awareness & Forecasting	5.3.2.6	Weather forecasting and estimating impacts on electric lines and equipment	Table 22, Pg 5-106	\$ 1,974	\$ 488	\$ (1,486)	-75%	\$ 592	\$ 488	\$ (104)	-18%	Variance Under \$5M		
Verification of funding	Situational Awareness & Forecasting	5.3.2.5.1	F.1 - Safety and Infrastructure Protection Teams (SIPT)	Table 22, Pg 5-103	\$ 4,734	\$ 3,319	\$ (1,414)	-30%	\$ 2,975	\$ 3,319	\$ 344	12%	Variance Under \$5M		
Verification of funding	Grid Operations & Operating Protocols	5.3.6.6	Stationed and on-call ignition prevention and suppression resources and services	Table 26, Pg 5-212	\$ 4,734	\$ 3,319	\$ (1,414)	-30%	\$ 2,975	\$ 3,319	\$ 344	12%	Variance Under \$5M		
Verification of funding	Vegetation Management & Inspections	5.3.5.5	Fuel management and reduction of “slash” from vegetation management activities	Table 25, Pg 5-187	\$ 25,000	\$ 23,666	\$ (1,334)	-5%	\$ 23,427	\$ 23,666	\$ 239	1%	Variance Under \$5M		
Verification of funding	Situational Awareness & Forecasting	5.3.2.2.6	B.8 - Sensor IQ Pilot Deployment	Table 22, Pg 5-94	\$ 1,819	\$ 563	\$ (1,256)	-69%	\$ 1,819	\$ 1,871	\$ 52	3%	Variance Under \$5M		
Verification of funding	Emergency Planning & Preparedness	5.3.9.2	Community outreach, public awareness, and communications efforts	Table 29, Pg 5-240	\$ 7,701	\$ 6,478	\$ (1,223)	-16%	\$ 3,850	\$ 6,478	\$ 2,627	68%	Variance Under \$5M		
Verification of funding	Grid Design & System Hardening	5.3.3.8-5	C.3 - Remote Grids	Table 23, Pg 5-122	\$ 943	\$ -	\$ (943)	-100%	\$ 943	\$ 755	\$ (188)	-20%	Variance Under \$5M		
Verification of funding	Vegetation Management & Inspections	5.3.5.17-1 and 5.3.5.17-2	Substation inspection	Table 25, Pg 5-199	\$ 1,160	\$ 453	\$ (707)	-61%	\$ 468	\$ 453	\$ (15)	-3%	Variance Under \$5M		
Verification of funding	Stakeholder Cooperation & Community Engagement	5.3.10.4	Forest service and fuel reduction cooperation and joint roadmap	Table 30, Pg 5-254	\$ 3,133	\$ 2,687	\$ (446)	-14%	\$ 3,133	\$ 2,687	\$ (446)	-14%	Variance Under \$5M		
Verification of funding	Grid Operations & Operating Protocols	5.3.6.3	F.5 - Implement SafetyNet Observation Cards	Table 26, Pg 5-205	\$ 1,235	\$ 840	\$ (395)	-32%	\$ 1,235	\$ 840	\$ (395)	-32%	Variance Under \$5M		
Verification of funding	Situational Awareness & Forecasting	5.3.2.2.1	Electric Transmission	Table 22, Pg 5-90	\$ 930	\$ 633	\$ (297)	-32%	\$ 930	\$ 1,219	\$ 290	31%	Variance Under \$5M		
Verification of funding	Data Governance	5.3.7.3	Documentation and disclosure of wildfire-related data and algorithms	Table 27, Pg 5-220	\$ 521	\$ 421	\$ (101)	-19%	\$ 521	\$ 421	\$ (101)	-19%	Variance Under \$5M		
Verification of funding	Vegetation Management & Inspections	5.3.5.10	Other discretionary inspections of vegetation around transmission electric lines and equipment	Table 25, Pg 5-191	\$ 90	\$ -	\$ (90)	-100%	\$ -	\$ -	\$ -		Variance Under \$5M		
Verification of funding	Data Governance	5.3.7.4	Define and track ignition near miss events	Table 27, Pg 5-221	\$ 788	\$ 723	\$ (65)	-8%	\$ 788	\$ 723	\$ (65)	-8%	Variance Under \$5M		
Verification of funding	Asset Management & Inspections	5.3.4.12	Patrol inspections of transmission electric lines and equipment	Table 24, Pg 5-168	\$ 61	\$ 48	\$ (13)	-21%	\$ 61	\$ 48	\$ (13)	-21%	Variance Under \$5M		
Verification of funding	Risk Assessment & Mapping	5.3.1.4	Initiative mapping and estimation of wildfire and PSPS risk-reduction impact	Table 21, Pg 5-51	\$ 23	\$ 16	\$ (8)	-33%	\$ 23	\$ 16	\$ (8)	-33%	Variance Under \$5M		
Verification of funding	Situational Awareness & Forecasting	5.3.2.1.6	7.3.2.1.6 Advanced weather monitoring and weather stations, Other Meteorology Tools and Upgrades	Table 22, Pg 5-78	\$ -	\$ 325	\$ 325	#DIV/0!	\$ -	\$ -	\$ -		Variance Under \$5M		
Verification of funding	Risk Assessment & Mapping	5.3.1.6	7.3.1.6 Weather-Driven Risk Map and Modelling Based on Various Relevant Weather Scenarios	Table 21, Pg 5-53	\$ -	\$ 475	\$ 475	#DIV/0!	\$ 545	\$ 475	\$ (69)	-13%	Variance Under \$5M		
Verification of funding	Emergency Planning & Preparedness	5.3.9.1	Adequate and trained workforce for service restoration	Table 29, Pg 5-239	\$ 1,452	\$ 1,969	\$ 517	36%	\$ 4,188	\$ 1,969	\$ (2,219)	-53%	Variance Under \$5M		
Verification of funding	Emergency Planning & Preparedness	5.3.9.6	Protocols in place to learn from wildfire events	Table 29, Pg 5-246	\$ 1,597	\$ 2,166	\$ 569	36%	\$ 4,607	\$ 2,166	\$ (2,441)	-53%	Variance Under \$5M		

SOW Category	Initiative Category	2020 Initiative Number	Initiative Name	2020 WMP Page Number	Budget	Actual	Funding Discrepancy Amount	ARC % Variance over Budget	IE Budget	IE Actual	IE Variance	IE % Variance over Budget	Detail on funding discrepancy	Finding	Detail on Finding
Verification of funding	Asset Management & Inspections	5.3.4.4	Infrared inspections of distribution electric lines and equipment	Table 24, Pg 5-160	\$ 697	\$ 1,561	\$ 865	124%	\$ 2,193	\$ 1,561	\$ (632)	-29%	Variance Under \$5M		
Verification of funding	Emergency Planning & Preparedness	5.3.9.5	Preparedness and planning for service restoration	Table 29, Pg 5-245	\$ 2,903	\$ 3,938	\$ 1,035	36%	\$ 8,376	\$ 3,938	\$ (4,437)	-53%	Variance Under \$5M		
Verification of funding	Grid Design & System Hardening	5.3.3.7	C.12 - Expulsion Fuse Replacement (non-exempt equipment)	Table 23, Pg 5-121	\$ 5,423	\$ 7,847	\$ 2,423	45%	\$ 8,278	\$ 7,847	\$ (431)	-5%	Variance Under \$5M		
Verification of funding	Asset Management & Inspections	5.3.4.11	Patrol inspections of distribution electric lines and equipment	Table 24, Pg 5-167	\$ 4,874	\$ 8,710	\$ 3,836	79%	\$ 12,878	\$ 8,710	\$ (4,167)	-32%	Variance Under \$5M		
Verification of funding	Vegetation Management & Inspections	5.3.5.18-1 and 5.3.5.18-2	Substation vegetation management, Maintenance substation transmission	Table 25, Pg 5-200	\$ 1,889	\$ 5,794	\$ 3,905	207%	\$ 6,064	\$ 5,794	\$ (270)	-4%	Variance Under \$5M		
Verification of funding	Situational Awareness & Forecasting	5.3.2.1.3	Advanced weather monitoring and weather stations, B.10 - Weather Stations	Table 22, Pg 5-68	\$ 342	\$ 8,426	\$ 8,085	2367%	\$ 342	\$ 257	\$ (85)	-25%	Variance Under \$5M		
Verification of funding	Grid Design & System Hardening	5.3.3.12-1	Substation Animal Abatement	Table 23, Pg 5-131	\$ 493	\$ 9,079	\$ 8,586	1743%	\$ 12,530	\$ 9,079	\$ (3,452)	-28%	Variance Under \$5M		
Verification of funding	Grid Design & System Hardening	5.3.3.8-2	C.4 -Transmission Line Evaluation for PSPS Scoping	Table 23, Pg 5-122	\$ 37,184	\$ 48,850	\$ 11,667	31%	\$ 50,956	\$ 48,850	\$ (2,106)	-4%	Variance Under \$5M		
Verification of funding	Asset Management & Inspections	5.3.4.15-1 and	D.4 - Substation HFTD Inspections (substations)	Table 24, Pg 5-172	\$ 8,992	\$ 20,949	\$ 11,957	133%	\$ 29,752	\$ 20,949	\$ (8,803)	-30%	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget overspend of \$11.96 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$8.99 million to \$29.75 million, resulting in an underspent amount of \$8.80 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per the PG&E, June 9th (IE Analysis 2020 vs. 2020 Plan v2) Report, "Transmission substation inspections focused primarily on HFTD, non-HFTD was overplanned incorrectly."</p>	<p>Budget Overspent by \$11.96 million, 133% of the \$8.99 million budget in the 2020 ARC Report for the 2020 WMP total budget (2020 ARC Report).</p> <p>Budget Underspent by \$8.80 million, 30% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).</p>	<p>PG&E spent \$20.95 million in 2020, \$11.96 million more than the \$8.99 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity.</p> <p>According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan v2), PG&E increased its overall budget from \$8.99 million to \$29.75 million, resulting in an underspend amount of \$8.8 million.</p>
Verification of funding	Vegetation Management & Inspections	5.3.5.8	LIDAR inspections of vegetation around transmission electric lines and equipment	Table 25, Pg 5-189	\$ 5,597	\$ 25,222	\$ 19,625	351%	\$ 27,614	\$ 25,222	\$ (2,391)	-9%	Variance Under \$5M		
Verification of funding	Grid Design & System Hardening	5.3.3.2-1, 5.3.3.2-2, 5.3.3.2-3, and 5.3.3.2-4	Circuit breaker maintenance and installation to de-energize lines upon detecting a fault	Table 23, Pg 5-115	\$ 34,195	\$ 57,731	\$ 23,536	69%	\$ 44,328	\$ 57,731	\$ 13,404	30%	Variance Under \$5M		
Verification of funding	Grid Design & System Hardening	5.3.3.11-1 and 5.3.3.11-2	Mitigation of impact on customers and other residents affected during PSPS event	Table 23, Pg 5-130	\$ 155,715	\$ 182,956	\$ 27,241	17%	\$ 444,376	\$ 185,746	\$ (258,630)	-58%	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget overspend of \$27.24 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, this item was realigned in the 2021 WMP to sub-initiative 7.3.3.11.1 Generation for PSPS Mitigation.</p> <p>Per the same June 9th report, the budget amount was increased from \$155.72 million to \$444.38 million, and the spend actuals increased from \$182.96 million to \$185.75 million, resulting in an underspend amount of \$258.63 million.</p> <p>PG&E Business Finance explained that PG&E's strategy has shifted from its initial plan to install several make-ready capital work and utilization of permanent generation equipment associated with the Distribution Generation Enabled Microgrid Services (DGEM). The current strategy entails fewer permanent installations and uses a hybrid of substation permanent and temporary generation equipment, which resulted in lower operating/event costs tied to the smaller deployment of Temporary Generation Reservations and Operations during PSPS events. Additionally, there are some invoices and final costs from 2020 spending that were recorded to the 2021 actuals, which collectively resulted in an overall underspend for this initiative.</p>	<p>Budget Overspent by \$27.24 million, 17% of the total budget (2020 ARC Report).</p> <p>Budget Underspent by \$258.63 million, 58% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).</p>	<p>PG&E spent \$182.96 million in 2020, \$27.24 million more than the \$155.72 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity.</p> <p>According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E increased its overall budget for this initiative/activity from \$155.72 million to \$444.38 million, and the spend actuals increased from \$182.96 million to \$185.75 million, resulting in an underspend amount of \$258.63 million.</p>
Verification of funding	Grid Design & System Hardening	5.3.3.6	Distribution pole replacement and reinforcement, including with composite poles	Table 23, Pg 5-119	\$ 212,477	\$ 243,570	\$ 31,092	15%	\$ 257,854	\$ 243,570	\$ (14,284)	-6%	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget overspend of \$31.09 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E's variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$212.48 million to \$257.85 million, resulting in an underspent amount of \$14.28 million. The actual spend did not change between the ARC report and PG&E's variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per the PG&E, June 9th (IE Analysis 2020 vs. 2020 Plan v2) Report, "Primarily driven by Covid-19 impacts and resources diverted to emergency response efforts related to fires."</p>	<p>Budget Overspent by \$31.09 million, 15% of the total budget (2020 ARC Report).</p> <p>Budget Underspent by \$14.28 million, 6% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).</p>	<p>PG&E spent \$243.57 million in 2020, \$31.09 million more than the \$212.48 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity.</p> <p>According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E increased its overall budget from \$212.48 million to \$257.85 million, resulting in an underspend amount of \$14.28 million.</p>

SOW Category	Initiative Category	2020 Initiative Number	Initiative Name	2020 WMP Page Number	Budget	Actual	Funding Discrepancy Amount	ARC % Variance over Budget	IE Budget	IE Actual	IE Variance	IE % Variance over Budget	Detail on funding discrepancy	Finding	Detail on Finding
Verification of funding	Grid Design & System Hardening	5.3.3.14	Transformers maintenance and replacement	Table 23, Pg 5-136	\$ 36,677	\$ 89,335	\$ 52,658	144%	\$ 120,205	\$ 89,335	\$ (30,870)	-26%	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report, shows a budget overspend of \$52.66 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E’s variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$36.68 million to \$120.21 million, resulting in an underspent amount by \$30.87 million. The actual spend did not change between the ARC report and PG&E’s variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E’s variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, PG&E stated, “that the substation transformer maintenance underran, which drove the underspend. It was due to Covid 19 impacts of work/projects being reprioritized and pushed out to 2021.”</p>	<p>Budget Overspent by \$52.66 million, 144% of total budget (2020 ARC Report).</p> <p>Budget Underspent by \$30.87 million, 26% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).</p>	<p>PG&E spent \$89.34 million in 2020, \$52.66 million more than the \$36.68 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity.</p> <p>According to a reconciliation spreadsheet provided by PG&E on June 9th to the IE (2020 Actual vs. 2020 Plan). PG&E increased its overall budget from \$36.68 million to \$120.21 million, resulting in an underspend amount of \$30.87 million.</p>
Verification of funding	Asset Management & Inspections	5.3.4.2	D.3 - Transmission HFTD Inspections (structures)	Table 24, Pg 5-157	\$ 413	\$ 89,857	\$ 89,444	21640%	\$ 142,331	\$ 89,857	\$ (52,474)	-37%	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget overspend of \$89.44 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E’s variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$413 thousand to \$142.33 million, resulting in an underspend amount by \$52.47 million.</p> <p>Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E’s variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, PG&E stated that lower unit costs were the primary driver to the underspend. The budgets were based on actuals incurred in 2019 and future contract labor rates due to the accelerated nature of the Enhanced Inspections 2020.</p>	<p>Budget Overspent by \$89.44 million, 21,640% of the total budget (2020 ARC Report).</p> <p>Budget Underspent by \$52.47 million, 37% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).</p>	<p>PG&E spent \$89.86 million in 2020, \$89.44 million more than the \$413 thousand budget in the 2020 ARC Report for the 2020 WMP initiative/activity.</p> <p>According to the reconciliation spreadsheet provided on June 9th to the IE by PG&E (2020 Actual vs. 2020 Plan), the overall budget increased from \$413 thousand to \$142.33 million, resulting in an underspend amount of \$52.47 million.</p>
Verification of funding	Vegetation Management & Inspections	5.3.5.3	Detailed inspections of vegetation around transmission electric lines and equipment	Table 25, Pg 5-184	\$ 13,052	\$ 130,878	\$ 117,826	903%	\$ 140,072	\$ 130,878	\$ (9,194)	-7%	<p>This 2020 WMP Activity/Initiative spend, per the 2020 ARC Report for the 2020 WMP, shows a budget overspend of \$117.83 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E’s variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$13.05 million to \$140.07 million, resulting in an underspent amount of \$9.19 million. The actual spend did not change between the ARC report and PG&E’s variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per PG&E’s latest self-report dated 06.09.21, (IE Analysis 2020 Actual vs. 2020 Plan v2) - The initiative is a percentage allocation based upon SME input (~71%) of the Transmission vegetation management program. Total transmission program underrun is driven by operational underruns in Routine, Orchard Removal, and IVM.</p>	<p>Budget Overspent by \$117.83 million, 903% of the total budget (2020 ARC Report).</p> <p>Budget Underspent by \$9.19 million, 7% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).</p>	<p>PG&E spent \$130.88 million in 2020, \$117.83 million more than the \$13.05 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity.</p> <p>According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan v2), PG&E increased its overall budget from \$13.05 million to \$140.07 million, resulting in an underspend amount of \$9.19 million.</p>
Verification of funding	Asset Management & Inspections	5.3.4.1	D.2 - Distribution HFTD Inspections (poles)	Table 24, Pg 5-156	\$ 1,006	\$ 132,614	\$ 131,608	13084%	\$ 155,502	\$ 132,614	\$ (22,888)	-15%	<p>This 2020 WMP Activity/Initiative spend, per the ARC Report, shows a budget overspend of \$131.61 million. Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E’s variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, the budget amount was increased from \$1.01 million to \$155.50 million, resulting in an underspent amount by \$22.89 million. The actual spend did not change between the ARC report and PG&E’s variance explanation spreadsheet received on June 9th, 2021, titled: IE Analysis 2020 Actual vs. 2020 Plan v2.</p> <p>Per SME interview conducted on June 8th with Christopher Wong, Principal, Business Finance and Jack Liu, Business Planning Expert per Appendix D Item No. 88 and PG&E’s variance explanation spreadsheet received on June 9th, 2021 titled: IE Analysis 2020 Actual vs. 2020 Plan v2, PG&E stated that lower unit costs were the primary driver to the underspend. The budgets were based on actuals incurred in 2019 and future contract labor rates due to the accelerated nature of the Enhanced Inspections 2020.</p>	<p>Budget Overspent by \$131.61 million, 13,084% of the total budget (2020 ARC Report).</p> <p>Budget Underspent by \$22.89 million, 15% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).</p>	<p>PG&E spent \$132.61 million in 2020, \$131.61 million more than the \$1.01 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity.</p> <p>According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan v2), PG&E increased its overall budget from \$1.01 million to \$155.50 million, resulting in an underspend amount of \$22.89 million.</p>



BUREAU
VERITAS



Appendix F Analysis of Inspection Documents

Results from 5.3.4.1 - D.2 – HFTD Distribution Pole Inspections.

	Asset Tier	Equipment #	As Stated in Report				From Photos			Notes
			Voltage	Have Conductor?	Equipment?	Idle?	Apparent Voltage	Conductor?	Equipment?	
1	Tier3	100029667	0	N	N		0.24	Y	N	Secondary
2	Tier3	100259086	0	Y	N		12	Y	N	2 conductors in primary insulators, HV sign
3	Tier3	100271809	0	Y	N		12	Y	N	2 conductors on standoff primary insulators
4	Tier3	100271891	0	Y	Y		12	Y	Y	2-phases and transformer
5	Tier3	100271940	0	Y	Y		12	Y	Y	2-phases and transformer
6	Tier3	100295641	0	Y	Y		12	Y	N	2 conductors in primary insulators
7	Tier3	100337421	12	N	N		0	N	N	Labeled as "12 kV", but pole has no facilities - Idle
8	Tier3	100338717	12	Y	Y	Y	12	Y	Y	Pole labeled as Idle, buy has 2-phase primary and Tx
9	Tier3	100338960	12	Y	N		12	Y	Y	Transformer
10	Tier3	100353660	12	Y	Y		12	Y	N	Cannot see any equipment on pole
11	Tier3	100375518	12	Y	N		12	Y	Y	Transformer
12	Tier3	100651670	0	Y	N		12	Y	N	2-phases on primary insulators
13	Tier3	100676412	0	N	N		0.24	Y	Y	Secondary and secondary riser
14	Tier3	100913702	0	Y	N		12	Y	N	3-Phase primary
15	Tier3	100987829	12	Y	N		12	Y	N	Photo of one pole has Primary Crossarm, other pole shows primary standoff insulators
16	Tier3	100988085	12	N	Y		12	Y	Y	Primary & Transformer
17	Tier3	101035895	4	Y	Y		4	Y	N	No equipment visible
18	Tier3	101512855	12	Y	N		12	Y	Y	Transformer
19	Tier2	102167248	12	Y	Y	Y	12	Y	Y	Primary and (2) transformers
20	Tier2	102197178	12	N	N		12	Y	N	2 Primary conductors
21	Tier2	102220490	12	Y	N		0.24	Y	N	No primary, only secondary
22	Tier2	103209390	0	Y	N		0	Y	N	Secondary appears to be supported by tree
23	Tier2	103329363	0	Y	Y		12	Y	Y	Primary & Transformer
24	Tier2	103652495	0	Y	Y		12	Y	Y	Primary & Transformer
25	Tier2	103958700	12	Y	N		12	Y	Y	Transformer
25 / 313 =		8.00%								



Appendix G - Conclusion Table

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
WMP Activity Completion	5.1.D.3.6	C.8 - Rapid Earth Fault Current Limiter (REFCL) Pilot	Activity Validated	Compliant with the 2020 WMP, per 2020 EPIC Annual Project Status, the REFCL Pilot is under construction.
Verification of QA/QC Programs	5.1.D.3.6	C.8 - Rapid Earth Fault Current Limiter (REFCL) Pilot	Activity Validated	Compliant with the 2020 WMP, per 2020 EPIC Annual Project Status Report and 2020 ARC Report by PG&E's WMP PMO QC.
WMP Activity Completion	5.1.D.3.8	C.3 - Remote Grids 5.3.3.8-5	Activity Validated	Compliant with the 2020 WMP, per PG&E's filed Advice Letter 6017E.
Verification of QA/QC Programs	5.1.D.3.8	C.3 - Remote Grids 5.3.3.8-5	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC.
WMP Activity Completion	5.3.1.1	A summarized risk map that shows the overall ignition probability and estimated wildfire consequence along the electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview and live model review.
Verification of QA/QC Programs	5.3.1.1	A summarized risk map that shows the overall ignition probability and estimated wildfire consequence along the electric lines and equipment	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1 (Appendix B Item No. 39).
WMP Activity Completion	5.3.1.2	Climate-driven risk map and modelling based on various relevant weather scenarios	Activity Validated	Compliant with the 2020 WMP, per SME interview and live model review.
Verification of QA/QC Programs	5.3.1.2	Climate-driven risk map and modelling based on various relevant weather scenarios	Activity Validated	Compliant with the 2020 WMP, per SME interview.
WMP Activity Completion	5.3.1.3	Ignition probability mapping showing the probability of ignition along the electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview and live model review.
Verification of QA/QC Programs	5.3.1.3	Ignition probability mapping showing the probability of ignition along the electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview.
WMP Activity Completion	5.3.1.4	Initiative mapping and estimation of wildfire and PSPS risk-reduction impact	Activity Validated	Compliant with the 2020 WMP, per SME interview and live model review.
Verification of QA/QC Programs	5.3.1.4	Initiative mapping and estimation of wildfire and PSPS risk-reduction impact	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.1.4	Initiative mapping and estimation of wildfire and PSPS risk-reduction impact	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
WMP Activity Completion	5.3.1.5	Match drop simulations showing the potential wildfire consequence of ignitions that occur along the electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview and live model review.
Verification of QA/QC Programs	5.3.1.5	Match drop simulations showing the potential wildfire consequence of ignitions that occur along the electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview.
WMP Activity Completion	5.3.1.6	Weather-driven risk map and modelling based on various relevant weather scenarios	Activity Validated	Compliant with the 2020 WMP, per SME interview and live model review.
Verification of QA/QC Programs	5.3.1.6	Weather-driven risk map and modelling based on various relevant weather scenarios	Activity Validated	Compliant with the 2020 WMP, per SME interview.
WMP Activity Completion	5.3.10.1	Community engagement	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.10.1	Community engagement	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.10.1	Community engagement	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.10.2	Cooperation and best practice sharing with agencies outside CA	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.10.2	Cooperation and best practice sharing with agencies outside CA	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.10.3	Cooperation with suppression agencies	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.10.3	Cooperation with suppression agencies	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.10.3	Cooperation with suppression agencies	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.10.4	Forest service and fuel reduction cooperation and joint roadmap	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.10.4	Forest service and fuel reduction cooperation and joint roadmap	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.10.4	Forest service and fuel reduction cooperation and joint roadmap	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.1.1	Advanced weather monitoring and weather stations, Weather Stations	Budget Underspent by \$8.15 million, 94% of total budget (2020 ARC Report). Budget Underspent by \$211 thousand, 2% of total new budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$488 thousand in 2020, \$8.15 million less than the \$8.64 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E increased its overall actual spend from \$488 thousand to \$8.43 million, resulting in an underspend amount of \$211 thousand.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
WMP Activity Completion	5.3.2.1.1	B.1 - Upgrade POMMS Model to 2km	Activity Validated	Compliant with the 2020 WMP, per 2021 WMP Commitments and Performance Table, EPIC Project BID Solicitation, and SME interview and live model review.
Verification of QA/QC Programs	5.3.2.1.1	B.1 - Upgrade POMMS Model to 2km	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
WMP Activity Completion	5.3.2.1.1	B.3 - Wind Event Forecasting Tool (Diablo)	Activity in Progress	Compliant with the 2020 WMP, per PG&E QIU 2021, and SME interview and live model review.
Verification of QA/QC Programs	5.3.2.1.1	B.3 - Wind Event Forecasting Tool (Diablo)	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
WMP Activity Completion	5.3.2.1.1	B.6 - Re-calibrate the OPW and FPI models	Activity Validated	Compliant with the 2020 WMP, per PG&E QIU 2021, and SME interview and live model review.
Verification of QA/QC Programs	5.3.2.1.1	B.6 - Re-calibrate the OPW and FPI models	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
WMP Activity Completion	5.3.2.1.10	Collaborative Efforts to Advance Fire Science	Activity in Progress	Compliant with the 2020 WMP, SJISU Fire Weather Workshop and Community Wildfire Safety Program Presentation.
Verification of QA/QC Programs	5.3.2.1.10	Collaborative Efforts to Advance Fire Science	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.2.1.2	Advanced weather monitoring and weather stations, Wildfire Cameras	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.2.1.2	B.4 - Wildfire Spread Model - Operational Impacts	Activity Validated	Compliant with the 2020 WMP, per SME interview and live model review.
Verification of QA/QC Programs	5.3.2.1.2	B.4 - Wildfire Spread Model - Operational Impacts	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC.
WMP Activity Completion	5.3.2.1.3	B.10 - Weather Stations	Target Goal Not Met	PG&E target: (400) units, PG&E self-reported: (378) actual units
Verification of QA/QC Programs	5.3.2.1.3	B.10 - Weather Stations	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC.
WMP Activity Completion	5.3.2.1.4	B.9 - HD Cameras Deployment	Target Goal Met/Exceeded	PG&E target: (200) units, PG&E actual units installed: (216)
Verification of QA/QC Programs	5.3.2.1.4	B.9 - HD Cameras Deployment	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC.
WMP Activity Completion	5.3.2.1.5	B.2 - NOAA-20 Satellite Data	Activity Validated	Compliant with the 2020 WMP, per PG&E Online Satellite Map, and SME interview and live model review.
Verification of QA/QC Programs	5.3.2.1.5	B.2 - NOAA-20 Satellite Data	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC.
WMP Activity Completion	5.3.2.1.6	B.5 - Live Fuel Moisture (LFM) Sampling	Activity Validated	Compliant with the 2020 WMP, per SME interview and live model review.
Verification of QA/QC Programs	5.3.2.1.6	B.5 - Live Fuel Moisture (LFM) Sampling	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
WMP Activity Completion	5.3.2.1.7	Addressing Weather Forecast Model Uncertainty	Activity Validated	Compliant with the 2020 WMP, per SME interview and live model review.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
Verification of QA/QC Programs	5.3.2.1.7	Addressing Weather Forecast Model Uncertainty	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.2.1.8	PG&E Lightning Detection Network (PLDN)	Activity Validated	Compliant with the 2020 WMP, per PG&E's Custom Internal Application Display, and the 2020 Q4 QIU
Verification of QA/QC Programs	5.3.2.1.8	PG&E Lightning Detection Network (PLDN)	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.2.1.9	Information Sharing	Activity Validated	Compliant with the 2020 WMP, per PG&E's Online Weather Application and Map, and Online Weather Awareness for 7-Day Forecast.
Verification of QA/QC Programs	5.3.2.1.9	Information Sharing	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.2.1-3	Advanced weather monitoring and weather stations, Fire Detection & Alerting	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.2.2.1	Electric Transmission	Activity in Progress	Compliant with the 2020 WMP, per 2020 Q4 QIU and SEL-T400L Time-Doman Line Protection.
Verification of QA/QC Programs	5.3.2.2.1	Electric Transmission	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.2.2.2	Electric Distribution	Activity in Progress	Compliant with the 2020 WMP, per PG&E 2020 Q4 QIU.
Verification of QA/QC Programs	5.3.2.2.2	Electric Distribution	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.2.2.3	B.7 - SmartMeters - Partial Voltage Detection	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.2.2.3	B.7 - SmartMeters - Partial Voltage Detection	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.2.2.3	B.7 - SmartMeters - Partial Voltage Detection	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC.
WMP Activity Completion	5.3.2.2.4	Distribution Fault Anticipation (DFA) Technology	Activity Validated	Compliant with the 2020 WMP, per EPIC 2.34 Annual Report and 2021 WMP Section 7.3.2.2.3.
Verification of QA/QC Programs	5.3.2.2.4	Distribution Fault Anticipation (DFA) Technology	Activity Validated	Compliant with the 2020 WMP per PG&E EPIC Reports.
WMP Activity Completion	5.3.2.2.5	Early Fault Detection (EFD)	Activity Validated	Compliant with the 2020 WMP, per EPIC 2.34 Annual Report and 2021 WMP Section 7.3.2.2.3.
Verification of QA/QC Programs	5.3.2.2.5	Early Fault Detection (EFD)	Activity Validated	Compliant with the 2020 WMP per PG&E EPIC Reports.
WMP Activity Completion	5.3.2.2.6	B.8 - Sensor IQ Pilot Deployment	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.2.2.6	B.8 - Sensor IQ Pilot Deployment	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC.
Verification of Funding	5.3.2.2.6	B.8 - Sensor IQ Pilot Deployment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.2.2.7	Line Sensor Devices	Activity Validated	Compliant with the 2020 WMP, per Smart Grid Annual Report.
Verification of QA/QC Programs	5.3.2.2.7	Line Sensor Devices	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
WMP Activity Completion	5.3.2.2.8	Distribution Arcing Fault Signature Library	Activity Validated	Compliant with the 2020 WMP, per various public information sources and third-party documentation.
Verification of QA/QC Programs	5.3.2.2.8	Distribution Arcing Fault Signature Library	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.2.2-1	Electric Transmission	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.2-3	Continuous monitoring sensors	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.2.3.1	Electric Transmission	Activity in Progress	Compliant with the 2020 WMP, PG&E had no future plans for installing Fault Indicators, however, per the 2021 WMP PG&E exploring other technologies.
Verification of QA/QC Programs	5.3.2.3.1	Electric Transmission	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.2.3.1	Electric Transmission	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of QA/QC Programs	5.3.2.3.2	Electric Distribution	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.2.3.2	Electric Distribution	Activity in Progress	Compliant with the 2020 WMP, PG&E had no future plans for installing Fault Indicators, however, per the 2021 WMP PG&E is exploring other technologies.
WMP Activity Completion	5.3.2.4	Forecast of a fire risk index, fire potential index, or similar	Activity Validated	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.2.4	Forecast of a fire risk index, fire potential index, or similar	Activity Validated	Compliant with the 2020 WMP, per SME interview.
WMP Activity Completion	5.3.2.5.1	F.1 - Safety and Infrastructure Protection Teams (SIPT)	Activity Validated	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.2.5.1	F.1 - Safety and Infrastructure Protection Teams (SIPT)	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
Verification of Funding	5.3.2.5.1	F.1 - Safety and Infrastructure Protection Teams (SIPT)	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of QA/QC Programs	5.3.2.5.2	Data collection	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.2.5.2	Data collection	Activity Validated	Compliant with the 2020 WMP, per SME interview and live model review.
Verification of Funding	5.3.2.6	Weather forecasting and estimating impacts on electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.2.6	Weather forecasting and estimating impacts on electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per PG&E's response to Case 3:14-cr-00175WHA Document
Verification of QA/QC Programs	5.3.2.6	Weather forecasting and estimating impacts on electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview.
WMP Activity Completion	5.3.2.7	Wildfire Safety Operations Center (WSOC)	Activity Validated	Compliant with the 2020 WMP, per multiple SME interviews.
Verification of QA/QC Programs	5.3.2.7	Wildfire Safety Operations Center (WSOC)	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
Verification of Funding	5.3.2.7-1	Other, Wildfire Safety Operations Center (WSOC)	Budget Underspent by \$5.56 million, 58% of total budget (2020 ARC Report). Budget Underspent by \$4.64 million, 48% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$4.08 million in 2020, \$5.56 million less than the \$9.64 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E increased the actual spend amount from \$4.08 million to \$5.0 million, still resulting in an underspend amount of \$4.64 million.
WMP Activity Completion	5.3.3.1	Capacitor maintenance and replacement program	Activity Ongoing	Compliant with the 2020 WMP, per 2021 Q1 QIU and 2021 WMP capacitor inspection and maintenance is ongoing on an annual basis.
Verification of Funding	5.3.3.1	Capacitor maintenance and replacement program	Budget Underspent by \$8.18 million, 49% of the total budget (2020 ARC Report). Budget Overspent by \$1.03 million, 14% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$8.56 million in 2020, less than the \$16.74 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$16.74 million to \$7.53 million, resulting in an over-spend of 1.03 million. The actual spend of \$8.56 million did not change in both reports.
Verification of QA/QC Programs	5.3.3.1	Capacitor maintenance and replacement program	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.3.10	Maintenance, repair, and replacement of connectors, including hotline clamps	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.
Verification of Funding	5.3.3.10	Maintenance, repair, and replacement of connectors, including hotline clamps	Budget Underspent by \$32.74 million, 78% of the total budget (2020 ARC Report). Budget Overspent by \$4.46 million, 95% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$9.17 million in 2020, less than the \$41.91 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$41.91 million to \$4.70 million, resulting in an overspend of 4.46 million. The actual spend of \$9.17 million did not change in both reports.
Verification of QA/QC Programs	5.3.3.10	Maintenance, repair, and replacement of connectors, including hotline clamps	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.3.11	Mitigation of impact on customers and other residents affected during PSPS event	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.3.11	Mitigation of impact on customers and other residents affected during PSPS event	Activity Validated	Compliant with the 2020 WMP, per SME interviews.
Verification of Funding	5.3.3.11-1	Mitigation of impact on customers and other residents affected during PSPS event	Budget Underspent by \$259.26 million, 60% of total budget.	PG&E spent \$174.40 million in 2020, which is less than the reported budget of \$433.66 million. PG&E cited strategic shifts to several initiatives and partial 2020 costs recorded in 2021 as part of the under-spend.
Verification of Funding	5.3.3.12-1	Substation Animal Abatement	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.3.12-1	Substation Animal Abatement	Activity in Progress	Compliant with the 2020 WMP, per 2020 Q4 QIU, 2021 Q1 QIU

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
Verification of QA/QC Programs	5.3.3.12-1	Substation Animal Abatement	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of QA/QC Programs	5.3.3.12-2	Transmission Line Initiatives	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.3.12-2	Transmission Line Initiatives	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.
Verification of Funding	5.3.3.12-2	Transmission Line Initiatives	Budget Underspent by \$7.95 million, 75% of the total budget (2020 ARC Report). Budget Underspent by \$115 thousand, 4% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$2.68 million in 2020, less than the \$10.63 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$10.63 million to \$2.79 million, resulting in an under-spend of 115 thousand. The actual spend of \$2.68 million did not change in both reports.
Verification of QA/QC Programs	5.3.3.12-3	Wildfire Safety Inspection Program Distribution Repair Work	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.3.12-3	Wildfire Safety Inspection Program Distribution Repair Work	Activity in Progress	Compliant with the 2020 WMP, 2020 Q4 QIU, 2021 Q1 QIU
WMP Activity Completion	5.3.3.13	Pole Loading Assessments	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.3.13	Pole Loading Assessments	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of QA/QC Programs	5.3.3.14	Transformers maintenance and replacement	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.3.14	Transformers maintenance and replacement	Budget Overspent by \$52.66 million, 144% of total budget (2020 ARC Report). Budget Underspent by \$30.87 million, 26% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$89.34 million in 2020, \$52.66 million more than the \$36.68 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided by PG&E on June 9th to the IE (2020 Actual vs. 2020 Plan). PG&E increased its overall budget from \$36.68 million to \$120.21 million, resulting in an underspend amount of \$30.87 million.
WMP Activity Completion	5.3.3.14	Transformers maintenance and replacement	Activity Ongoing	Compliant with the 2020 WMP, per GO165 Program.
Verification of Funding	5.3.3.15	Transmission tower maintenance and replacement	Budget Underspent by \$191.85 million, 68% of total budget (2020 ARC Report). Budget Underspent by \$16.28 million, 15% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$92.16 million in 2020, less than the \$284.01 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$284.01 million to \$108.44 million, still resulting in an underspend amount of \$16.28 million.
WMP Activity Completion	5.3.3.15	Transmission tower maintenance and replacement	Activity Ongoing	Compliant with the 2020 WMP, per 2020 Q4 QIU, and SME Interview
Verification of QA/QC Programs	5.3.3.15	Transmission tower maintenance and replacement	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
WMP Activity Completion	5.3.3.16	Undergrounding of electric lines and/or equipment	Activity Ongoing	Compliant with the 2020 WMP, per Large Volume Quantifiable Goal/Target - Field Verifiable Section for C.10 System Hardening
Verification of QA/QC Programs	5.3.3.16	Undergrounding of electric lines and/or equipment	N/A	This initiative is tracked and managed under Section 5.3.3.17 System Hardening
Verification of QA/QC Programs	5.3.3.17.1	System Hardening Design Guidance	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.3.17.1	System Hardening Design Guidance	Activity in Progress	Compliant with the 2020 WMP, per Design Guidance Document continuing to be evolved by PG&E
WMP Activity Completion	5.3.3.17.2-1	C.10 - System Hardening (line miles)	Target Goal Met/Exceeded	PG&E target: (221) miles, PG&E actual mileage completed: (342)
Verification of QA/QC Programs	5.3.3.17.2-1	C.10 - System Hardening (line miles)	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interviews.
WMP Activity Completion	5.3.3.17.2-2	C.11 - Butte County Rebuild (UG de-energized miles)	Activity Validated	Compliant with the 2020 WMP, per various reports and publicly available information.
Verification of QA/QC Programs	5.3.3.17.2-2	C.11 - Butte County Rebuild (UG de-energized miles)	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
Verification of QA/QC Programs	5.3.3.17.3	Relationship Between System Hardening and Enhanced Vegetation Management	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.3.17.3	Relationship Between System Hardening and Enhanced Vegetation Management	Activity Validated	Compliant with the 2020 WMP, per SME Interviews and 2021 WMP reporting Tables.
Verification of Funding	5.3.3.17.3	Relationship Between System Hardening and Enhanced Vegetation Management	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of QA/QC Programs	5.3.3.17.4	C.6 - Non-Exempt Surge Arrester Replacement Program	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
WMP Activity Completion	5.3.3.17.4	C.6 - Non-Exempt Surge Arrester Replacement Program	Target Goal Met/Exceeded	PG&E target: (8,850) units, PG&E actual units installed: (10,263)
Verification of QA/QC Programs	5.3.3.17.5	Transmission Line System Hardening Overview and Strategy	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.3.17.5	Transmission Line System Hardening Overview and Strategy	Activity Validated	Compliant with the 2020 WMP, per SME interview and live model review.
WMP Activity Completion	5.3.3.18.1	C.7 - System Protection deploy DCD (reclosers)	Target Goal Met/Exceeded	PG&E target: (100) units, PG&E actual units reported installed: (126), PG&E data request correction: (302) units installed
Verification of Funding	5.3.3.18.1	C.7 - System Protection deploy DCD (reclosers)	Unused Budget of \$11.30 million, 100% of total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$11.30 million activity/initiative in 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$11.30 million initiative/activity.
Verification of QA/QC Programs	5.3.3.18.1-1	C.7 - System Protection deploy DCD (reclosers)	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
WMP Activity Completion	5.3.3.18.1-2	Increased Protection Sensitivity	Activity Validated	Compliant with the 2020 WMP, per Large Volume Quantifiable Goal/Target - Field Verifiable Section for C.7 System Protection deploy DCD (Reclosers)
Verification of QA/QC Programs	5.3.3.18.1-2	Increased Protection Sensitivity	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of QA/QC Programs	5.3.3.18.2	Transmission Line Modeling	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.3.18.2	Transmission Line Modeling	Activity Validated	Compliant with the 2020 WMP, per SME interview and live model review.
Verification of QA/QC Programs	5.3.3.18.3	Building and Sourcing Services	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.3.18.3	Building and Sourcing Services	Activity Ongoing	Compliant with the 2020 WMP, per 2020 Q4 QIU.
WMP Activity Completion	5.3.3.2	Circuit breaker maintenance and installation to de-energize lines upon detecting a fault	Activity Ongoing	Compliant with the 2020 WMP, per the TD-3222M and TD-3222S Substation Circuit Breakers and Equipment Maintenance Requirements.
Verification of QA/QC Programs	5.3.3.2	Circuit breaker maintenance and installation to de-energize lines upon detecting a fault	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.3.2-2	Circuit breaker maintenance and installation to de-energize lines upon detecting a fault	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.3.3	Covered conductor installation	Activity Ongoing	Compliant with the 2020 WMP, per Section 5.3.3.17 System Hardening Section.
Verification of Funding	5.3.3.3	Covered conductor installation	Unused Budget of \$17.02 million, 100% of total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$17.02 million activity/initiative in 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$17.02 million initiative/activity.
Verification of QA/QC Programs	5.3.3.3	Covered conductor installation	Activity Validated	Compliant with the 2020 WMP, per SME interview.
WMP Activity Completion	5.3.3.4	Covered conductor maintenance	Activity Ongoing	Compliant with the 2020 WMP, per GO165 Program.
Verification of QA/QC Programs	5.3.3.4	Covered conductor maintenance	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.3.5	Cross-arm maintenance, repair, and replacement	Activity Ongoing	Compliant with the 2020 WMP, per GO165 Program and multiple SME Interviews.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
Verification of Funding	5.3.3.5	Cross-arm maintenance, repair, and replacement	Budget Underspent by \$22.58 million, 25% of the total budget (2020 ARC Report). Budget Underspent by \$10.58 million, 13% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent 67.92 million in 2020, less than the \$90.50 million budget in the 2020 ARC Report for the 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$90.50 million to \$78.51 million, resulting in an underspend amount of \$10.58 million. The actual spend of \$67.92 million did not change in both reports.
Verification of QA/QC Programs	5.3.3.5	Cross-arm maintenance, repair, and replacement	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.3.6	Distribution pole replacement and reinforcement, including with composite poles	Activity Ongoing	Compliant with the 2020 WMP, per the PG&E PT&T Program.
Verification of Funding	5.3.3.6	Distribution pole replacement and reinforcement, including with composite poles	Budget Overspent by \$31.09 million, 15% of the total budget (2020 ARC Report). Budget Underspent by \$14.28 million, 6% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan)	PG&E spent \$243.57 million in 2020, \$31.09 million more than the \$212.48 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E increased its overall budget from \$212.48 million to \$257.85 million, resulting in an underspend amount of \$14.28 million.
Verification of QA/QC Programs	5.3.3.6	Distribution pole replacement and reinforcement, including with composite poles	Activity Validated	Compliant with the 2020 WMP, per SME interview.
Verification of Funding	5.3.3.7	C.12 - Expulsion Fuse Replacement (non-exempt equipment)	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.3.7	C.12 - Expulsion Fuse Replacement (non-exempt equipment)	Target Goal Met/Exceeded	PG&E target: (625) replacements, PG&E actual replacements: (643)
Verification of QA/QC Programs	5.3.3.7	C.12 - Expulsion Fuse Replacement (non-exempt equipment)	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
WMP Activity Completion	5.3.3.8-1	C.2 - Distribution Sectionalizing (automated devices)	Target Goal Met	PG&E target: (592) devices; cannot confirm exceeded amount of 603 per 2% sampling discrepancy.
Verification of QA/QC Programs	5.3.3.8-1	C.2 - Distribution Sectionalizing (automated devices)	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interviews.
Verification of Funding	5.3.3.8-1	C.2 - Distribution Sectionalizing (automated devices)	Budget Underspent by \$13.35 million, 16% of the total budget (2020 ARC Report). Budget Overspent by \$6.67 million, 11% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$70.05 million in 2020, less than the \$83.39 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$83.39 million to \$63.37 million, resulting in an over-spend of 6.67 million. The actual spend of \$70.05 million did not change in both reports.
Verification of Funding	5.3.3.8-2	C.4 -Transmission Line Evaluation for PSPS Scoping	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
WMP Activity Completion	5.3.3.8-2	C.4 -Transmission Line Evaluation for PSPS Scoping	Activity Validated	Compliant with the 2020 WMP, per data analysis.
Verification of QA/QC Programs	5.3.3.8-2	C.4 -Transmission Line Evaluation for PSPS Scoping	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC.
WMP Activity Completion	5.3.3.8-3	C.1 - SCADA Transmission Switching (switches)	Activity Validated	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.3.8-3	C.1 - SCADA Transmission Switching (switches)	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
Verification of Funding	5.3.3.8-3	C.1 - SCADA Transmission Switching (switches)	Budget Underspent by \$11.06 million, 99% of the total budget (2020 ARC Report).	PG&E spent \$119 thousand in 2020, less than the \$11.18 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$11.18 million to \$0, (no budget), and the actual spend was also decreased to \$0 (no spend).
WMP Activity Completion	5.3.3.8-4	C.9 - System Hardening Criteria Refinement (Dist.)	Activity Validated	Compliant with the 2020 WMP, per 2020 Q4 QIU and 2021 Q1 QIU
Verification of QA/QC Programs	5.3.3.8-4	C.9 - System Hardening Criteria Refinement (Dist.)	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC.
Verification of Funding	5.3.3.8-5	C.3 - Remote Grids	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of QA/QC Programs	5.3.3.8-6	I.6 - Microgrids for PSPS Mitigation (operationalized units)	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
WMP Activity Completion	5.3.3.8-6	I.6 - Microgrids for PSPS Mitigation (operationalized units)	Activity Validated	Compliant with the 2020 WMP, per SME interview and publicly available information.
WMP Activity Completion	5.3.3.9-1	C.5 - System Hardening (SCADA enabled circuit breakers)	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.3.9-1	C.5 - System Hardening (SCADA enabled circuit breakers)	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
Verification of Funding	5.3.3.9-2	Replacement of Legacy 4C Controllers (reclosers)	Unused Budget of \$3.49 million, 100% of total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$3.49 million activity/initiative in 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$3.49 million initiative/activity.
WMP Activity Completion	5.3.3.9-2	Replacement of Legacy 4C Controllers (reclosers)	Activity In Progress	Compliant with the 2020 WMP, per 2020 Q4 QIU and 2021 WMP goals to replace remaining 4C Controllers. See Verification of Funding related to the no spend related to this activity.
Verification of QA/QC Programs	5.3.3.9-2	Replacement of Legacy 4C Controllers (reclosers)	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
Verification of Funding	5.3.3.9-3	Installation of system automation equipment	Unused Budget of 4.09 million, 100% of the total budget (2020 ARC Report). Budget Underspent by \$6.20 million, 26% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E did not spend or record any allocation of costs spent for this \$4.09 million activity/initiative in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E increased its overall budget from \$4.09 million to \$23.43 million. Additionally, a spend amount of 17.24 million was allocated to this activity/initiative. The changes to the budget and spend resulted in an underspend of 6.20 million.
WMP Activity Completion	5.3.4.1	D.2 - Distribution HFTD Inspections (poles)	8% error rate on inspections	Noted discrepancies within inspection reports reviewed (written content did not align with images)
Verification of QA/QC Programs	5.3.4.1	D.2 - Distribution HFTD Inspections (poles)	Activity Validated	2020 WMP Initiative validated per PG&E's response to Data Request and SME interview, detailed in section 3.3.
Verification of Funding	5.3.4.1	D.2 - Distribution HFTD Inspections (poles)	Budget Overspent by \$131.61 million, 13,084% of the total budget (2020 ARC Report).	PG&E spent \$132.61 million in 2020, \$131.61 million more than the \$1.01 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity.
WMP Activity Completion	5.3.4.1	Distribution WSIP 2019 FMEA expansion	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.4.1	Distribution WSIP 2019 FMEA expansion	Activity Validated	Compliant with the 2020 WMP, per SME interview.
WMP Activity Completion	5.3.4.10	Other discretionary inspection of transmission electric lines and equipment, beyond inspections mandated by rules and regulations	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.4.10	Other discretionary inspection of transmission electric lines and equipment, beyond inspections mandated by rules and regulations	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.4.10	Other discretionary inspection of transmission electric lines and equipment, beyond inspections mandated by rules and regulations	Budget Underspent by \$59.71 million, 99% of the total budget (2020 ARC Report). Budget Fully Spent (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$347 thousand in 2020, less than the \$60.05 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$60.05 million to \$347 thousand, resulting in a full spend for the activity/initiative.
WMP Activity Completion	5.3.4.11	Patrol inspections of distribution electric lines and equipment	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.4.11	Patrol inspections of distribution electric lines and equipment	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.4.11	Patrol inspections of distribution electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.4.12	Patrol inspections of transmission electric lines and equipment	Not Assessed	Due to time constraints this initiative was not assessed.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
Verification of QA/QC Programs	5.3.4.12	Patrol inspections of transmission electric lines and equipment	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.4.12	Patrol inspections of transmission electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.4.13	Pole Loading Calculations and Desktop Validation	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.4.13	Pole Loading Calculations and Desktop Validation	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.4.13	Pole Loading Calculations and Desktop Validation	Budget Underspent by \$19.40 million, 51% of total budget (2020 ARC Report). Budget Overspend by \$4.40 million, 31% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$18.61 million in 2020, \$19.40 million less than the \$38.0 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced the budget from \$38.0 million to \$14.20 million, resulting in an overspend amount of \$4.40 million.
WMP Activity Completion	5.3.4.14	Quality assurance / quality control of inspections	Activity Validated	2020 WMP Initiative validation detailed in section 3.3.
Verification of QA/QC Programs	5.3.4.14	Quality assurance / quality control of inspections	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.4.14	Quality assurance / quality control of inspections	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.4.15	D.4 - Substation HFTD Inspections (substations)	Activity Validated	Compliant with the 2020 WMP, per review of PG&E's provided OH Checklist inspection record (Appendix C Data Request 014).
Verification of QA/QC Programs	5.3.4.15	D.4 - Substation HFTD Inspections (substations)	Activity Validated	2020 WMP Initiative validated per PG&E's response to Data Request, detailed in section 3.3.
Verification of Funding	5.3.4.15-1	D.4 - Substation HFTD Inspections (substations)	Budget Overspent by \$11.96 million, 133% of the total budget (2020 ARC Report). Budget Underspent by \$8.80 million, 30% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$20.95 million in 2020, \$11.96 million more than the \$8.99 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan v2), PG&E increased its overall budget from \$8.99 million to \$29.75 million, resulting in an underspend amount of \$8.8 million.
Verification of Funding	5.3.4.2	D.3 - Transmission HFTD Inspections (structures)	Budget Overspent by \$89.44 million, 21,640% of the total budget (2020 ARC Report). Budget Underspent by \$52.47 million, 37% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$89.86 million in 2020, \$89.44 million more than the \$413 thousand budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to the reconciliation spreadsheet provided on June 9th to the IE by PG&E (2020 Actual vs. 2020 Plan), the overall budget increased from \$413 thousand to \$142.33 million, resulting in an underspend amount of \$52.47 million.
Verification of QA/QC Programs	5.3.4.2-1	D.3 - Transmission HFTD Inspections (structures)	Activity Validated	2020 WMP Initiative validated per PG&E's response to Data Request, detailed in section 3.3.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
WMP Activity Completion	5.3.4.2-1	D.3 - Transmission HFTD Inspections (structures)	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.4.2-2	Transmission WSIP 2019 FMEA expansion	Not Assessed	Due to time constraints this initiative was not assessed.
WMP Activity Completion	5.3.4.2-2	Transmission WSIP 2019 FMEA expansion	Not Assessed	Due to time constraints this initiative was not assessed.
WMP Activity Completion	5.3.4.3	D.1 - Ultrasonic Inspections Pilot	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.4.3	D.1 - Ultrasonic Inspections Pilot	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
WMP Activity Completion	5.3.4.4	Infrared inspections of distribution electric lines and equipment	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.4.4	Infrared inspections of distribution electric lines and equipment	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.4.4	Infrared inspections of distribution electric lines and equipment	Budget Overspent by \$865 thousand, 124% of the total budget (2020 ARC Report). Budget Underspent by \$632 thousand, 29% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$1.56 million in 2020, \$865 thousand more than the \$697 thousand budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E increased its overall budget from \$697 thousand to \$2.19 million, resulting in an underspend amount of \$632 thousand.
Verification of QA/QC Programs	5.3.4.5	Predictive Modelling	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.4.5	Predictive Modelling (high risk conductors)	Not Assessed	Due to time constraints this initiative was not assessed.
WMP Activity Completion	5.3.4.6	Intrusive pole inspections	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.4.6	Intrusive pole inspections	Not Assessed	Due to time constraints this initiative was not assessed.
WMP Activity Completion	5.3.4.7	LiDAR inspections of distribution electric lines and equipment	Activity Validated	Compliant with the 2020 WMP – per SME interview
Verification of QA/QC Programs	5.3.4.7	LiDAR inspections of distribution electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview.
WMP Activity Completion	5.3.4.8	D.7 - VM utilizing LiDAR data to support EVM program	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.4.8	D.7 - VM utilizing LiDAR data to support EVM program	Activity Validated	Compliant with the 2020 WMP, per SME interview.
WMP Activity Completion	5.3.4.9	D.1 - Ultrasonic Inspections Pilot	Not Assessed	Due to time constraints this initiative was not assessed.
Verification of QA/QC Programs	5.3.4.9	D.1 - Ultrasonic Inspections Pilot	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC.
Verification of Funding	5.3.4.9	D.1 - Ultrasonic Inspections Pilot	Unused Budget of \$93.18 million, 100% of the total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$93.18 million activity/initiative in the 2020 ARC Report for 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$93.18 million initiative/activity.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
WMP Activity Completion	5.3.5.1	Additional efforts to manage community and environmental impacts	Activity Validated	Compliant with the 2020 WMP, per SME interview
Verification of QA/QC Programs	5.3.5.1	Additional efforts to manage community and environmental impacts	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.5.10	Other discretionary inspections of vegetation around transmission electric lines and equipment	Activity Validated	Compliant with the 2020 WMP - per field assessment WMP process to target high risk areas.
Verification of QA/QC Programs	5.3.5.10	Other discretionary inspections of vegetation around transmission electric lines and equipment	Activity Validated	2020 WMP Initiative validated per PG&E's responses to Data Requests, detailed in section 3.3.
Verification of Funding	5.3.5.10	Other discretionary inspections of vegetation around transmission electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.5.11	Patrol inspections of vegetation around distribution electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview and contractor interview in the field
Verification of QA/QC Programs	5.3.5.11	Patrol inspections of vegetation around distribution electric lines and equipment	Activity Validated	2020 WMP Initiative validated per SME interview, detailed in section 3.3.
Verification of Funding	5.3.5.11	Patrol inspections of vegetation around distribution electric lines and equipment	Unused Budget of \$105.35 million, 100% of total budget.	PG&E did not spend or record any allocation of costs spent for this \$105.35 million 2020 WMP initiative/activity.
WMP Activity Completion	5.3.5.12	Patrol inspections of vegetation around transmission electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview and review of Utility Standard: TD-7103S
Verification of QA/QC Programs	5.3.5.12	Patrol inspections of vegetation around transmission electric lines and equipment	Activity Validated	2020 WMP Initiative validated per PG&E's responses to Data Requests, detailed in section 3.3.
Verification of Funding	5.3.5.12	Patrol inspections of vegetation around transmission electric lines and equipment	Unused Budget of \$35.89 million, 100% of total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$35.89 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E decreased the budget by the full budget amount of \$35.89, resulting in a no spend.
WMP Activity Completion	5.3.5.13	Quality assurance / quality control of vegetation inspections	Activity Validated	Compliant with the 2020 WMP, per SME interview
Verification of QA/QC Programs	5.3.5.13	Quality assurance / quality control of vegetation inspections	Activity Validated	2020 WMP Initiative validated per SME interview, detailed in section 3.3.
WMP Activity Completion	5.3.5.14	Recruiting and training of vegetation management personnel	Activity Validated	Compliant with the 2020 WMP, per SME interview and review of Work Verification Inspector Training Material.
Verification of QA/QC Programs	5.3.5.14	Recruiting and training of vegetation management personnel	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.5.14	Recruiting and training of vegetation management personnel	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
WMP Activity Completion	5.3.5.15	E.1 - EVM line miles	Target Goal Met/ Exceeded	Compliant with the 2020 WMP Per -2020 WMP Commitments and Performance –from PG&E ARC 202110331
Verification of QA/QC Programs	5.3.5.15	E.1 - EVM line miles	Activity Validated	2020 WMP Initiative validated per SME interviews, detailed in section 3.3.
WMP Activity Completion	5.3.5.16	Removal and remediation of trees with strike potential to electric lines and equipment	Activity Validated	Compliant with the 2020 WMP Per Independent Evaluator Field Observations
Verification of QA/QC Programs	5.3.5.16	Removal and remediation of trees with strike potential to electric lines and equipment	Activity Validated	2020 WMP Initiative validated per PG&E's responses to Data Requests, detailed in section 3.3.
Verification of Funding	5.3.5.16	Removal and remediation of trees with strike potential to electric lines and equipment	Unused Budget of \$14.64 million, 100% of the total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$14.64 million in 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$14.64 million initiative/activity.
WMP Activity Completion	5.3.5.17	Substation inspection	Activity Validated	Compliant with the 2020 WMP Per review of Utility Bulletin TD-3322B-065
Verification of QA/QC Programs	5.3.5.17	Substation inspection	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.5.17	Substation inspection	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.5.17-2	Substation inspection, Transmission substation	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.5.18	Substation vegetation management	Activity Validated	Compliant with the 2020 WMP Per review of Utility Bulletin TD-3322B-065
Verification of QA/QC Programs	5.3.5.18	Substation vegetation management	Activity Validated	2020 WMP Initiative validated per PG&E's response to Data Request, detailed in section 3.3.
Verification of Funding	5.3.5.18-2	Substation vegetation management, Maintenance substation transmission	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.5.19	Vegetation inventory system	N/A	Compliant with 2020 WMP as system is described in WMP
Verification of QA/QC Programs	5.3.5.19	Vegetation inventory system	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.5.2	Detailed inspections of vegetation around distribution electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview
Verification of QA/QC Programs	5.3.5.2	Detailed inspections of vegetation around distribution electric lines and equipment	Activity Validated	2020 WMP Initiative validated per SME Interview, detailed in section 3.3.
WMP Activity Completion	5.3.5.20	Vegetation management to achieve clearances around electric lines and equipment	Approximately 7.5% non-compliant	Compliant with 2020 WMP per 92% of field site observations

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
Verification of QA/QC Programs	5.3.5.20	Vegetation management to achieve clearances around electric lines and equipment	Activity Validated	2020 WMP Initiative validated per PG&E's response to Data Request and SME interview, detailed in section 3.3.
Verification of Funding	5.3.5.20	Vegetation management to achieve clearances around electric lines and equipment	Unused Budget of \$438.31 million, 100% of the total budget (2020 ARC Report).	PG&E did not spend or record any allocation of costs spent for this \$438.31 million in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E did not spend or record any allocation of costs spent for this \$438.31 million initiative/activity.
WMP Activity Completion	5.3.5.3	Detailed inspections of vegetation around transmission electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview and Utility Procedure: TD-7103P-1
Verification of QA/QC Programs	5.3.5.3	Detailed inspections of vegetation around transmission electric lines and equipment	Activity Validated	2020 WMP Initiative validated per PG&E's responses to Data Requests and SME interview, detailed in section 3.3.
Verification of Funding	5.3.5.3	Detailed inspections of vegetation around transmission electric lines and equipment	Budget Overspent by \$117.83 million, 903% of the total budget (2020 ARC Report). Budget Underspent by \$9.19 million, 7% of the total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$130.88 million in 2020, \$117.83 million more than the \$13.05 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan v2), PG&E increased its overall budget from \$13.05 million to \$140.07 million, resulting in an underspend amount of \$9.19 million.
WMP Activity Completion	5.3.5.4	Emergency response vegetation management due to red flag warning or other urgent conditions	Activity Validated	Compliant with the 2020 WMP, per SME interview
Verification of QA/QC Programs	5.3.5.4	Emergency response vegetation management due to red flag warning or other urgent conditions	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.5.5	Fuel management and reduction of "slash" from vegetation management activities	Activity Validated	Compliant with the 2020 WMP Per Independent Evaluator Field Observations
Verification of QA/QC Programs	5.3.5.5	Fuel management and reduction of "slash" from vegetation management activities	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.5.5	Fuel management and reduction of "slash" from vegetation management activities	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.5.6	Improvement of inspections	Activity Validated	Compliant with the 2020 WMP Per contractor field findings
Verification of QA/QC Programs	5.3.5.6	Improvement of inspections	Activity Validated	2020 WMP Initiative validated per SME interview, detailed in section 3.3.
Verification of Funding	5.3.5.6	Improvement of inspections	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.5.7	LiDAR inspections of vegetation around distribution electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview
Verification of QA/QC Programs	5.3.5.7	LiDAR inspections of vegetation around distribution electric lines and equipment	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
Verification of Funding	5.3.5.7	LiDAR inspections of vegetation around distribution electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.5.8	LiDAR inspections of vegetation around transmission electric lines and equipment	Activity Validated	Compliant with the 2020 WMP, per SME interview
Verification of QA/QC Programs	5.3.5.8	LiDAR inspections of vegetation around transmission electric lines and equipment	Activity Validated	2020 WMP Initiative validated per PG&E's responses to Data Requests and SME interview, detailed in section 3.3.
Verification of Funding	5.3.5.8	LiDAR inspections of vegetation around transmission electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.5.9	Other discretionary inspections of vegetation around distribution electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.5.9	Other discretionary inspections of vegetation around distribution electric lines and equipment	Activity Validated	Compliant with the 2020 WMP - per WMP process to target high risk areas
Verification of QA/QC Programs	5.3.5.9	Other discretionary inspections of vegetation around distribution electric lines and equipment	Activity Validated	2020 WMP Initiative validated per SME interview, detailed in section 3.3.
Verification of Funding	5.3.5.9	Other discretionary inspections of vegetation around distribution electric lines and equipment	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of QA/QC Programs	5.3.6.1	F.3 - Removal of TripSaver Auto-Reclosing Functionality	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC.
WMP Activity Completion	5.3.6.1	F.3 - Removal of TripSaver Auto-Reclosing Functionality	Target Goal Met/Exceeded	Capability removed for most units via a software update, remaining units were removed and replaced with a different type of device
WMP Activity Completion	5.3.6.2	F.1 - SIPT Crews and Engines Resourcing	Activity Validated	Compliant with the 2020 WMP, per SME interview and various live location maps shared during interview.
Verification of QA/QC Programs	5.3.6.2	F.1 - SIPT Crews and Engines Resourcing	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
Verification of Funding	5.3.6.2	F.1 - SIPT Crews and Engines Resourcing	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of QA/QC Programs	5.3.6.3	F.5 - Implement SafetyNet Observation Cards	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
Verification of Funding	5.3.6.3	F.5 - Implement SafetyNet Observation Cards	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.6.3	F.5 - Implement SafetyNet Observation Cards	Activity Validated	Compliant with the 2020 WMP, per SME interview.
Verification of Funding	5.3.6.3	F.5 - Implement SafetyNet Observation Cards	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of QA/QC Programs	5.3.6.4	F.2 - Protocols for PSPS Re-Energization	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interviews.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
WMP Activity Completion	5.3.6.4	F.2 Protocols for PSPS Re-Energization	Activity Validated	Compliant with the 2020 WMP, per SME interview.
WMP Activity Completion	5.3.6.5	PSPS events and mitigation of PSPS impacts	Activity Validated	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.6.5	PSPS events and mitigation of PSPS impacts	Activity Validated	Compliant with the 2020 WMP, per SME interview.
Verification of Funding	5.3.6.5	PSPS events and mitigation of PSPS impacts, Distribution and Transmission	Budget Underspent by \$129.55 million, 62% of total budget.	PG&E spent \$80.81 million in 2020, less than the \$210.36 million in WMP. According to a reconciliation spreadsheet provided on June 9th (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$210.36 million to \$139.05, resulting in an underspent amount of \$58.58 million. PG&E stated that spend reductions in planned PSPS event costs were attributed to investments made to mitigate PSPS events, such as fire risk modeling, system hardening, and sectionalizing devices.
Verification of Funding	5.3.6.5-1	PSPS events and mitigation of PSPS impacts	Budget Underspent by \$129.55 million, 62% of the total budget (2020 ARC Report).	PG&E spent \$80.81 million in 2020, less than the \$210.36 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$210.36 million to \$153.61, resulting in an underspend amount of \$72.80 million.
Verification of Funding	5.3.6.5-2	PSPS events and mitigation of PSPS impacts	Budget Underspent by \$129.55 million, 62% of the total budget (2020 ARC Report).	PG&E spent \$80.81 million in 2020, less than the \$210.36 million budget in the 2020 ARC Report for 2020 WMP. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced its overall budget from \$210.36 million to \$153.61, resulting in an underspend amount of \$72.80 million.
Verification of QA/QC Programs	5.3.6.6	Stationed and on-call ignition prevention and suppression resources and services	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.6.6	Stationed and on-call ignition prevention and suppression resources and services	Activity Validated	Compliant with the 2020 WMP, per SME interview and various live location maps shared during interview.
Verification of Funding	5.3.6.6	Stationed and on-call ignition prevention and suppression resources and services	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.7.1	Consolidate Data Into Single Repository	Activity In Progress	Compliant with the 2020 WMP, 2020 Smart Grid Report, 2021 WMP Table 7.3.7.1, and SME Interview
Verification of QA/QC Programs	5.3.7.1	Consolidate Data Into Single Repository	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.7.2	Collaborative research on utility ignition and/or wildfire	Activity In Progress	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.7.2	Collaborative research on utility ignition and/or wildfire	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.7.3	Documentation and disclosure of wildfire-related data and algorithms	Activity Ongoing	Compliant with the 2020 WMP, per PG&E RAMP Report.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
Verification of QA/QC Programs	5.3.7.3	Documentation and disclosure of wildfire-related data and algorithms	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.7.3	Documentation and disclosure of wildfire-related data and algorithms	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.7.4	Define and track ignition near miss events	Activity Ongoing	Compliant with the 2020 WMP, per 2021 CPUC Stakeholder Meeting and Safety and Operational Metrics Rulemaking.
Verification of QA/QC Programs	5.3.7.4	Define and track ignition near miss events	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.7.4	Define and track ignition near miss events	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.8.1	Allocation methodology development and application	N/A	PG&E had no activities identified within the 2020 WMP for this initiative.
Verification of QA/QC Programs	5.3.8.1	Allocation methodology development and application	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.8.2	Risk reduction scenario development and analysis	Activity Ongoing	Compliant with the 2020 WMP, per PG&E Presentation on Vegetation Management to WSD
Verification of QA/QC Programs	5.3.8.2	Risk reduction scenario development and analysis	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.8.3	Risk spend efficiency analysis	Activity Validated	Compliant with the 2020 WMP, PG&E 2020 RAMP Report.
Verification of QA/QC Programs	5.3.8.3	Risk spend efficiency analysis	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.9.1	Adequate and trained workforce for service restoration	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.9.1	Adequate and trained workforce for service restoration	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.9.1	Adequate and trained workforce for service restoration	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.9.2-1	Community outreach, public awareness, and communications efforts	Activity Validated	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.9.2-1	Community outreach, public awareness, and communications efforts	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.9.2-1	Community outreach, public awareness, and communications efforts	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.9.2-2	I.4 - Community Based Organizations (CBOs) Coordination	Activity Validated	Compliant with the 2020 WMP – per SME Interviews
Verification of QA/QC Programs	5.3.9.2-2	I.4 - Community Based Organizations (CBOs) Coordination	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
WMP Activity Completion	5.3.9.3-1	Customer support in emergencies	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.9.3-1	Customer support in emergencies	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
WMP Activity Completion	5.3.9.3-2	I.8 CRC Mitigate PSPS Customer Impacts	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
Verification of QA/QC Programs	5.3.9.3-2	I.8 CRC Mitigate PSPS Customer Impacts	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interviews.
WMP Activity Completion	5.3.9.3-3	I.7 - PSPS - 24/7 Information Updates	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.9.3-3	I.7 - PSPS - 24/7 Information Updates	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
Verification of QA/QC Programs	5.3.9.4	I.5 - CERP (Update and Publish)	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
WMP Activity Completion	5.3.9.4	I.5 - CERP (Update and Publish)	Activity Validated	Compliant with the 2020 WMP, per SME interview.
Verification of Funding	5.3.9.4	I.5 - CERP (Update and Publish)	Budget Underspent by \$21.18 million, 82% of total budget (2020 ARC Report). Budget Overspend by \$3.54 million, 359% of total budget (PG&E Analysis 2020 Actual vs. 2020 Plan).	PG&E spent \$18.61 million in 2020, \$19.40 million less than the \$38.0 million budget in the 2020 ARC Report for the 2020 WMP initiative/activity. According to a reconciliation spreadsheet provided on June 9th to the IE (2020 Actual vs. 2020 Plan), PG&E reduced the budget from \$38.0 million to \$14.20 million, resulting in an overspend amount of \$4.40 million.
Verification of Funding	5.3.9.5	Preparedness and planning for service restoration	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of QA/QC Programs	5.3.9.5-1	I.1 - Emergency Preparation and Restoration	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
WMP Activity Completion	5.3.9.5-1	I.1 Emergency Preparation and Restoration	Activity Ongoing	Compliant with the 2020 WMP, per SME interview.
WMP Activity Completion	5.3.9.5-2	I.2 - PSPS - Service Restoration	Activity Validated	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.9.5-2	I.2 - PSPS - Service Restoration	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interview.
WMP Activity Completion	5.3.9.5-3	I.3 - PSPS Customer Impact Mitigation	Activity Validated	Compliant with the 2020 WMP, per SME interview.
Verification of QA/QC Programs	5.3.9.5-3	I.3 - PSPS Customer Impact Mitigation	Activity Validated	Compliant with the 2020 WMP, per 2020 ARC Report by PG&E's WMP PMO QC and SME interviews.
WMP Activity Completion	5.3.9.6	Protocols in place to learn from wildfire events	Activity Validated	Compliant with the 2020 WMP, per PSP Report for De-energization Lessons Learned, Company Emergency Response Plan (CERP) Plan, and 2021 WMP Table 7.3.9.6
Verification of QA/QC Programs	5.3.9.6	Protocols in place to learn from wildfire events	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.
Verification of Funding	5.3.9.6	Protocols in place to learn from wildfire events	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
WMP Activity Completion	5.3.9.7	Resource Sharing to Support Inspection Work and Other Aspects of the Wildfire Management Plan	Activity Ongoing	Compliant with the 2020 WMP, per Mutual Assistance Agreements.
Verification of QA/QC Programs	5.3.9.7	Resource Sharing to Support Inspection Work and Other Aspects of the Wildfire Management Plan	N/A	PG&E had no QA/QC activities identified per Inventory Attachment 1.

SOW Category	2020 Initiative Number	Initiative Name	Finding	Detail on Finding
Verification of Funding	5.3.9.7	Resource Sharing to Support Inspection Work and Other Aspects of the Wildfire Management Plan	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.1.6	7.3.1.6 Weather-Driven Risk Map and Modelling Based on Various Relevant Weather Scenarios	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.
Verification of Funding	5.3.2.1.6	7.3.2.1.6 Advanced weather monitoring and weather stations, Other Meteorology Tools and Upgrades	Variance Noted	Variance Under \$5M, See Table 2 in Section 3.2 or Appendix E.

APPENDIX H - 2020 PG&E SMART GRID ANNUAL REPORT

PACIFIC GAS AND ELECTRIC COMPANY SMART GRID ANNUAL REPORT – 2020



SMART GRID TECHNOLOGIES
ORDER INSTITUTING RULEMAKING 08-12-009
CALIFORNIA PUBLIC UTILITIES COMMISSION

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CPUC Reporting Requirements and

Pacific Gas and Electric Company's Smart Grid Deployment Plan and Project Updates

Pursuant to Decision (D.) 10-06-047, Ordering Paragraph (OP) 15 and the Smart Grid Deployment Plan D.13-07-024, OP 4, Pacific Gas and Electric Company (PG&E or the Company or the Utility) provides this Smart Grid Annual Report (SGAR) with the following information included:

- a) A summary of PG&E's deployment of Smart Grid technologies during the reporting period (July 2019 through end of June 2020) and its progress on its Smart Grid Deployment Plan.¹ Added focus is given this year to grid wildfire protection and safety-related investments which support the development of the Smart Grid to cope with the accumulating impacts of climate change².
- b) The costs and benefits of Smart Grid deployment to PG&E's customers during the past year, including a monetary estimate of the health and environmental benefits that may arise from the Smart Grid where possible³.
- c) Current PG&E initiatives for Smart Grid deployments and investments.
- d) Updates to PG&E's security risk assessment and privacy threat assessment; and PG&E's compliance with North American Electric Reliability Corporation (NERC) security rules and other security guidelines and standards identified by the National Institute of Standards and Technology (NIST) and adopted by the Federal Energy Regulatory Commission (FERC).

¹ Unless otherwise specified, PG&E has provided cost and benefits for all projects for the period beginning July 1, 2019 through June 30, 2020.

² To help meet the climate-driven challenge of increasing wildfires and extreme weather events, PG&E announced a comprehensive Community Wildfire Safety Program (CWSP) in 2018.

³ For information on project costs and benefits in former years, please reference past Smart Grid Deployment Plan Updates on California Public Utilities Commission's (CPUC or Commission) California Smart Grid website at: www.cpuc.gov/General.aspx?id=4693.

Consistent with PG&E's Smart Grid Deployment Plan, PG&E's SGAR provides information on the status of its PG&E's Smart Grid investments, including Smart Grid Baseline Projects, Smart Grid-Related Customer programs, and proposed Smart Grid Roadmap Projects.⁴

⁴ PG&E's Smart Grid Deployment Plan, A.11-06-029, Chapters 4, 5 and 6.

CHAPTER 1

SMART GRID ANNUAL REPORT

EXECUTIVE SUMMARY

1 Smart Grid Annual Report Executive Summary

Throughout the reporting period of July 2019 to June 2020, PG&E continued to build capabilities to deliver on its vision of modernizing its grid. This vision integrates new energy devices, monitoring and control, and other situational awareness technologies to enable greater grid safety, resiliency, and energy diversity for our customers. PG&E plays a critical role in delivering an integrated grid that will help define tomorrow's energy landscape for California.

California has experienced dramatic and rapidly evolving environmental changes⁵ in recent years, resulting in record drought, unprecedented tree mortality, record rainfall, record heat waves, and extremely strong wind events. The climate change underlying these changes has altered the operating risks of the electric grid.⁶ In the CPUC's 2018 Fire-Threat Map, more than 50 percent of PG&E's territory is now identified as having an elevated or extreme wildfire risk. PG&E continues to take all efforts necessary to maximize the safety of its electric facilities, including with respect to the risk for catastrophic wildfires. PG&E is providing regular updates on efforts to reduce the wildfire risk via PG&E's Wildfire Mitigation Plan Report⁷ and ongoing regulatory and public communications.

Grid modernization through Smart Grid and supporting technologies play a key role in PG&E's strategies to mitigate risks brought on by the changing climate. PG&E is taking advantage of technological advancements to reduce system risks as part of its development of an integrated grid. These investments play a key role in increasing the flexibility of the grid to allow for greater resiliency. For example, PG&E is implementing technology demonstration projects and pilot programs to evaluate alternative technologies that may harden and modernize the electrical system and improve operational capabilities. This includes a demonstration project on

⁵ From 2010 to 2018, according to the U.S. Forest Service, over 147 million trees have died in California. Bark beetle infestations and drought have contributed to this. Moreover, as air temperatures rise, forests and land are drying out, increasing fire risks and creating weather conditions that readily facilitate the rapid expansion of fires.

⁶ PG&E's Initial Response to OII and Order to Show Cause (I.19-06-015) filed June 27, 2019

⁷ PG&E's 2020 Wildfire Mitigation Plan Report (R.18-10-007) describes the enhanced, accelerated, and new programs that PG&E is and will continue to implement to prevent wildfires in 2019 and beyond, submitted in February 2019 pursuant to the requirements of SB 901.

Rapid Earth Fault Current Limiter (REFCL), a technology that moves the neutral line to the faulted phase during a fault, significantly reducing the risk of ignition.

Microgrids (MG) have the potential to enhance the resiliency of the grid. PG&E is exploring the use of remote grid configurations as an advanced solution for wildfire risk mitigation. This includes testing the use of MG operations for their potential to reduce customer impact during proactive grid operations deployed for reducing wildfire risk or other natural disaster response scenarios. PG&E is actively engaging in new demonstration and pilot projects to help unlock new value streams provided by Distributed Energy Resources (DERs).

An integrated grid enables our customers to have greater flexibility and choice in how they use and obtain value from their energy supply. PG&E customers are leading the adoption of DERs and clean technologies, including solar, storage, and electric vehicles (EV). However, the widespread adoption of DER and clean technologies also introduces new challenges in operating the grid, such as those related to two-way power flow, voltage and power quality issues as well as supply intermittency. Smart Grid and technology advancements help PG&E to manage and optimize this additional complexity, through advanced grid communication, analysis [monitoring] and control capabilities. This is critical to realizing the requirements set forth in CA's Senate Bill (SB) 100 (2018), which increases CA's renewable portfolio standard (RPS) to 60 percent by 2030 and requires all the state's electricity to come from carbon-free resources by 2045.⁸

PG&E's Grid Modernization Vision

PG&E's vision for modernizing its grid through Smart Grid and supporting technologies furthers developments towards a secure, resilient, reliable and affordable platform that strengthens the grid while enabling continued gains for clean-energy technologies.⁹ PG&E's Smart Grid and

⁸ CPUC, RPS Program, <https://www.cpuc.ca.gov/rps/>.

⁹ Adapted from PG&E's 2020 General Rate Case (GRC) application, Chapter 19, Attachment A: Grid Modernization Plan – 10 Year Vision

technology upgrades are foundational to achieving its grid modernization vision, which focuses on developing the following capabilities:

1. Seamless integration of critical grid data visualization, analysis, and control systems to optimize grid operational efficiency and stability in Real-Time (RT)
2. Enhanced situational awareness and operational flexibility to mitigate more dynamic and extreme weather events while minimizing disruption to customers
3. Enhanced grid communications and cybersecurity infrastructure necessary to securely accommodate the growth in web-enabled grid-tied devices
4. Reliable integration of geographically dispersed DER generation and storage options to provide customers with clean energy choices and to enable grid configurations designed to provide enhanced resiliency.

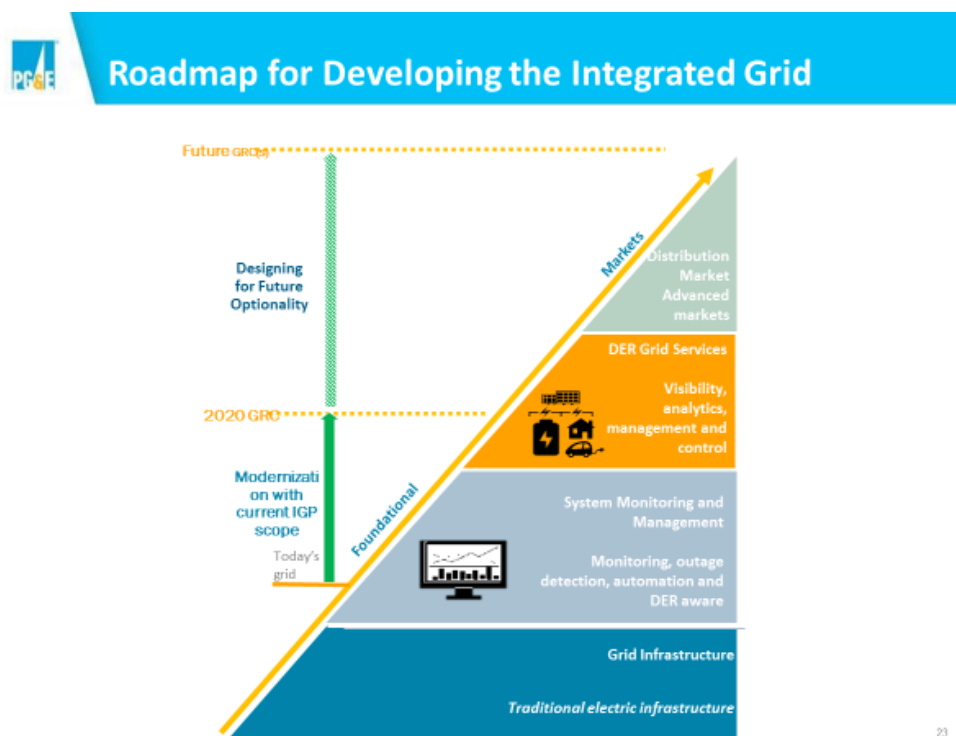


Figure: PG&E's Grid Modernization Plan – Integrated Grid Capabilities

PG&E's grid modernization vision is, in part, enabled by the **Electric Program Investment Charge (EPIC)**. Through EPIC, PG&E has been able to cost-effectively develop and demonstrate innovative technologies that advance a broad array of objectives including grid safety, resiliency, reliability, and the integration of a wide range of DERs such as clean, renewable energy. EPIC demonstrations aid in identifying key requirements, implementation challenges, and benefit-cost details to inform future deployment. PG&E's EPIC projects also support the creation of new and valuable Intellectual Property (IP), which can lead to improved products and services that help improve the operations of the electricity grid by reducing operating expenses and/or potentially generate alternative forms of incremental revenue that can reduce customer costs.

Given the rapidly evolving energy landscape and the impact of climate change in California, the continuation of technology innovation programs like EPIC is critical to the continued advancement of the grid. Innovation is further required to enable increased customer choice and empower Disadvantaged Communities. PG&E is excited to embark on new technology demonstrations contained within that plan which build on past projects, meet emerging grid needs and California policy objectives, and ensure that customers and the state can maximize the benefits of this program.

Smart Grid & Technology - Focus Areas:

- i. **Wildfire Safety & Grid Resilience:** PG&E details its efforts to reduce the wildfire risk via PG&E's annual Wildfire Mitigation Plan, including a section on new or emerging technologies. Technology plays a significant role in wildfire risk mitigation and associated potential impact on public safety. Select wildfire mitigation capabilities progressed through smart grid and technology investments include:
 - a. **Situational Awareness & Forecasting:** PG&E is deploying a powerful set of complementary tools to better assess and more accurately locate, often in near real time, environmental events that pose a danger to the grid so that critical issues may be dealt with as quickly as possible to avoid the risk of catastrophic wildfires. In addition, PG&E is exploring the use of situational awareness technologies and analytics that provide insights on grid conditions. Select

examples include: (i) Incorporating new data sets to further PG&E's Wildfire Spread Modelling capabilities; (ii) Promoting situational awareness through PG&E's industry-leading fire detection system and sharing automated email fire alerts with California Department of Forestry and Fire Protection (CAL FIRE) and numerous county and local fire departments; and (iii) installing sensor technology on PG&E assets to monitor system health.

- b. **Grid Design & System Hardening:** Smart grid and technology investments can enable innovative system hardening techniques to mitigate the risk of fire ignition and potential impacts on public safety. Select examples include (i) demonstrating the ability to rapidly reduce the flow of current when faults are detected to minimize ignition risk; (ii) exploring the use of MG configurations and underlying technologies to support wildfire risk mitigation; (iii) system automation including Supervisory Control and Data Acquisition (SCADA)-enabled recloser device and sectionalizing device implementation to allow greater operational flexibility
- c. **Asset Management (AM) and Inspections:** Smart grid and technology investments can enable automated and improved methods to identify asset or system issues so that high risk items can be addressed prior to failure. Select examples include (i) the development of predictive maintenance tools that can identify the onset of equipment failure so that correct action can be taken before actual failure occurs; and (ii) the use of machine learning and data analytics to accelerate accurate inspections to ensure system safety.
- d. **Data Governance & Enablement** Smart grid and technology investments unlock new data streams that can be leveraged to inform risk-based decision-making. PG&E aims to integrate certain data from different data sources into a single environment, enabling data driven approaches to wildfire mitigation initiatives and efforts.

Successful wildfire-mitigation-focused technology implementation relies on smart grid technology investments, including grid communication tools and control networks, which

enable greater exchange of information required to provide real or near-real time operational visibility across the grid for enhanced decision-making. These foundational items can also increase the flexibility of the grid, providing additional capabilities to advance system resiliency.

- ii. **DER Integration & Enablement:** PG&E continues to make significant strides in the deployment of emerging grid technologies (e.g., solar, grid-tied storage and EV charging infrastructure) and the deployment of technologies to facilitate integration and optimization of DER resources. PG&E offers a wide array of incentives to encourage customer adoption of cost-effective energy efficiency (EE) measures, is developing new Smart Grid and technology solutions to encourage the adoption of DERs and is exploring the potential for demand management programs. Some examples of new and emerging Smart Grid and related technologies that seek to optimize DERs for our customers include (i) the development of an Advanced Distribution Energy Resources Management System (ADERMS) and (ii) a demonstration project in collaboration with the California Energy Commission (CEC) and Schatz Energy Research Center to develop a multi-customer MG for enhanced reliability and resilience.
- iii. **Customer Service:** PG&E provides customers with the tools necessary to understand and manage their energy use and costs through programs such as Home Energy Reports (HER) and Stream My Data. PG&E also offers innovative programs that help customers participate in EE. One example is the introduction of financing programs that reduce the up-front cost of large, comprehensive EE projects that would not have been financially feasible otherwise. Another example is the Residential Pay-for-Performance (P4P) pilot which uses the Normalized Meter Energy Consumption (NMEC) approach to estimate customer EE savings directly from Advanced Metering Infrastructure (AMI)-meter readings. PG&E uses market feedback to understand the roadblocks to customer adoption of EE and uses advertising and marketing campaigns to promote engagement with these tools and participation in programs.
- iv. **Security:** The increase in internet-connected Smart Grid and technology devices will be accompanied by a corresponding increase in cyber-security threats. In December of

2019, the five-year California Energy Systems for the 21st Century (CES-21) program was concluded. CES-21 was primarily a cybersecurity Research and Development (R&D) partnership among the California investor-owned utilities (IOU) and national labs that began to build the foundation of next generation of industrial control systems cybersecurity and automated threat response capabilities.

1.1 Conclusion

PG&E's Smart Grid vision is for a safer, more resilient grid that gives our customers maximum flexibility and maximum choice in how they use energy. Smart Grid and related technologies play a key role in achieving this vision. The energy landscape in PG&E service territory is evolving in complexity – a result of climate induced challenges of heightened wildfire threat and increased DER penetration. Smart grid technologies will have a profound impact on how the grid operates, enabling new operational processes, providing visibility into RT system conditions, and increasing grid operating flexibility. This in turn unlocks new capabilities for proactive grid management and opportunities for continuous improvement. PG&E continues to progress these capabilities through a strategic approach to Smart Grid and technology investments, as highlighted throughout the report.

1.2 Epilogue

This year represents the last annual SGAR update pursuant to D.10-06-047 and the Smart Grid Deployment Plan D.13-07-024. Substantial progress towards realizing the vision for the Smart Grid has been made in the 10 years since PG&E first submitted its 2011 Smart Grid Deployment Plan, as highlighted by select examples provided below:

1. Smart Grid digital information and control technologies provide a foundation for new grid devices and capabilities to enhance operational outcomes:
 - a) SCADA technologies have been deployed to most areas of the electric transmission (ET) and distribution grids. SCADA-enabled reclosing and sectionalizing devices have been implemented at scale to allow greater operational flexibility and resiliency. Currently, 97 percent of distribution substations are equipped with SCADA and nearly 10,000 automated devices (switchers and reclosers) have been installed throughout the distribution system. Nearly 650 additional SCADA commissioned distribution sectionalizers have been installed in Tier 2 and Tier 3 High Fire Threat Districts (HFTD) since 2019 to minimize the impact of Public Safety Power Shutoff (PSPS) events in addition to 23 SCADA transmission sectionalizing devices.
 - b) Smart Grid Fault Location, Isolation, and Service Restoration (FLISR) technology has so far been installed on 967 of PG&E's distribution circuits serving 2,187,704 customers. To date it has helped PG&E reduce customer power interruptions by over one million avoided outage hours over the last five years.
 - c) Line sensors are one of a number of next generation fault identification technologies that monitor and communicate grid disturbances in real time and is being enabled to support preventative maintenance to reduce asset failure risk. To date PG&E has installed approximately 987 current-measuring line sensors as well as 25 Early Fault Detection (EFD) line sensors across more than 350 locations. Since 2019, all line sensors installations (180) have been in HFTD's, which includes all installed EFD line sensors.

- d) Development of the next generation of integrated monitoring and control Advanced Distribution Management System (ADMS) is underway, which will further improve the reliability, security, and efficiency of the electric grid.
- 2. More than 99 percent of customers now have two-way communicating Smart Meters enabling customers to monitor and adjust energy use and providing PG&E with data to drive insights on grid operating conditions:
 - a) Smart Meter technology is the basis for customers being able to monitor and adjust their energy use, including through programs such as StreamMyData which enables real time energy monitoring via a smart phone app.
 - b) PG&E has enabled Single-Phase SmartMeters™ to send RT alarms to the Distribution Management System (DMS) under partial voltage conditions (25-75 percent of nominal voltage). Energized or de-energized wires down will create a low voltage condition on transformers through the mechanism of transformer back feed from the inactive phase to the fault. This enhanced situational awareness can help detect and locate downed distribution lines more quickly to enable faster response.
 - c) PG&E is leveraging automated Smart Meter technologies to improve customer service. These solutions, which include the ability to automatically identify “nested outages”¹⁰, have allowed us to realize improved distribution grid reliability, reduced outage restoration times, and provide more accurate outage information to our customers. They also can provide data to target maintenance programs in the best interest of the customer.
- 3. There has been substantial deployment and integration of cost-effective DERs and renewable generation:

¹⁰ A nested outage occurs when a circuit has more than one electrical break occurring in series.

- a) PG&E's electricity supply mix has increased from 14.4% eligible renewable energy in 2009 to 29.7%¹¹ in 2019, driven by the adoption of solar and other renewable energy sources. This has occurred without disrupting grid stability.
 - b) The expansion in grid-tied solar includes 465,000 customer solar systems – more than 4,400 megawatts (MW) – that were connected to PG&E's electric grid by 2019.
 - c) Battery storage to further integrate clean energy from renewable generation while ensuring future grid reliability has been growing rapidly in recent years. Earlier this year, PG&E in partnership with Tesla obtained approval for a one gigawatt (GW) battery storage facility at Moss Landing, which will be one of the largest of its kind in the world. Approval for an additional five battery storage projects totaling 423 MW was requested from the CPUC in May.
4. **EV Expansions:** In 2010, there were 195 customers enrolled in time-variant EV tariffs. Today that number has grown to over 63,000, mirroring the growing adoption of EVs in PG&E's service area and which reached 292,145 registrations as of June 2020. A pilot program is also underway to provide make-ready infrastructure for Level 2 EV charging stations with a target to reach 4,500 charging ports by 2021. PG&E had installed 2,192 ports as of March 31, 2020.
 5. **Energy Efficiency:** PG&E's gross electric energy savings from innovative EE programs have generally exceeded 1,200 gigawatt-hour (GWh) per year between 2011 and 2019, roughly equivalent to the annual energy use of 148,000¹² homes.
 6. **Data Driven Insights:** Images captured via drone and helicopter are being captured and fed into Sherlock, a web application that allows inspectors to view photographs of assets along with associated data. The markups from Sherlock feed into computer vision models, which are being trained to classify photos, identify asset components, and

¹¹ https://www.pgecorp.com/corp_responsibility/reports/2020/bu07_renewable_energy.html

¹² Average Pacific states annual residential household electricity use in 2015 was estimated to be 8,088 kilowatt-hour (kWh):
<https://www.eia.gov/consumption/residential/data/2015/c&e/pdf/ce2.5.pdf>

search for potential issues in an automated fashion. Models within the inspection flow are currently being used to flag select images (e.g. overview, right of way, asset tag), saving time for inspectors and allowing them to focus inspection efforts on potential ignition risks.

While the annual reporting of Smart Grid deployments pursuant to D.10-06-047 is coming to an end progress towards California's vision of a modernized Smart Grid is not. Meeting California's 100 percent clean energy electricity and state-wide carbon neutrality goals by 2045 will continue to drive Smart Grid technology change. Two examples that illustrate how PG&E will continue to develop and implement the technologies necessary to realize these goals are Distributed Energy Resource Management Systems (DERMS) and data analytics.

The increasing penetration of renewables into the grid will bring about significant operational challenges in terms of distribution power flow patterns and regulation and necessitate major changes to the protection, distribution, automation, as well as voltage and volt-ampere reactive management. Increased renewable generation also implies limited dispatchability and intermittencies, which will require ancillary services. PG&E is developing a DERMS system which will provide the advanced monitoring and control capabilities to enable integration of the increasing adoptions of solar, battery storage, EVs, MGs, etc. while maintaining grid reliability and resiliency.

Second, the two-way communication channels and data layers being added to the transmission and distribution (T&D) grids through widespread installation of smart meters and myriad sensors is driving huge growth in RT and near RT data collection. While harnessing such data offers new opportunities to operate the grid safely and efficiently, deriving full value from these data streams requires advanced data analytics capabilities. PG&E has embarked on developing these capabilities in a number of key areas, including in the current use of advanced meteorological forecasting to predict wildfire related outages. Additional use cases being worked on include data mining for predictive maintenance and grid health monitoring as well as complex network analysis to aid fault detection. Future advanced analytics capabilities will include transient network stability analysis in areas with high renewables penetration and advanced security protection.

PG&E looks forward to continuing the leading role in the development of California's Smart Grid and in supporting the realization of California's ambitious green energy goals while ensuring safe, reliable, and affordable energy for our customers.

CHAPTER 2

SELECT SMART GRID AND TECHNOLOGY FURTHERING GRID MODERNIZATION

2 Select Smart Grid and Technology Furthering Grid Modernization

Chapter 2 details example Smart Grid and technology projects, demonstrations, pilots, and regulatory proceedings taking place over the reporting period that contribute to the achievement of our vision. Project updates are organized under the following categories:

- **Wildfire Mitigation & Grid Resilience**
- **DER integration & Enablement**
- **Customer Service**
- **Security**

2.1 Wildfire Mitigation & Grid Resilience

During the July 1, 2019 to June 30, 2020 reporting period, PG&E made substantial progress on several fronts to enhance wildfire safety and grid resilience through the utilization of Smart Grid and technology solutions across a variety of programs, including EPIC and the CWSP. Technology-dependent focus areas include but are not limited to: (i) Situational Awareness & Forecasting; (ii) Grid Design & System Hardening; and (iii) AM and Inspections. Additional details on PG&E's work to enhance grid resiliency and wildfire safety are described in its Updated 2020 Wildfire Mitigation Plan¹³.

2.1.1 Situational Awareness & Forecasting

PG&E is deploying multiple complementary tools to better assess and more accurately locate, often in near real time, environmental events and grid issues that increase wildfire risk so that critical issues may be dealt with as quickly as possible to avoid the risk of catastrophic wildfires. In addition, PG&E is exploring the use of situational awareness technologies and analytics that provide insights on grid conditions. Select examples include:

¹³ PG&E's Updated 2020 Wildfire Mitigation Plan February 28, 2020, R.18-10-007.

- **Satellite Fire Detection:** Uses remote sensing data from six geostationary (GOES-16 and GOES-17) and polar orbiting satellites (MODIS, VIIRS) to detect fires. PG&E is actively sharing automated email fire alerts with CAL FIRE through the California National Guard and with numerous county and local fire departments. PG&E is sharing these data with Southern California Edison Company (SCE) and San Diego Gas & Electric Company (SDG&E) through the Technosylva wildfire analyst application. PG&E also developed a public facing webpage where these detections are available:

https://www.pge.com/en_US/safety/emergency-preparedness/natural-disaster/wildfires/fire-detection-satellite-map.page

- **SmartMeter Partial Voltage Detection:** Energized or de-energized wires down will create a low voltage condition on transformers through the mechanism of transformer back feed from the inactive phase to the fault. PG&E has determined that with a firmware change, SmartMeters can detect this partial voltage condition (25-75 percent of nominal voltage) and send RT alarms to the DMS. This enhanced situational awareness can help detect and locate downed distribution lines more quickly to enable faster response.
- **Predictive risk identification with radio frequency added to line sensors:** Distribution Fault Anticipation (DFA) technology captures primary distribution disturbance current and voltage waveforms. It then conducts digital signal processing locally, communicating results to a waveform classification engine which then identifies both normal and abnormal events on the distribution system. The DFA technology is installed within the substation and uses existing substation bus potential transformers and circuit breaker current transformers. DFA technology is being evaluated on six distribution feeders covering 718 line miles. These installations are part of PG&E's EPIC 2.34 and have a primary objective of validating the performance of the EFD sensors in capturing disturbance and arcing events.

2.1.2 Grid Design and System Hardening

PG&E is reducing the risk of fire ignition through the adoption of grid design and system hardening practices that leverage Smart Grid and supporting technologies. Select examples include:

- **PSPS Mitigation:** PG&E's PSPS program proactively de-energizes power lines to prevent wildfires if gusty winds and dry conditions, combined with a heightened fire risk, are forecasted. PG&E recognizes the burden that PSPS places upon affected customers and communities and is committed to minimizing the number of PSPS events and their scope (number of customers affected) and duration, while working to keep our customers and communities safe during times of severe weather and high wildfire risk. Smart grid and technology investments can help to reduce the scope, duration and frequency of PSPS events. Select investments include:
 - **Distribution Segmentation:** PG&E is targeting various distribution lines where additional switching devices coupled with targeted system hardening can be utilized to further sectionalize distribution feeders to minimize the number of customers impacted by PSPS outages.
 - **Transmission Line Sectionalizing:** PG&E plans to enhance transmission segmentation strategies including installation of additional SCADA-controlled switches. PG&E has identified various transmission lines where additional switching devices will be utilized to further sectionalize transmission lines to be able to minimize the number of customers impacted by PSPS outages.
 - **Microgrids:** MGs can reduce the number of customers deenergized during PSPS events, as well as provide additional impact mitigation by energizing shared community resources that support the surrounding population. Developments in this space are subject to the MG and Resilience Strategies Rulemaking (R.19-09-009).

- **EPIC 3.15: Proactive Wires Down Detection:** The EPIC 3.15, Proactive Wires Down Mitigation demonstration project, seeks the ability to automatically and rapidly reduce the flow of current and risk of ignition in single phase to ground faults through the use of REFCL. The REFCL Technology has been shown by the Victoria State Government (Australia) to directly reduce the risk of wildfires for single line to ground faults. REFCL works by moving the neutral line to the faulted phase during a fault, which significantly reduces the energy available for the fault. This significantly lowers the energy for single line to ground faults by reducing the potential for arcing and fire ignitions, as well as better detection of high impedance faults / wire on ground. REFCL technology is only feasible for three-wire uni-grounded circuits, which are the majority of PG&E's distribution circuits within high fire threat areas. Successful implementation of REFCL technology has the potential to more reliably detect high impedance ground faults and energized wire down events and minimize this risk to public safety.
- **EPIC 3.11: Multi-Use Microgrid:** The EPIC 3.11, Multi-use MG demonstration project, seeks to enable a multi-customer MG within the Arcata-Eureka Airport business community and will incorporate four PG&E and Redwood Coast Energy Authority (RCEA) customers. The project will design and develop control specifications and provide SCADA integration to maintain visibility and operational control of the MG in grid-connected and islanded modes. This project will test capabilities to integrate third party controlled MGs into PG&E's distribution system. The findings of this project will help support MG growth to support resiliency (e.g., remote grid configurations) and enhanced customer choice.
- **SCADA-enabled automation:** PG&E has installed SCADA-enabled reclosers in place of manual devices to allow system operators to remotely prevent a line from automatically reenergizing ("reclosing") after a fault. This assures that if any potential fire or other risk event causes a line to drop out of service, that line will remain out of service and not contribute to a fire until PG&E personnel can verify that it is safe to put the line back in operation. In 2019, PG&E completed SCADA-enabling of all line reclosers serving HFTD areas. PG&E will continue upgrading devices with SCADA capability in targeted portions of the HFTD areas to help minimize the impact of PSPS events on customers in low-risk

areas adjacent to the HFTD areas. These upgrades will include adding or replacing existing manually operated fuses and switches at strategic locations with new SCADA-enabled Fusesavers™, switches, or reclosers. By isolating the lines closer to the border of the HFTD, fewer customers will be impacted and fewer lines will be de-energized. These improvements will also expedite restoration by reducing the amount of lines requiring a patrol.

2.1.3 AM and Inspections

Smart grid and technology investments can enable automated and improved methods to identify asset or system issues so that high risk items can be addressed prior to failure. Select examples include:

- Enhanced Asset Inspections - Drone/AI (Sherlock & Waldo):** Sherlock is a web application that allows inspectors to view and inspect photographs of assets along with associated data. It also allows for pre-inspection review of data coming in from drone pilots, helicopter photographers, and other means of data capture, to ensure that only quality-assured data is viewed by inspectors, and further by others such as engineers, estimators and investigators who need the photos for their work. In addition, inspectors can file corrective requests within the Sherlock application itself by marking up photographs and selecting the appropriate failure and severity rating of identified issues. The corrective requests identified by inspectors inside Sherlock feed Waldo, a computer vision API (Application Programming Interface), where computer vision models are trained to identify issues using Artificial Intelligence (AI), in an automated fashion. Waldo's predictions can then be surfaced in Sherlock to be confirmed as correct or incorrect by inspectors, creating a positive feedback loop which then improves the models further. Other applications (e.g., mobile applications) can send/receive data and images to/from Waldo to train/retrain models, and/or to receive predictions to help automate their processes.
- EPIC 3.20: Maintenance Analytics:** The EPIC 3.20, Maintenance Analytics, demonstration project aims to reduce unanticipated distribution asset failures through

the development of predictive maintenance capabilities. The project will monitor for signs of failure onset through use of existing data sources including SmartMeter™ connectivity data, geolocational asset data, and weather data. The objective is to develop an analytical model in conjunction with existing PG&E data sets to predictively identify electric distribution equipment issues so that corrective action can be taken before failure occurs.

- Probability of Asset Failure (PAF):** The 2020 PAF project uses data science methods to predict the likelihood of corrective maintenance tags on different ET asset classes (insulators, conductors, switches, steel and non-steel structures). The work supplements engineering judgment used to inform asset strategy and project nomination decisions. The 2020 PAF project delivers enhancements to the asset health models delivered in 2019 via the System Tool for Asset Risk (STAR) for T-line project (see 'appendix: closed projects' for details). Each update of the asset health models delivers learnings of what additional data improve the quality of the models, allowing the models to mature in accuracy of predictions.

2.1.4 Data Governance & Enablement

Smart grid and technology investments unlock new data streams that can be leveraged to inform risk-based decision-making. PG&E aims to integrate certain data from different data sources into a single environment, enabling data driven approaches to wildfire mitigation initiatives and efforts. PG&E's vision for data analytics is focused on a practical data integration approach (utilizing data pipelines from data sources/systems into an integrated data platform) as opposed to a data consolidation approach (eliminating existing data sources/systems and building a single data system for all PG&E data). The long-term objective is to enable advanced data analytics that allow for predictive models to identify at risk assets to further enable proactive AM practices to mitigate the risk of asset failure and enhance customer safety.

2.2 DER Integration & Enablement

DERs and clean technology growth continues in PG&E's service territory, with EV sales, solar installations, and grid battery storage adoption rates growing at unprecedented rates. DER milestones achieved in PG&E service territory over the current reporting period include:

- The number of EVs sold in PG&E service territory reached 292,145 by the end of June this year, a roughly 24 percent increase over the previous year.
- PG&E's EV Charge Network Program will install up to 7,500 EV level 2 charging ports focused on workplaces and multi-unit dwellings. As of March 31, 2020, 200 sites representing 4,932 ports had signed agreements with PG&E.¹⁴
- Over 420,000 solar roof-top photovoltaic (PV) systems have been installed by the end of the current SGAR reporting period, an increase of about 14 percent over the previous reporting period.
- PG&E has already contracted for greater than 600 MW in utility owned and third-party contracted grid-tied battery storage, in excess of the CPUC mandated goal of 580 MW by 2020.

2.2.1 Managing the Effects of DER on the Distribution System

Balancing loads between three phases on the distribution grid becomes challenging with higher DER penetration. Considerations include the effects of DERs' output, location and characteristics on the distribution grid to mitigate issues such as phase imbalance and voltage regulation problems. PG&E is investing in Smart Grid technologies to establish more sophisticated engineering and operational tools to detect and predict grid issues. One key development includes the testing of an ADERMS through EPIC 3.03. This project seeks to design, procure, and deploy a prototype enterprise DER Management System. This includes development of a cost-effective non-SCADA solution for providing advanced situational awareness and control capabilities. These will enable operators to manage DERs, dispatch DER

¹⁴ https://www.pge.com/pge_global/common/pdfs/solar-and-vehicles/your-options/clean-vehicles/charging-stations/program-participants/EV-Charge-Network_2020_Q1_Report.pdf

Registration data requests and monitor Smart Inverter (SI)-based DERs through a head-end platform, and provide an interface to dispatch DERs as a remote grid and Non-Wires Alternative (NWA) solutions.

DERs can provide new products and services for customers, including enhanced resiliency through MG configurations. PG&E is actively assessing and testing MG capabilities and how these may provide greater benefit for our customers. For instance, EPIC 3.11, Multi-use MG, seeks to enable a multi-customer MG within the Arcata-Eureka Airport business community and will incorporate four PG&E and RCEA customers. The project will design and develop control specifications and provide SCADA integration to maintain visibility and operational control of the MG in grid-connected and islanded modes and will help satisfy the community's demand for enhanced resilience of their power supply.

The following projects have proven successful in addressing DER integration and enablement and are currently being scaled-up. The multi-year ADMS deployment is an earlier Phase 2 EPIC demonstration project¹⁵:

- Multi-year ADMS deployment integrating several mission critical distribution control center applications that are currently spread across multiple platforms. This technology will enable the visibility, control, forecasting and analysis required from a more dynamic grid.
- T&D SCADA deployments which will achieve close to 100 percent visibility and control of all critical transmission substation and distribution substation breakers over the next few years.
- Expansion of the FLISR system to approximately 30 percent of PG&E's distribution circuits.
- Continued development of the transmission Energy Management System's (EMS) capabilities, including improved integration of additional synchrophasor PMUs.

¹⁵ For more information, reference EPIC closeout reports: https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/electric-program-investment-charge/closeout-reports.page.

2.2.2 Distribution Resources Planning

Distribution Resources Plan (DRP) Overview

Since PG&E's DRP filing in July 2015, PG&E has continually advanced its distribution planning and interconnection processes and tools to more effectively enable customers through the integration of DERs into the distribution grid. Over the last few years, PG&E has worked closely with the CPUC and external non-utility stakeholders on topics such as DER Integration Capacity Analysis, process for identifying NWA solutions and grid modernization for DER enablement. Select examples through which PG&E is enabling our customers through the DRP and related items are provided below.

Refreshed Data Portal Reflects Increased DER Integration Capacity

Since 2016, PG&E and California's other investor owned utilities have provided contractors and developers with online access to maps designed to help them find potential project sites for DERs, such as solar and energy storage. PG&E has refreshed the maps reflecting an increase in the posted DER integration capacity of our electric distribution system. The maps are accessible at PG&E's [Distributed Resource Planning Data Portal](#), and show hosting capacity, grid needs and other information about PG&E's electric distribution grid.

Distribution Investment Deferral Framework

The Distribution Deferral Opportunity Report (DDOR) and Grid Needs Assessment (GNA) reports identify locations where DERs may be a feasible and cost-effective option to defer traditional "wires" solutions on PG&E's distribution grid. On August 17th of 2020, PG&E published its third annual GNA and DDOR reports. The GNA identified capacity, voltage support, reliability and resiliency needs on PG&E's distribution system and the DDOR identified and assessed planned "wires" investments as potential candidate deferral opportunities for DERs. The 2020 reports identified 29 candidate deferral opportunities and recommends 8 candidate deferrals (30 MW) for NWA solicitation.

2.3 Customer Service

Over the past year, PG&E has continued to make progress providing customers with a robust suite of solutions that empower customers to eliminate unnecessary energy use, reduce their carbon footprint, and save money¹⁶. PG&E considers its customers to be the primary driver of its Smart Grid and technology investments. Therefore, without engaged and empowered customers, many of the benefits that Smart Grid and technology systems can offer will be difficult to realize.

PG&E administers a diverse portfolio of EE programs that include strategies to help customers upgrade to more energy efficient equipment, audit their energy use and understand opportunities for savings, and undertake comprehensive retrofits. PG&E's Codes & Standards (C&S) program has been particularly effective in achieving energy savings. Highlights from PG&E's work for the current 2019/2020 reporting cycle include:

- **We expanded our EE financing program**, which provides commercial customers and government agencies with loans for EE upgrades with no out-of-pocket costs and zero interest. The program affords project developers and customers flexibility in how they implement their projects. It also allows customers to get measures tailored to their needs and drive the process and timeline themselves. In 2019, the program funded 668 loans worth a total of \$59 million. Most loans went to small and medium businesses, and public organizations.
- **Increased financial incentives for energy-efficient and resilient construction practices in homes rebuilt after wildfires.** As part of our broader efforts, PG&E is encouraging customers to build high-performing homes that will result in lower energy bills.
- **Meter-based savings programs** use actual meter energy use to estimate EE savings. Data analytics has provided a powerful tool in identifying and targeting customers with high savings potential. The continuous feedback and P4P nature of meter-based programs helps ensure that the expected savings are realized. PG&E launched its first

¹⁶ PG&E's 2019 Energy Efficiency Annual Report:
<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M337/K862/337862483.PDF>

residential NMEC program, the Residential P4P pilot program, in 2018. P4P employs energy meter data to understand the impacts of customers targeting deeper energy savings. During the current reporting cycle, this program served 2,206 homes, an increase of 21 percent over the previous period. In 2019 PG&E launched NMEC programs to serve the commercial and public sectors and is on track to launch several more in 2020 and 2021. These programs also help achieve PG&E's goals of establishing on-going relationships with its customers in a joint pursuit of energy savings. Additional EE products which help further these efforts are HERs¹⁷; Business Energy Checkup and Home Energy Checkups¹⁸ and Industrial Strategic Energy Management programs¹⁹.

- **Moving forward on predominantly third-party implemented EE portfolio by 2023.** In January, 2018, the CPUC issued D.18-01-004, which formalized the third-party solicitation process for EE programs. In June, 2020, PG&E signed eight new statewide third-party contracts for EE resource programs. To help ensure programs goals will be attained, the contracts include performance payments for energy savings, cost effectiveness goals, as well as other key performance metrics
- **Supported California's goal for all newly constructed residential buildings to be zero net energy (ZNE) by 2020.** To do so, PG&E experts advocated for strong state and federal appliance standards and conducted research to support California's 2022 Energy Code rulemaking cycle. Further, the 2019 update to California's Energy Code, which applies to all new construction, additions, and alteration projects permitted on or after January 1, 2020, is expected to result in savings from the measures of approximately 603 GWh/year, 3.2 million therms and 30 million gallons of water for each year's construction following the effective date.

Additional C&S program highlights for the 2019/2020 reporting cycle include:

¹⁷ HERs are comparative energy usage reports for residential customers.

¹⁸ Business Energy Checkup and Home Energy Checkups are online assessment tools that help customers understand their energy usage and offer tips on how to save energy.

¹⁹ Industrial Strategic Energy Management programs involve industrial facility employees tracking down energy savings opportunities and provide planning resources for future energy needs.

- i. PG&E leads Appliance Standards Advocacy for new or updated sections of California's Title 20 Appliance Efficiency Regulations (Title 20) and Department of Energy (DOE) appliance standards, and related ENERGY STAR® activities. In 2019, PG&E led the IOU's support to revise the commercial Variable Refrigerant Flow (VRF) test procedure and efficiency standard which will ensure VRF energy savings are accurately reflected in their equipment ratings. PG&E collaborated with DOE to demonstrate that equipment ratings, based on the new test procedure, could double the savings consumers would realize in their facilities. This effort is opening opportunities to collaborate on other test procedures.
- ii. Through the Energy Code Ace platform, the Compliance Improvement program offered training, tools, and resources to support compliance with California's existing EE regulations. In 2019, PG&E delivered more than 101 classes, across eight modalities and dozens of roles. PG&E reached more than 2,660 students and achieved a 98 percent satisfaction rate and an 18 percent knowledge swing, on average.
- iii. PG&E also provided support to jurisdictions interested in adopting local reach codes, including those that contain pro-electrification policies, that go beyond the state's current Energy Code and help achieve local greenhouse gas (GHG) emission reduction goals. By June 2020, approximately 30 jurisdictions had adopted reach codes. PG&E submitted letters of support to more than 25 cities who requested a public statement as part of their city council approvals process.

PG&E's EE programs in 2019 resulted in annual electric and demand savings of 1,253 GWh and 253 MW, respectively.²⁰

²⁰ Annual energy savings refer to the first-year impacts associated with installed customer energy efficiency projects and codes and standards interventions. Savings are calculated on a net basis, which excludes savings that would have been achieved in the absence of energy efficiency programs. Savings shown comprise 539 GWh and 96 MW from installed projects and 714 GWh and 157 MW from codes and standards programs. Data are as filed with the CPUC in PG&E's Energy Efficiency Program Portfolio Reports and available on the CPUC's CEDARS website: <https://cedars.sound-data.com/upload/confirmed-dashboard/PGE/2019/>.

2.4 Security

The increase in internet-connected Smart Grid and technology devices will be accompanied by a corresponding increase in cyber-security threats. PG&E is collaborating with other California IOUs and national labs to understand the threats that could result from integrating grid communications and controls required for the functioning of the grid with the goal of developing the next generation cybersecurity and automated threat response capabilities that can be applied to industrial control systems such as the electric grid. Significant progress was made in the previous year in terms of leveraging modeling & simulation capabilities to understand the potential effects and mitigations of the malware and tactics employed in the December 2016 Ukrainian power system event. With the installation of PG&E equipment at INL, all three IOUs now also have substation instances at the Physical Test Bed, to allow for high-resolution assessments of specific threats. Over the past year, significant progress was also made across the various sub-components of the Automated Response Research Package, including the continued development of Indicator and Remediation Language use cases and continued enhancement of vulnerability scoring capabilities.

CHAPTER 3

SUMMARY OF BENEFITS

FOR SELECTED PROJECTS

3 Summary of Benefits for Selected Projects

3.1 Summary of Benefits for Selected Projects

This year, PG&E's Smart Grid benefits continued to grow, adding an estimated \$202.6 million of incremental savings from July 2019 through end of June 2020 for select projects (shown below).

Table 3-1: PG&E's Smart Grid Estimated Project Benefits – July 2019 to June 30, 2020²¹

Category	Annual Savings
Direct Customer Savings (Bill Forecast Alerts (BFA), Demand Response (DR))	\$372 Thousand (est. ²²)
Avoided Costs (Operational, Capital, Environmental ²³)	\$3.2 Million
Customer Reliability Benefit ²⁴	\$199 million ²⁵
Total Benefits	\$202.6 million
Reliability	81.1 million customer minutes avoided ²⁶

²¹ For information on project benefits in prior years, reference past Smart Grid Deployment Plan Updates on CPUC's California Smart Grid website at:

<http://www.cpuc.ca.gov/General.aspx?id=4693>.

²² Saving based on 2018/2019 customer participation data. Comparable data is not available for the current reporting period. However, PG&E does not anticipate that customer participation changed substantially over the reporting period.

²³ For details on PG&E's Environmental developments, please see PG&E's Corporate Sustainability Report at: <http://www.pgecorp.com/corp/responsibility-sustainability/corporate-responsibility-sustainability.page>.

²⁴ Reliability benefits may vary between the California IOUs due to differences between the projects included and calculated time period of accumulated benefits.

²⁵ Customer Reliability Benefit for FLISR since inception is \$1,320 million, with 472 million customer minutes avoided.

²⁶ FLISR has enabled the following statistics for Customers Experiencing Sustained Outages (CESO), avoided outage minutes, and Customer Minutes of Interruption (CMI), respectively:

- Avoided Customer Sustained outages over reporting period: 824,258 (CESO)
- Actual recorded outage minutes over reporting period: 719,792,704
- 5-year average recorded outage minutes: 147,390,767 (CMI)
- 5-year average avoided outage minutes: 78,079,958 (CMI)

Projects that contribute to PG&E's Smart Grid project benefits include:

- PG&E's SmartMeter Outage Information Improvement (\$0.7 million)
- PG&E's BFAs (formerly: Energy Alerts) (\$0.372 million est.)
- PG&E's FLISR project (\$199 million)
- PG&E's Modular Protection and Automation Control (MPAC) project (\$2.6 million)

3.2 Benefits Descriptions

3.2.1 Direct Customer Savings (BFAs/Automated Demand Response (AutoDR))

BFA estimate what a customer's bill will be (gas and electric) and alerts them when the forecasted amount exceeds their custom-set threshold. Because forecasts are predictions, estimates may differ from the customer's actual charges for each statement period. PG&E's current BFA replaced the former Tier Alerts in March 2016 in anticipation of E1 tier collapse and new Time-of-Use (TOU) rates coming on-line. Additionally, gas usage was added to the forecast for a more complete customer experience. Many customers have been receiving alerts (both Tier and then the BFA) for eight years. Early savings results from the programs were a result of initial awareness of household costs associated with energy usage and initial meaningful adjustments made to control this. PG&E's *2018 Program Year SmartMeter Program Enabled Demand Response and Energy Conservation Annual Report* concluded \$372,000 in annual customer savings for BFA participants, dually enrolled High Usage Alert (HUA) and BFA customers, for a combined savings of 9,521 megawatt-hours (MWh)²⁷. While comparable participant savings data is not included for the 2019/2020 reporting cycle to calculate actual customer savings benefits, overall program participation levels are believed to have been similar. The program continues to serve customers by providing them with a transparent billing alert and helps customers to manage energy cost with consumption patterns. We are therefore using 2018/2019 direct customer savings as an estimate for the current reporting cycle savings.

²⁷ https://www.pge.com/pge_global/common/pdfs/safety/how-the-system-works/electric-systems/smart-grid/AnnualReport2019.pdf

Automated DR benefits result from load reductions for customers who adopt control technologies and participate in a DR program. No direct customer savings are calculated for AutoDR for the 2019/2020 reporting cycle. More information on the benefits calculation for this project can be found in the ‘Automated Demand Response (AutoDR) Program’ program box in the *Emerging Customer Side Technology Projects* section of this report.

3.2.2 Avoided Costs (SmartMeter Outage Information Improvement/MPAC)

Avoided cost benefits represent the total avoided costs associated with SmartMeter Outage Information Improvement and MPAC. SmartMeter Outage Information Improvement project delivers reliability and operational benefits through leveraging SmartMeter data to better understand and resolve customer outages. The program reduced an estimated 8,174 “truck rolls,” saving over \$600,000 over the reporting period. MPAC helps improve reliability of the transmission system by replacing aging infrastructure and modernizing facilities. Over the past year, the MPAC Installation Program has avoided \$2.6 million in capital costs over traditional upgrade methods and has avoided a cumulative total of \$72.4 million²⁸.

3.2.3 Reliability Benefits (FLISR)

Reliability benefits come primarily from PG&E’s FLISR project. FLISR limits the impact of outages by quickly opening and closing automated switches. What may have been a one- to two-hour outage can be reduced to less than five minutes. For the purposes of this report, the benefits are estimated using a Value-of-Service reliability model that was developed in-house using the Freeman & Sullivan analysis incorporating various tax law changes²⁹. FLISR procedures have been updated to account for fire index disabling, under which select FLISR circuits may be disabled on extreme fire condition days.

²⁸ MPAC benefit totals reflect updated calculations for 2020 Smart Grid Annual Report.

²⁹ FLISR reliability benefits are calculated from actual CMI and CESO savings (tracked per every event) that are applied to the Value of Service calculator.

3.2.4 Smart Grid's Role in Furthering Environmental Sustainability

California has adopted the strongest GHG reduction targets in North America. SB 32 requires the state to cut GHG emissions to 40 percent below 1990 levels by 2030. SB 350 mandates a goal of doubling EE savings by 2030. As California's largest energy provider, PG&E is committed to helping California achieve these goals.

Smart Grid and technology enable numerous environmental benefits. Over 465,000 customers have installed roof top solar and generate their own power in PG&E service territory.

292,145 customers have decided to replace their traditional vehicles with EVs fueled by the Smart Grid. Smart Grid technologies, including sensing technologies, two-way digital communication, controls and automation, all provide foundations for which new DERs can be connected and controlled via the grid. Given the intermittency and flexibility of DERs like solar and EVs, PG&E's ability to communicate with such assets and in some cases, determine whether it generates or uses energy, enables GHG reductions while building a more resilient grid.

For more information on environmental developments at PG&E, please view PG&E's Corporate Sustainability Report at: <http://www.pgecorp.com/corp/responsibility-sustainability/corporate-responsibility-sustainability.page>.

CHAPTER 4

PG&E'S SMART GRID DEPLOYMENT

PROJECT UPDATES

Introduction

Chapter 4 provides detailed updates on the Smart Grid and technology projects and programs over the reporting period of July 1, 2018 to June 30, 2019.

4 Summary Updates for Selected Projects

4.1 Community Wildfire Safety Program – Select Technologies

PG&E continues to make substantial progress toward its CWSP goals. Below are select technology projects enabling new capabilities to help mitigate the risk of wildfires and protect customers and communities.

PSPS Risk Modeling	Approximate Cost Over Reporting Period: N/A
<p><u>Summary and Background:</u> Recognizing that wildfire risk cannot be completely eliminated through vegetation management, system inspection, and system hardening, PG&E has developed, and continues to refine, a proactive de-energization program that was initially developed in advance of the 2018 wildfire season and deployed in October 2018. The program was significantly enhanced for the 2019 wildfire season and is being further enhanced for the 2020 wildfire season. PG&E implemented its PSPS program in 2018 to proactively de-energize lines that traverse Tier 3 HFTD areas with extreme fire risk. In developing the PSPS program, PG&E performed extensive benchmarking with SDG&E (the domestic utility with the longest history of proactively shutting power off to avoid wildfire events) in a variety of areas, including meteorology, operational processes, emergency response, restoration, communications and customer support.</p> <p>PG&E is focused on maturing this program to most effectively eliminate potential ignitions during extreme weather conditions. In 2020, lines considered for potential PSPS events include all distribution and transmission lines at all voltages (500 kilovolt (kV) and below) that traverse Tier 2 or Tier 3 HFTD areas. In comparison, lines considered for potential PSPS events in 2018 included all distribution lines and transmission lines at 70 kV or below that crossed Tier 3 HFTD areas. This expansion of the PSPS program increases the targeted distribution lines from approximately 7,000 circuit miles to over 25,000 circuit miles, and the targeted transmission lines from approximately 370 circuit miles to approximately 5,500 circuit miles.</p> <p>As PG&E expanded the PSPS program to include higher-voltage lines within HFTD areas in 2019, PG&E also developed a risk-based process, or Operability Assessments (OA), to assess the wildfire risk of individual transmission lines and structures. Through these OAs, initially applied to transmission lines in 2019, PG&E has applied a risk-informed methodology to evaluate the potential risks and impacts from de-energization. This risk-informed methodology guides PSPS decisions, allowing PG&E to de-energize specific, targeted transmission lines to reduce wildfire risk and minimize impacts to customers. OA also facilitates compliance with federal reliability and operational requirements (e.g., NERC Reliability</p>	

Standards, and California Independent System Operator (CAISO) Corporation Tariff requirements) and limits wide-area grid reliability risk while still reducing wildfire risk.

OA Methodology Detail: A fundamental aspect of managing the operation and maintenance of transmission infrastructure is assessing the condition (health) of the components and structures and evaluating the increased risk of failure associated with known degradation mechanisms or aging in general. Key to understanding the OA tool is the concept of fragility. In short, fragility refers to the increasing probability of failure for increasing applied load. In the context of the OA tool, fragility is the conditional probability that an asset (tower, pole, conductor, anchor, etc.) will fail at a given wind speed.

While wind speed is the intensity measure used to define fragility, the OA tool considers many damage mechanisms such as corrosion, fatigue, wear and decay that can lower the capacity of the asset to resist wind loads. The OA tool is based on assigning a fragility curve to each asset to reflect its current health relative to a newly designed and constructed, but otherwise identical, asset. This is done by first presuming a fragility associated with a new, healthy asset, and then adjusting both the strength and uncertainty to reflect the observed condition, age, environment, and historical performance of the circuit in whole. Specifically, the median strength is adjusted based on ground and drone inspection results, test and treat inspection findings (for wood poles only), and structural engineering analysis of the towers/poles, insulators, guys, foundations, anchors and conductors. The uncertainty is adjusted based on the asset age versus a notional design life, the aggressiveness of the asset environment with respect to corrosion and windiness, and the past performance of the circuit.

For OA, the fragility can be used to predict the risk that an asset (or set of assets) will underperform at a forecast wind speed. Alternately, if a risk tolerance is defined, the corresponding wind speed at which that tolerance is exceeded can be determined directly from the fragility as described earlier. The risk tolerance is an input to the OA tool, and is a function of many concerns outside the scope of the OA tool. The OA tool also includes a mechanism for continuous improvement of wind-based asset strength estimation. Past and on-going component failures and survivals of assets in windy conditions are incorporated into the model using Bayesian updating methodologies. Further, PG&E is undertaking a testing program to better define fragility curves for specific components. In 2020, OA has been migrated to run in PG&E's cloud-based Asset Data Foundation (ADF). ADF is PG&E's first-of-its kind unified T&D Asset data set where attributes are defined, sources are known, and data pipelines are established and governed. By linking multiple utility systems of record into one data warehouse using the Amazon Web Services cloud platform, ADF's mission is to operationalize electric asset intelligence at lower cost and greater repeatability with more trustworthy analytical results for wildfire risk reduction.

Funding Source: Fire Risk Mitigation Memorandum Account (FRMMA) / Wildfire Plan Memorandum Account (WPMA) per PG&E's Amended 2019 Wildfire Safety Report (WSP)

Status: Active

Benefits Description: Proactively de-energizes high fire risk power lines to prevent wildfires during extreme weather conditions.

Benefit Category: PG&E Community Wildfire and Safety Program - Smart Utility

Dx Risk Model	Approximate Cost Over Reporting Period: N/A
<p>Description: Dx risk model project objectives are to develop models that 1. Provide situational awareness of risk, 2. Enable risk-informed decision making and 3. Enable PG&E to develop line-of-sight on risk reductions from wildfire risk mitigation initiatives. Meeting these three objectives will raise the modeling maturity from relative risk models at the circuit level with system level risk reduction and Risk Spend Efficiency (RSE) capabilities, as represented in the CPUC maturity survey, to automated quantitative risk models that include risk reduction and RSE evaluations all at the asset level.</p> <p>Funding Source: PG&E expense</p> <p>Status: The Dx modeling effort recently delivered a Distribution Enhanced Vegetation Management (EVM) model to VM and is in the process of developing a System Hardening equipment failure model for use by Distribution Asset Strategy in determining the System Hardening workplan.</p> <p>Benefits Description: Benefit Category: PG&E Community Wildfire and Safety Program - Smart Utility</p>	

Probabilistic Risk Assessment (PRA) Model	Approximate Cost Over Reporting Period: N/A
<p>Description: As part of PG&E's response to SB 901, PG&E itemized efforts to develop and operationalize methods and capabilities for proactive wildfire risk management and response planning. Under a collaborative R&D agreement, PG&E and the UCLA B. John Garrick Institute for the Risk Sciences have been working together to develop an integrated wildfire PRA model. This model will include developing a web-based software platform to support risk informed decisions during normal and abnormal conditions to prevent and mitigate safety, reliability, financial, and environmental impact of wildfires.</p> <p>Currently, Diablo Canyon utilizes a PRA model to manage risk. First, the PRA model is used to inform AM plans by determining risk reduction for different mitigation options. Second, the model is used to assess the risk inherent with different operational decisions. Finally, the model output provides a common measure with the Nuclear Regulatory Commission for determining acceptable risk and reporting on plant performance.</p> <p>Project Objective: The Electric PRA Model Project will explore the applicability of this model as an analytical and decision tool for Electric Operations.</p> <p>Model Structure: The proposed framework is designed for use in three different modes:</p> <p>(1) Offline Mode for long-term risk management and decisions such as AM strategies and prioritization of risk mitigation options;</p> <p>(2) Online Mode 1 for continuous risk monitoring and decision support based on real time or near real time information (e.g., meteorological condition) to alarm operators of the changing risk levels and provide input in decision making regarding actions such as proactive PSPS;</p>	

(3) **Online Mode 2**, for decision support during an active fire situation, dynamic updating of risks associated with fire propagation and supporting decisions on PSPS, and evacuation.

The structure of the model begins at a high level with an event tree. The event tree details the key events or decisions related to a risk. At each of these events the model provides probabilistic information on the outcome, in this case a Catastrophic Wildfire.

Funding Source: This model is being developed with the Garrick Institute for Risk at University of California Los Angeles (UCLA) which is funded with a Pledge of funding to UCLA. Under this funding approach there is not a formal Contract Work Authorization (CWA) issued. For the HFRA review this is a statement of work with a CWA / contract and is treated differently.

Status: The PRA model recently completed the major milestone – a North Bay division pilot which was reviewed by leadership with the approval to proceed toward developing a model for the whole PG&E electric system. Next step is to the develop the schedule for this next phase.

Benefits Description: Benefit Category: PG&E Community Wildfire and Safety Program - Smart Utility

Temporary MG – Preinstalled Interconnection Hub (PIH)	Approximate Cost Over Reporting Period: \$13.7 Million
<p><u>Description</u>: PG&E is continually working to analyze our systems, refine our procedures and further assess how we can minimize the impacts of a PSPS. One of the ways we are working to do this is through establishing new “Temporary Microgrids” (the 2019 Angwin pilot was referred to as a “Resilience Zone”).</p> <p>Temporary MGs are being developed across PG&E’s service area in 2020 as a part of the company’s comprehensive actions to reduce wildfire risks across our system and minimize the impact of public safety outages on our customers and communities. PG&E’s specific objective with the development of Temporary MGs is to provide electricity to resources such as medical facilities and pharmacies, police and fire stations, gas stations, banks, markets and other shared community services when weather conditions make it unsafe to operate the grid.</p> <p>A Temporary MG is a designated area where PG&E can safely provide electricity to central community resources by rapidly isolating it from the wider grid and re-energizing it using temporary mobile generation during a public safety outage. Though each Temporary MG will vary in scale and scope, the following equipment will be found at each site:</p> <ol style="list-style-type: none"> 1. Isolation devices used to disconnect the circuit from the wider grid during a public safety outage 2. A pre-installed interconnection hub (PIH) that enables PG&E to rapidly connect temporary generation and energize the isolated circuit (thereby forming an energized “island”) <p>Weather conditions and other operational considerations prevent PG&E from guaranteeing electricity to all customers potentially served by a Temporary MG during all PSPS conditions or scenarios.</p> <p><u>Funding Source</u>: FRMMA / WPMA per PG&E’s Amended 2019 WSP, CWSP, MWC 49M</p> <p><u>Status</u>: Pilot project was operational in 2019. Summary status on Temporary MG development is as follows:</p>	

Design Completed – 10

Construction in Progress – 3

Construction Completed - 4

Benefits Description: Reduce public safety impact and increase community normalcy during PSPS events.

Benefit Category: PG&E Community Wildfire and Safety Program - Smart Utility

PGE.com Portal Enhancements	Approximate Cost Over Reporting Period: \$0.58 Million
<p><u>Description</u>: Enhancements were made to PG&E's website by creating a web portal to support the PSPS program. The main focus of the work was sharing maps of de-energization areas and creating interstitials to encourage customers to provide notification information. This work has been transitioned into PG&E's Emergency Web implementation, which expands on prior work and builds additional resiliency as an outcome.</p> <p><u>Funding Source</u>: FRMMA / WPMA per PG&E's Amended 2019 WSP</p> <p><u>Status</u>: Complete</p> <p><u>Benefit Description</u>: Public safety</p> <p><u>Benefit Category</u>: PG&E CWSP - Smart Utility</p>	

Weather Station Deployment / Hi-Definition Camera Deployment	Approximate Cost Over Reporting Period: \$8.5 Million
<p><u>Description</u>: PG&E is rapidly increasing its situational awareness—its knowledge of local weather and environmental conditions—to obtain real time information on a more granular level. This type of information is critical for both wildfire prevention and PSPS events and is accessible to respective fire response agencies. From 01 July 2019 through 30 June 2020, PG&E installed 298 weather stations and 154 HD cameras to continue to improve its RT knowledge of localized conditions that affect wildfire risk. By 2022, PG&E plans to install a total of 1,300 weather stations and 600 HD cameras across its service territory. PG&E will grant fire agencies access to control the cameras, consistent with an approach taken by SDG&E.</p> <p><u>Funding Source</u>: FRMMA / WPMA per PG&E's Amended 2019 WSP</p> <p><u>Status</u>: Active.</p> <p><u>Benefits Description</u>: Provides real time information on temperature, humidity and wind speed that is used for fire modeling and decision-making processes during a possible PSPS event.</p> <p><u>Benefit Category</u>: System reliability and operational efficiency. CWSP - Smart Utility.</p>	

Wildfire Spread Models	Approximate Cost Over Reporting Period: \$6M
<p>Description: In late 2019, PG&E partnered with Technosylva, an external expert in the fire modeling field to test and deploy cloud-based wildfire spread model capabilities to better understand the technology and to test integration into current decision support frameworks. In 2020, several enhancements are being made to the inputs and underlying fuel model maps to improve the fire spread outputs. Over 70 million virtual fires are simulated by the technology each day every 200m along PG&E's overhead assets in the CPUC HFTD. Fire simulations are driven by weather and fuel model inputs from PG&E's high resolution PG&E Operational Mesoscale Modeling System (POMMS) weather model. Fire simulation outputs are available every 3 hours across a 3-day forecast horizon. In Q3 2020 and beyond, PG&E plans to continue to work with Technosylva to enhance the inputs and outputs of the model framework.</p> <p>Funding Source: Wildfire Mitigation Balancing Account (WMBA)</p> <p>Funding Source: FRMMA / WPMA per PG&E's Amended 2019 WSP</p> <p>Status: Active</p> <p>Benefit Description: Enhanced understanding of fire spread risk based on forecast information. Added ability to rapidly simulate new fires for enhanced awareness and potential impacts.</p> <p>Benefit Category: CWSP – Smart Utility.</p>	

POMMS Enhanced Fire-Risk Modelling	Approximate Cost Over Reporting Period: \$3.5 Million
<p>Description: POMMS is a high-resolution weather forecasting model that generates important fire weather parameters including wind speed, temperature, relative humidity, and precipitation at a 3-kilometer (km) resolution. Outputs from POMMS are used as inputs to the National Fire Danger Rating System (NFDRS), the Nelson Dead Fuel Moisture (DFM) model, and a proprietary Live Fuel Moisture (LFM) model to derive key fire danger indicators such as 1hr, 10hr, 100hr, 1000hr DFM, LFM, and NFDRS outputs such as the Energy Release Component, Burning Index, Spread Component and Ignition Component.</p> <p>In late 2018 to 2019, PG&E successfully completed one of the largest known high resolution climatological datasets in the utility industry: a 30-yr, hourly, 3 km spatial resolution dataset consisting of weather, dead and live fuel moistures, NFDRS outputs, and fire weather derivative products such as the Fosberg Fire Weather Index. The quantity of data generated at the near-surface was near 80 billion datapoints. With this robust weather and fire parameter dataset, PG&E Meteorology sought to develop outage and fire potential models in 2019 utilizing best-practices deployed in the utility industry, fire science and data science communities.</p> <p>PG&E is enhancing its weather model capabilities by creating a new 2km version of its weather model as well as reconstructing a new 30-year climatology based on the 2 km model configuration. PG&E has partnered with external</p>	

numerical weather prediction vendors to help execute this project. Enhancing this data through POMMS can drive improved results in downstream models such as the Outage Producing Wind Model, the Fire Potential Index, and fire spread simulations.

Funding Source: WMBA

Status: Active

Benefit Description: Enhanced model accuracy and granularity. Benefits downstream models such as FPI and OPW, which are main inputs for PSPS

Benefit Category: CWSP – Smart Utility

DMS/ Outage Management Tool (OMT) / Integrated Logging Information System (ILIS) Enhancements	Approximate Cost Over Reporting Period: NA
<p><u>Description</u>: Enhancements to PG&E's DMS, OMT, and ILIS to manage PSPS events. The focus is on management of Estimated Time of Restoration (ETOR), providing operational views of outages to support patrol and restoration, inclusion of OMT capability to document presence of hazard(s) at outage location, creation of new customer coding for pandemic responses (i.e., PR1 code) and telecommunication customers (i.e., TT1 & TT2), improved PSPS alignment between ILIS, DMS, and OMT when creating new outages, and notification of customers for All-Clear, ETORs and final restoration.</p> <p><u>Funding Source</u>: FRMMA / WPMA per PG&E's Amended 2019 WSP</p> <p><u>Status</u>: In-Flight</p> <p><u>Benefit Description</u>: Public Safety</p> <p><u>Benefit Category</u>: PG&E Community Wildfire and Safety Program - Smart Utility</p>	

Enhanced Vegetation Management – Information Technology (IT) Field Tool	Approximate Cost Over Reporting Period: \$4.6 Million
<p><u>Description</u>: The EVM* program was implemented by PG&E's Vegetation Management organization as an additional precautionary measure intended to help further reduce wildfire risks by reducing vegetation above and adjacent to overhead primary voltage power lines in the HFTD.</p> <p>The EVM work includes the following:</p> <ol style="list-style-type: none"> 1. Meeting state standards for minimum clearances around the power lines 2. Addressing overhanging limbs and branches directly above and around the lines 3. Removing hazardous vegetation such as dead or dying trees that pose a potential risk to the lines 4. Trimming vegetation around lower voltage secondary lines to prevent damage, when needed 5. Evaluating the condition of trees that may need to be addressed if they are tall enough to strike the lines 	

Vegetative fuels under power lines may also be considered for treatment, the scope for that effort is captured separately as the “Fuel Reduction” program.

To enable this program, mobile-application-based solutions were rapidly developed and deployed using the ESRI ArcGIS Online Software as a Service platform. These solutions expedited the performance of pre-inspection and tree work activities in the field via work management enablement on hand-held smart phones and devices.

*From August 2018 through 12/10/2018 the program was called Accelerated Wildfire Risk Reduction. Beginning 12/11/18 the program was renamed to EVM to reflect changes in the program’s scope of work.

Funding Source: FRMMA / WPMA per PG&E’s Amended 2019 WSP

Status: Mobile applications were developed and deployed in September 2018 and have been maintained and enhanced since that time to meet the requirements of the program. Additionally, end user support of over 2,500 field users is ongoing with major application enhancements planned quarterly to improve functionality and maintain alignment with business processes.

Benefits Description: These solutions expedited the performance of pre-inspection and tree work activities in the field via work management enablement on hand-held smart phones and devices.

Benefit Category: PG&E Community Wildfire and Safety Program - Smart Utility

Enhanced Asset Inspections – Drone/AI (Sherlock & Waldo)	Approximate Cost Over Reporting Period: \$5.8 Million
<p><u>Description:</u> PG&E developed an enhanced inspection program as part of the CWSP, known as the Wildfire Safety Inspection Program (WSIP). The WSIP implemented enhanced inspections to be completed on an accelerated schedule for PG&E to inspect its electric facilities in Tier 2 and Tier 3 HFTD areas and address any high priority repairs identified before the 2019 fire season. Under WSIP, the accelerated inspections focus on conditions that could lead to potential fire ignitions, identified through a Failure Modes and Effects Analysis (FMEA), and supplement PG&E’s baseline inspection and maintenance procedures. Through the FMEA, PG&E has identified single points of failure of electric system components that could lead to fire ignition. The identification of these failure points will aid in the development of inspection methods that can most appropriately identify the condition of such components, which are designed in accordance with CPUC General Orders (GO) 95, 165, and 174 requirements.</p> <p>Under the program, PG&E has and will continue to perform detailed ground inspections and climbing inspections (for transmission towers) that focus on failure points capable of visual inspection as well as secondary inspections using drones for all transmission assets and for distribution assets that are on or near those transmission towers.</p> <p>Sherlock is a web application that allows inspectors to view photographs of assets along with associated data and enables tracking the remote inspections within Sherlock in near RT. It also allows for remote access of data new drone/helicopter images taken by the vendors, as well as quality assurance review of the data coming in from drone pilots to ensure that only corrected data is viewed by inspectors. This helps to reduce the time from flight to inspection. In addition, inspectors can</p>	

mark-up issues within the inspection profile of the application, which generates the necessary documentation from the application itself, ensuring auditability and data quality.

The markups from Sherlock feed Waldo, a computer vision API, where computer vision models are trained to identify components as well as problems in an automated fashion. Other applications can send/receive data to/from Waldo to train/retrain models, and/or to receive predictions. Models within the inspection flow are currently being used to flag particular images (e.g. overview, right of way, asset tag) for inspectors so as to free up time that could otherwise be used to find potential ignition risks. This will allow for measurement of how introducing automation may affect inspector behaviour. These models can also be used to identify particular components or issues in images that are in the inspection queue, or to enable searching images by components visible in them, rather than by asset identifiers.

Future features include the ability to write correctives directly into source systems, enabling full imagery QA, adding the inspection questionnaire, and enabling tracking from flight through to inspection, all within a single interface.

Funding Source: FRMMA / WPMA per PG&E's Amended 2019 WSP

Status: In Development

Benefits Description: PG&E Community Wildfire and Safety Program - Smart Utility, System Reliability and Operational Efficiency.

Benefit Category: Community Wildfire and Safety Program - Smart Utility. System Reliability and Operational Efficiency.

4.2 Customer Engagement and Empowerment Projects

Over the reporting period, PG&E continued to make steady progress on several projects to provide customers with the tools necessary to manage their energy usage and costs. Continuing to leverage SmartMeter™ capabilities and providing energy use data access to customers is vital to the company's efforts to help customers understand their energy use and manage their energy bills.

Progress continues to be made on pilot programs exploring the use of DR as a behind-the-meter DER that can be integrated into the wholesale energy market but can also address local distribution needs. DR programs can be used to both mitigate excessive demand and as a way to support the future grid in times of excess generation by storing this energy for later use. Existing technologies such as storage, EVs and smart devices can be used for this purpose. PG&E is undergoing efforts to enhance customer access to EV infrastructure and programs. By supporting adoption of EVs, PG&E can extend efforts to reduce GHG emissions across the state.

As PG&E considers its customers to be the primary driver of its Smart Grid and technology investments, without an engaged and empowered customer population, many benefits offered by a Smart Grid would be difficult to realize.

4.2.1 DR Projects

Supply Side II DR Pilot (SSP II)	Approximate Cost Over Reporting Period: \$0.47 Million
<p>Description: The Supply Side II DR Pilot (SSP II) continues the work started in previous DR pilots to enable participation of customer behind-the-meter DERs as DR in the wholesale energy market using the Proxy Demand Resource (PDR) whole sale product. In addition, the SSP II in 2017 was expanded to start investigating the ability of wholesale DR to also provide distribution services, specifically investigating how to operationalize the interactions between wholesale market availability and distribution services availability and starting to develop a method for dispatching available DR resources based on distribution operational needs.</p> <p>Funding Source: Funding for this pilot in 2017 was approved by the CPUC in D.16-06-029, and the CPUC subsequently approved 3 additional years of funding (2018-2020) in D.17-12-003.</p> <p>Status: Participants have been bidding into the wholesale energy market. Between April 2015 and June 2020, pilot participants have submitted over 16,650 bids and received over 2,400 awards in the wholesale day-ahead energy market. While the pilot is open to residential aggregators, and several have gone through various stages of the enrollment process, to date none have completed the process and all participants are commercial customers or aggregators. In 2017, the SSP II started investigating the operational feasibility of utilizing DR resources that are integrated in the wholesale energy market to also address local distribution needs. As part of this work, the SSP II was used in conjunction with PG&E's EPIC 2.02 (DERMS) project to test if an aggregation of behind-the-meter DERs could respond to both wholesale and distribution instructions with no negative impact to the safety and reliability of the grid. While work with EPIC 2.02 ended in 2018, the SSP II is continuing to investigate this issue. PG&E submitted AL 5799-E back in April 2020, proposing to close the SSP II by December 31, 2020.</p> <p>Benefits Description: The SSP II is a gateway for more DR resources to be integrated into the CAISO wholesale market. PG&E has structured the pilot as a bridge between the retail and wholesale market as well as an avenue for third-party DR providers to participate in the CAISO wholesale market. This step is vital to have a self-sustaining third-party DR market in California. Learnings from the pilot were integrated into PG&E's proposed enhancements to its Capacity Bidding Program (CBP) included in its 2018-2022 DR Application, and future results from the SSP II, in addition to inputs from the Distributed Resource Plan and Integrated DERs proceedings, may be used to inform a proposal for distribution service offerings in future DR programs.</p> <p>The SSP II also provides a pathway for new technologies. Technologies behind the customer meter, such as storage, EVs, and or Smart devices, can play a vital role as grid-responsive assets.</p>	

DR programs will act as avenues for participants to provide demand reduction based on the needs of the CAISO and distribution systems. Results of the SSP II will help PG&E and the Commission assess the benefits of DR as a gateway to grid benefits and provide an in-depth understanding of the benefits of behind-the-meter technologies.

Benefit Category: Smart Market – PG&E is continuing to evaluate the value streams of enabling DR resources in a changing operations environment and to provide services to facilitate the reliable and cost-effective integration of renewable resources. PG&E is pursuing discovery of the necessary program attributes that T&D system operators will need in the future.

Excess Supply DR Pilot (XSP)	Approximate Cost Over Reporting Period: \$0.36 Million
<p>Description: There has been much written about the changing net load curve, where the “net load” is the total system load minus the renewable generation. This change from the conventional mid-day peak, due in large part to the increased penetration of renewables, dramatically impacts the system operational needs. This is often referred to as the “duck curve.” Not only have the net load profiles changed in recent years, they fluctuate substantially over the course of a year. This demonstrates the importance of a flexible solution that can be adapted to fit the ever-changing load profiles. These changes in net load, policy, and technology, create challenges to the grid in balancing against the capacity in T&D and require California to evaluate which market constructs and resources can address future grid needs. Examples of policy tools available to solve ramping issues include TOU pricing where retail rates are aligned with wholesale grid conditions, exporting electricity during periods of excess supply, curtailing renewable resources, or incentivizing customers to shift load on - demand when needed by the grid.</p> <p>PG&E’s XSP is investigating ways to incentivize customers to shift energy usage as a possible way to mitigate these challenges. In the XSP, demand responsive and flexible loads are being considered as one of the many resources that can support in-state economical and reliability needs of the future grid. The XSP is a departure from other offerings in that it asks participants to shift energy usage to consume more energy at certain times to help mitigate situations of excess supply on the transmission and/or distribution systems as well as in the case of negative wholesale energy prices. By getting customers to shift their energy consumption to align with periods of excess supply, the XSP hopes to demonstrate that customers can actively assist with renewables integration and improve alignment of supply and demand.</p> <p>Funding Source: The XSP was originally approved by the CPUC as part of the 2015-2016 DR funding bridge D.14-05-025. Funding for this pilot in 2017 was approved by the CPUC in D.16-06-029, and the CPUC subsequently approved 3 additional years of funding (2018-2020) in D.17-12-003.</p> <p>Status: The XSP was initiated in 2016 and was approved by the CPUC to continue through at least 2020. During this timeframe, there were twenty-seven non-residential customers fully enrolled with several other participants that have completed part of the enrollment process. In addition, Q4 2019 commence the enrollment of customers that are part of PG&E’s Electric Vehicle Charge Network (EVCN) into XSP. PG&E’s EVCN program offers EV chargers and installation to customers located in PG&E’s service territory. Of the twenty-seven non-residential XSP participants, 16 are part of EVCN. To</p>	

date, larger commercial customers, and 3rd parties aggregating commercial customers, have generally been more interested in participating in the XSP than small commercial and residential customers.

Since there is currently not a mechanism or model in the wholesale market to register or bid this type of load increase/shift DR resource, the XSP is operated out of market but is designed in a manner to potentially enable market integration in the future. In addition, XSP events were dispatched based on administrative decisions to test the overall construct of response to excess supply conditions, not based directly on actual grid conditions. This enabled broader testing of participants by allowing more flexibility in when test events were called without having to wait for actual excess supply market conditions. However, starting in 2018 the XSP began using day-ahead oversupply forecasts from PG&E's Short-Term Electric Supply group as a way of triggering dispatches, and these oversupply forecasts use day-ahead wholesale market prices as an input.

An additional enhancement to the XSP in 2018 was the introduction of bi-directionality where a participant could provide non-overlapping load increase and load decrease bids. However, even if a participant chose to provide bids in both directions, load increase and load decrease dispatches were treated independently, and energy neutrality was not required.

The XSP has been successful in gaining learnings in a number of its key objectives and, in doing so, has directly and indirectly addressed multiple barriers to renewable integration challenges. In addition, these learnings have helped inform ongoing proceedings at the CPUC and CAISO. The XSP is also being looked at and utilized by other groups. For example, site hosts in PG&E's EVCN program can meet the EVCN's load management plan requirement by participating in the XSP. Including EVCN participants in the XSP enables the pilot to incorporate a technology (EVs) and customer classes (smaller commercial and multi-unit residential) that have been absent from the program.

In 2019, the XSP was also recognized by the Peak Load Management Alliance (PLMA) as one of three recipients of its 2019 Program Pacesetter award. More information about the PLMA awards can be found at <https://www.peakload.org/awards>, and a webinar about the pilot can be viewed at <https://www.peakload.org/dialogue--pg-e-excess-supply-dr>. The XSP was also featured in an article in Energy Central and can be found at <https://www.energycentral.com/c/em/pges-excess-supply-demand-re>. PG&E submitted AL 5799-E back in April 2020, proposing to close the XSP by December 31, 2020.

Benefits Description: PG&E envisions that the XSP ultimately will either be a program offering or captured in rate schedules that will assist during excess supply conditions. The XSP is meant to explore how customers can help mitigate situations of excess supply on the transmission and/or distribution systems as well as in the case of negative wholesale energy prices, by shifting their load consumption to these periods and contribute to the improved alignment of supply and demand. Learnings from the XSP have helped inform ongoing proceedings at the CPUC and CAISO, including the CAISO's Energy Storage and DER stakeholder process and the CPUC's investigation of new models of DR as a part of the Load Shift Working Group.

The XSP also provides a pathway for new technologies. PG&E believes that technologies adopted behind the customers' meters, such as storage, EVs, and smart devices, can play a vital role as grid-responsive assets to help with excess supply situations.

DR programs will act as avenues for participants to provide load shifts that are tied to when there is excess supply on the grid. Results of the XSP will help PG&E, the CPUC, and the CAISO assess the benefits of DR as a gateway to grid needs and benefits and, in addition, provide an in-depth understanding of the benefits of behind-the-meter technologies.

Benefit Category: Smart Market – PG&E is continuing to evaluate the value streams of enabling DR resources in a changing operations environment and to provide services to facilitate the reliable and cost-effective integration of renewable resources through improved alignment of supply and demand. PG&E is pursuing discovery of the necessary program attributes that T&D system operators will need in the future.

AC Cycling	Approximate Cost Over Reporting Period: \$2.5 Million*
<p>Description: Under its direct installation program, SmartAC™, PG&E has deployed direct load control devices on or near central air conditioners since 2007. Currently, there are 92,000 active participants on the program who either have legacy 1-way paging devices or the new technology which leverages PG&E's investment in the AMI network by communicating through SmartMeters. In order to improve the reliability of this resource, PG&E conducted extensive testing beginning in 2014 and began deployment of the bidirectional (2-way) technology by Tantalus (formerly Energate) in 2017. communicates through Smart Meters. This technology communicates with PG&E's SmartMeters via a Zigbee Smart Energy 1.1b standard protocol module. Residential SmartMeters at PG&E incorporated this auxiliary communication module since initial deployment to promote Home Area Network and Smart Grid automation. PG&E has integrated the 2-way device head-end control system, Itron's (formerly Silver Spring Networks) Home and Business Area Network (HAN) Communication Manager, with its DR management system, TRC's (formerly Lockheed Martin Energy) SEElload product, to have a single system of dispatch to support CAISO market integration of its SmartAC program in 2018 and provide a graphically based dashboard of enrollment and dispatchable status.</p> <p>Funding Source: *PG&E's SmartAC program is authorized through 2023 under D.17-12-003 which provides a balancing account mechanism. Includes marketing, administrative, and device costs</p> <p>Upcoming Plans (Subject to Change): PG&E has currently deployed nearly 15,000 2-way load control switches. Deployment plans do not entail mass replacement of legacy 1-way technology but rather if existing devices are malfunctioning, they will be replaced. The SmartAC program is currently in a mode of not recruiting any new customers. The SmartAC program technology maybe leveraged for localized purposes such as support during Public Safety Power Shut-off events and/or to alleviate substation constraints.</p> <p>Benefits Description: Because 2-way switches are associated with healthy SmartMeter devices, the reliability rate of this resource will improve over 1-way paging devices. By installing 2-way direct load control devices, PG&E has near RT visibility into an individual premise and the air conditioner's actual response to a load control event signal. This facilitates early detection of device malfunction in either under- or over-performance circumstances and lost load can be recaptured quicker. Currently, PG&E uses SmartMeter data to determine an estimate of the number of non-performing devices in its maintenance program. With a disconnect alarm on a 2-way switch, unnecessary truck rolls can be avoided to sites.</p> <p>Benefit Category: Smart Utility – The 2-way technology provides greater visibility into device behavior, which will be used in more accurate forecasting of load reduction during events, increase the load reduction value per customer, and provide efficiencies in program management operations. Further, DR is a DER and as such can provide load balancing benefits for grid operators.</p>	

4.2.2 EV Integration Projects

PG&E continued to make significant progress in enablement of EV adoption with its EV Charge Network Program. This is the 3rd year of a three-year pilot whose purpose is to increase access to charging for EVs within PG&E service territory by installing approximately 4,500 EV level 2 charging ports focused on workplaces and multi-unit dwellings. As of June 30, 2020, 198 sites representing 4,898 ports had signed agreements with PG&E.³⁰

The EV Charge Program positions PG&E at the nexus of customer service and emerging infrastructure needs. Public charging infrastructure is needed for California to meet its goal of 5 million zero emission vehicles on the road by 2030. PG&E's dedicated end-to-end deployment of infrastructure will help meet the state's goals. Furthermore, a customized customer-facing web portal and tools, marketing collateral, application process, and community partnerships will foster a level of customer service and public EV education formerly absent.

The program will scale to completion in 2021 and construction times have been setback due to COVID-19. For further project information, see the EVCN Quarterly Reports:

https://www.pge.com/en_US/business/solar-and-vehicles/your-options/clean-vehicles/charging-stations/program-participants/resources.page.

EV Infrastructure	Approximate Cost Over Reporting Period: \$35 Million
<p><u>Description:</u> PG&E's EV Charge Network Program is a three-year pilot which enables the deployment of service connection and supply infrastructure (make-ready infrastructure) to support approximately 4,500 EV Level 2 charging ports. The program focuses on serving two key market segments, workplaces and multi-unit dwellings. Charging ports may be owned by either Site Hosts or PG&E, with PG&E able to own charging ports in multi-unit dwellings and workplaces located in disadvantaged communities. PG&E also administers rebates and participation payments for the EV chargers contingent upon the Site Hosts' attributes, physical location, and ownership model selected. The total program cost will not exceed \$130 million.</p> <p><u>Funding Source:</u> This project was funded through the PG&E EV Balancing Account.</p>	

³⁰ https://www.pge.com/en_US/large-business/solar-and-vehicles/clean-vehicles/ev-charge-network/program-participants/resources.page.

Status: In 2019, PG&E fully subscribed the program. As of June 30, 2019, PG&E had received 819 applications for the program, totaling more than 15,000 charging ports. At the close of Q1 2020, 198 sites had been approved and moved into final design and pre-construction phases, including 119 sites that have completed construction, installation, and activation of chargers. PG&E has installed 2,192 ports as of March 31, 2020. The program will scale to complete construction in 2021. For further project information, see EVCN Quarterly Reports: https://www.pge.com/en_US/business/solar-and-vehicles/your-options/clean-vehicles/charging-stations/program-participants/resources.page.

Upcoming Plans (Subject to Change): See program status for details of upcoming plans.

Benefits Description: The EV Charge Network Program positions PG&E at the nexus of customer service and emerging infrastructure needs. Public charging infrastructure is needed for California to meet its goal of 5 million zero emission vehicles on the road by 2030. PG&E's dedicated end-to-end deployment of infrastructure will help meet the state's goals. Furthermore, a customized customer-facing web portal and tools, marketing collateral, application process, and community partnerships will foster a level of customer service and public EV education formerly absent. PG&E is also mindful of potential grid benefits that EV charger deployment may drive, such as load shaping through DR communications and the establishment of load management guidelines. This charging and pricing data will help inform strategy for rapid EV growth across the state.

Benefit Category: Smart Utility

EV Rates	Approximate Cost Over Reporting Period: \$0.1 Million
<p>Description: PG&E's EV rates provide customers with a TOU, non-tiered electric rate schedule that allows drivers to recharge their EVs at a fraction of the cost of gasoline. The rate is structured to offer low-cost, off-peak rates from 12:00AM to 3:00PM allowing customers to access low cost fuelling overnight and during the day. This helps PG&E integrate new EV charging load by shifting demand overnight when there is ample capacity on the utility grid and higher renewable energy during the day. The EV rates also remove the tiered rate structure of PG&E's default residential rates, which can cause EV charging to be as costly as, or more expensive than, gasoline for higher-usage customers. PG&E offers two residential EV rates to customers: Home Charging EV2-A³¹ allows customers to meter their home usage and EV charging together; EV-B involves installation of a second utility meter to bill only vehicle charging on the EV rate. Since the introduction of</p>	

³¹ The EV-A rate was closed to new enrollments on 7/1/2019 upon the launch of the EV2-A rate. The majority of customers enrolled in the EV-A rate were transitioned to the EV2-A rate in November 2019 with the exception of grandfathered NEM customers. The remaining customers on the rate will continue to be transitioned to EV2-A as part of annual transition based on grandfathering expiration dates taking place through 2025.

residential EV rates in 2013, PG&E has enrolled over 63,000 residential customers on an EV rate, representing 22 percent of the total registered EVs in PG&E's service territory to date.³²

In May of 2020, PG&E introduced the Business EV rate, a new TOU rate option for commercial customers with EV charging capabilities. The rate is designed to lower the cost of charging for commercial customers and allow greater adoption of EVs. Customers can choose between the BEV-1, intended for low usage with charging installations up to 100 kW, or the BEV-2 for charging installations of 100 kW or more.

Funding Source: GRC

Status: On July 1, 2019, PG&E opened the Home Charging EV2-A rate plan, which replaces the EV-A rate. The Home Charging EV2-A rate plan is also available to battery storage customers. PG&E continues outreach activities to EV drivers to increase awareness of EV rates and other options for customers to reduce fuel costs. This includes a partnership with the Center for Sustainable Energy, the administrator of the State's Clean Vehicle Rebate Project, to reach new EV drivers. PG&E also supports several EV ride-and-drive events each year to connect with customers interested in transitioning to an EV. However, due to the COVID-19 pandemic, these have been paused for the time being and PG&E continues to explore ways to further customer outreach through digital platforms.

Benefits Description: The current off-peak price for electricity on the EV rate \$0.15/kWh, equivalent to approximately \$1.36/gallon of gasoline. This low off-peak price allows EV drivers to realize significant fuel cost savings compared to gasoline, which is currently trending just below \$3.00 per gallon in California.³³

Benefit Category: Engaged Customer – this program increases customer awareness and engagement in managing their energy use. With one EV accounting for roughly half of the annual consumption of a typical home, shifting charging behavior away from peak periods can allow PG&E to avoid upgrades to local distribution infrastructure, as well as costs for expensive peak-hour energy procurement. In addition, the extension of the off-peak period to 3PM is designed to help support the integration of renewable energy, by reducing the morning and evening ramp period and thereby alleviating stress on the grid.

³² Percentage of registered EVs in PG&E territory is derived from Electric Power Research Institute (EPRI) Data. The cumulative number of customers on PG&E's rate, 63,285, is 21.7 percent of total EV sales in PG&E territory, 292,145 as of June 2020.

³³ <https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMM EPM0 PTE SCA DPG&f=M>.

4.2.3 SmartMeter-Enabled Customer Tool Projects

Energy Diagnostics and Management (ED&M)	Approximate Cost Over Reporting Period: \$3.96 Million ³⁴
<p>Description: The ED&M Project is the implementation of a comprehensive strategy for customer self-service demand-side management. With the release of ED&M Platform, the customer can use Your Account portal to understand their energy bills, how they use and generate energy, rate options, and savings opportunities. In addition to launching new versions of existing online tools, the current HER Program has been scaled to 1.8 million residential customers and expanded email HERs to 650,000 existing HER recipients to complement the mail and driver deeper engagement in the online channel.</p> <p>Funding Source: This project was funded through the EE and DR Balancing Accounts and GRC. Approximate costs listed reflect total budget allocated to project over the duration of the reporting period.</p> <p>Status: The project was launched in May 2015 and development completed in March 2017 on the base product. PG&E continues to release functionality on the web portal and new HER modules. Notable updates during this reporting period include: web and HER features to better support EV and solar customers (including new rates), new web functionality to support residential customers transitioning and enrolling in new TOU rates, dozens of new commercial and AG rate changes, and many new paper and electronic HER features, including providing easier ways for customers to complete the Home Energy Checkup. PG&E also increase its overall HER recipients by 300,000 customers during this timeframe.</p> <p>Upcoming Plans (Subject to Change): There are several planned rate changes for Non-Residential customers towards the end of 2020 to support Business EV rates, NEMs, peak day pricing (PDP), and new storage rates. Non-Residential customers will also have access to improve Rate Analysis tools which will allow them to better and more quickly understand the rate options on their accounts. Residential tools will continue to support new or updated residential rates. As households continue to increase electricity consumption due to electrification, the HER/BER program, with its proven ability to deliver electric savings, should continue to provide information on ways for customers to achieve electric savings.</p> <p>Benefits Description: This project provides residential and small and medium non-residential customers with actionable information and personalized recommendations on how they can save energy find the best rate for them and explore Distributed Generation (DG) and EV options.</p> <p>Benefit Category: Engaged Consumer – the project increases customer awareness and engagement in managing their energy usage in an environmentally sustainable and economically efficient manner.</p>	

³⁴ HERs during this time period cost approximately \$10.1 million. These costs are also reported as part of the Energy Efficiency Annual Report.

BFAs (formerly: Energy Alerts)	Approximate Cost Over Reporting Period: NA
<p><u>Description:</u> The BFA feature allows customers to set personalized budget thresholds and are notified via email, text, or phone when they are projected to exceed that amount during their monthly billing cycle. Customers with a single premise, with a SmartMeter, on their account, and on a supported rate plan (HG1, HE1, HE6, HEVA, HEVB, HETOUA, HETOUB, HETOUC, G1, E1, E6, , EVA, EVB) are eligible. The following classes of customers are not supported: DA, and Net Energy Metering (NEM).</p> <p><u>Funding Source:</u> This project was originally funded under PG&E's SmartMeter Upgrade Program and received additional funding under GRC's capital fund and expense.</p> <p><u>Status:</u> In March of PY 2016 Energy Alerts transitioned into BFAs. BFA replaced the Tier Alerts with an alert that warns customers when they reach their user-specified dollar amount threshold. Customers are subsequently notified with an alert via their channel of choice (email, phone, or text message) when they meet their designated threshold amount up to one day prior to the end of their billing cycle. BFA is only available for residential customers who are SmartMeter read and billed.</p> <p>Customers can enroll in Energy Alerts, or currently BFA, online via the Your Account web site. During the past few years, PG&E has marketed Energy Alerts and BFA in a similar manner as Customer Web Presentment (CWP) and often in parallel with CWP and Your Account communications. In December 2013, the Your Account homepage was redesigned, which made it easier for customers to connect to other often-used functions, such as analyzing usage, comparing rate plans, and signing up for Energy Alerts. From 2014 through 2018 enrollments continued to increase, most likely due to greater customer awareness of PG&E's digital services accessible through the Your Account website. In December 2017, BFA reactivated Marin Clean Power and Sonoma Clean Energy customers who had been enrolled in BFA prior to transitioning to their Community Choice Aggregators (CCA). Though CCA customers have been ineligible for new BFA enrollments due to rate modelling limitations, PG&E opened enrollment into BFA to new CCA customers in 2019.</p> <p>In February 2017, PG&E added to its product offering the HUAs program. This program sends out an early warning notification when customers are projected to trigger a surcharge. The High Usage Surcharge (HUS) is incurred when customers exceed four times their Baseline Allowance. HUA is only available for residential customers with electric service through a SmartMeter and are on eligible tiered rate plans. Similar to BFA, customers can enroll in HUA online via the Your Account website. As part of the implementation of the HUS, PG&E sends letters to customers who are at risk of the surcharge or have incurred it. The HUA program is featured in these compliance letters, which has helped drive some of the enrollments into the program.</p> <p>In 2018, a total of 117,201 customers enrolled in the HUA program with 1,022,319 HUAs sent. These counts also include d participants who were enrolled in other PG&E programs such as CWP, BFA, SmartRate™ and SmartAC. As with BFA, the analysis population excluded SmartAC and SmartRate customers, participants who received alerts on more than one media type, and those who did not receive an alert in 2018. The analysis population was also segmented into singly-enrolled HUA participants and participants dually-enrolled in BFA and HUA. As a result, the HUA analysis population consisted of 42,393 singly-enrolled participants and 74,808 dually-enrolled participants, for a total of 117,201 analyzed HUA participants in 2018. Singly enrolled HUA Customers saved \$98,000 annually with 2,501 MWh is energy savings.</p>	

Since the BFA program has similar enrollment numbers along with no major programmatic changes, PG&E did not complete a detailed participant analysis as in previous years. Given the similarities between the years, PG&E has no reason to believe that interest in the programs have substantially changed in the past year.

Benefits Description: BFA provides enrolled customers with a monthly projected bill amount notification when their current usage pattern is expected to exceed their personalized threshold amount. This alert helps customers adjust their consumption patterns to avoid paying higher energy bills or financially plan for their estimated bill amount.

Benefit Category: Engaged Customer.

Benefits Quantification Methodology: In previous years, this evaluation was conducted in four phases: data collection, ex post impact estimation, documentation and reporting, and regulatory support and consultation. The data analyzed singly- and dually-enrolled HUA and BFA customers, and calculated Energy Savings and Financial benefits (reported in thousands). During the 2018/2019 reporting period, dually-enrolled customers experienced a total of 5,417 MWh of energy savings and \$212,000 in financial benefits; singly-enrolled HUA customers experienced 2,501 MWh of energy savings and \$98,000 of financial benefits; and singly-enrolled BFA experienced 1,603 MWh of energy savings and \$62,000 of financial benefits. To calculate financial benefits for conservation programs, PG&E used the following formula: Financial benefits = energy savings x avoided generation costs (\$39.06/MWh in 2018). The cost figure comes from Appendix A of the Settlement agreement on marginal Cost and Revenue Allocation in Phase II of G&E's 2014 GRC (A.13-04-02). Detailed results, including seasonal usage, comparison group matching, and alert data is found in the SmartMeter Enabled Programs PY 2018 Report and Appendix. As mentioned above, benefits in 2018/2019 are expected to be comparable to previously reported savings. Therefore, no calculation of the benefits for the current 2018/2019 are being provided.

2018 Full Report: PY2018 Evaluation of BFAs and HUAs. CALMAC ID PGE0418 Opinion Dynamics. For further project information, see: OP10 compliance report, Progress on Residential Rate Reform

(<http://www.cpuc.ca.gov/General.aspx?id=12154>).

Share My Data (Customer Data Access (CDA)) Project	Approximate Cost Over Reporting Period: \$0.44 Million
<p>Description: Under the CDA project, now known as "Share My Data," PG&E developed a platform that provides authorized and secure data to customer-authorized third parties. With the release of CDA Phase 1 functionality, customers could share electric energy usage data with third parties. With the release of the CDA Phase 2 functionality in December 2015, customers could also opt to share one or more categories of information, including usage (e.g., interval usage data for gas consumption), billing (e.g., rate schedules, billing history) and account (e.g., service address). In 2018, PG&E implemented an online authorization process which enables customers to authorize data release via an online platform. This authorization pathway supplements the paper-based form which had previously been the sole means for customers to authorize data release.</p> <p>Funding Source: This project was funded by the CDA D.13-09-025 through December 2016. As of January 2017, operation and maintenance for this project is funded through GRC. The Click Through Project is funded by D.16-06-008 and covers both Share My Data related updates and specific changes to better support Electric Rule 24 process for DRP.</p>	

Status: On September 19, 2013, the CPUC approved PG&E's CDA Application (D.13-09-025). PG&E launched Phase 1 of the Share My Data project in March 2015 and Phase 2 in December 2015. On August 25, 2017, the CPUC approved PG&E's Advice Letter (AL) 4992-E in compliance with OP 10 of D.16-06-008 to deliver Click Through with Resolution (Res.) E-4868. PG&E launched Click Through Phase 1 to comply with Res. E-4868 on February 22, 2018 and Phase 2 on June 28, 2018, Expanded Data Set at the end of September, and Phase 3 on November 15, 2018. This project was to provide improvements to the Electric Rule 24 process for DRPs to obtain customer authorization to access the customer's data for direct participation in the CAISO's wholesale market. This also included simplifying the overall electronic authorization process via the Share My Data platform. In 2020 PG&E continues to maintain the SMD platform and awaits CPUC decision on further enhancements according to Resolution E-4868.

Upcoming Plans (Subject to Change): There are no upcoming projects related to Share My Data. PG&E submitted an application to the CPUC in compliance with Resolution E-4868, in which it outlines its estimate to implement an Alternative Authorization Solution, proposes its plan to accommodate quick response and to expand click-through to DERs, and a few other enhancements submitted by vendors through the CDA Committee. The Application is pending with the Commission. Other upcoming work includes regular platform O&M and enhancements.

Benefits Description: This platform provides PG&E's customers and their selected third-party service providers with a robust means of accessing their energy data in a standardized manner. It also supports the evolution of the energy services industry by providing the data necessary for third parties to develop applications that will help customers manage their energy usage and reduce their monthly energy bills.

Benefit Category: Engaged Consumer – the program increases customer awareness and engagement in managing their energy usage in an environmentally sustainable and economically efficient manner.

Energy Data Access	Approximate Cost Over Reporting Period: \$0.2 Million
<p>Description: In Commission D.14-05-016 (Decision), the Commission adopted rules to provide access to energy usage and usage-related data to local governments, academic researchers, and state and federal agencies for specific use cases, while protecting the privacy of customers' personal data. The Decision ordered the utilities to create a Data Request and Release Program to facilitate this access and instructed the utilities to submit an updated data catalog in the SGAR.³⁵</p> <p>Funding Source: Through December 2016, PG&E was tracking the incremental costs associated with implementing this decision in a memorandum account and was seeking authorized recovery of such costs through its GRC proceeding. As of January 2017, operation and maintenance for this project is funded through GRC.</p> <p>Status: In December 2014, PG&E implemented the Decision requirements, which includes the development of an Energy Data Request Program portal, creation of a Data Request and Release Process, publishing of a data request log (referred to as data catalog in the Decision), publishing of a quarterly energy consumption report by zip code and customer class, and the formation of a statewide Energy Data Access Committee (EDAC). An updated data request log (data catalog) is provided</p>	

³⁵ D.14-05-016, pp. 91-92.

below and summarizes the requests worked on during the period July 1, 2019 through June 30, 2020. The complete log can be viewed on PG&E's website at <http://www.pge.com/energydatarequest>. The EDAC was required to hold quarterly meetings through December 2016 and thereafter only met on an 'as needed' basis. Minutes from the meetings are posted on the CPUC's EDAC website: <http://www.cpuc.ca.gov/General.aspx?id=10151>. For further project information see: Quarterly Advice Letters (Latest filing: https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4273-G.pdf).

Benefits Description: This program provides energy consumption and energy-related customer data to qualified academic researchers for research purposes, local governments for their climate action plans, and state and federal agencies to fulfill statutory obligations, including low-income participation in EE programs. The data provided is intended to promote EE, DR, and GHG reductions, and advance Smart Grid policy goals.

Benefit Category: Engaged Consumer – this program facilitates access to energy data for local governments, academic researchers, and state and federal government entities needing data to fulfill statutory requirements.

Table 4-1: PG&E ENERGY DATA REQUEST PROGRAM – DATA REQUEST LOG (7/1/2019 – 6/30/2020)

Organization	Requestor Type	Description	Status	Change Date
Energy Institute at Haas	Academic Researcher	Data on agricultural users' usage and billing plus associated information to help identify and analyze pump usage/billing. Also pump test data, where available, from PG&E Agricultural EE programs.	In Review	6/30/2020
University of California, Davis CWEE	Academic Researcher	Interval and identifying information for all customers on agricultural rate schedules in zip codes specified by UCD. Also matching PG&E pump test data where available.	Downloaded	6/22/2020
The Regents of the University of California	Academic Researcher	Detailed electric usage for Yuron, Delano, and Fresno.	Downloaded	6/11/2020
Energy Institute at Haas	Academic Researcher	Anonymized usage data for the PG&E service territory.	Approved - In Progress	6/10/2020
University of California, Davis CWEE	Academic Researcher	Interval and identifying information for all customers on agricultural rate schedules in zip codes specified by UCD. Also matching PG&E pump test data where available.	Downloaded	5/22/2020

Organization	Requestor Type	Description	Status	Change Date
Purdue University	Academic Researcher	Anonymized monthly usage and EE program participation data plus location data for all NEM and a sample of non-NEM customers in a list of zip codes provided by Purdue.	Downloaded	5/19/2020
Michigan State University	Academic Researcher	Anonymized interval usage and usage related data for Pay for Performance (P4P) program users and a random sample of non-P4P users.	Completed	5/18/2020
City of San Mateo	Local Government	Aggregate energy savings data for the commercial sector for 2015-2019.	Approved - In Progress	5/7/2020
City of West Sacramento	Local Government		Canceled / Withdrawn	5/6/2020
Ca Dep. of Community Services & Dev.	Community Services & Development	Average usage and billing amount per household, and total number of residential households, by county, for residential households in PG&E's service territory.	Downloaded	4/8/2020
City of Arcata	Local Government	Anonymized monthly residential gas usage	Downloaded	3/27/2020
University of California, Davis CWEE	Academic Researcher	TBD: need to refine both customer list and data field list.	Suspended	3/26/2020
City of Sunnyvale	Local Government	Total usage and number of billed days, split by commodity and residential vs. non-residential, for 2019.	Downloaded	3/5/2020
City of Richmond	Local Government	Non-residential usage for 2014-18, by year.	Canceled / Withdrawn	3/4/2020
Town of Los Altos Hills	Local Government	TBD	Canceled / Withdrawn	3/4/2020
Gazarian Real Estate Center, CSUF	Academic Researcher	Installation date (where available) and address for all Solar installations in Fresno County.	Downloaded	3/2/2020
University of California Berkeley	Academic Researcher	TBD	Canceled / Withdrawn	2/20/2020
County of Santa Barbara	Local Government	Aggregated energy usage data and customer counts, by sector, for City of Arcata in 2018	Downloaded	2/12/2020
Spring Creek Apartments	Community Services & Development		Canceled / Withdrawn	2/11/2020

Organization	Requestor Type	Description	Status	Change Date
UCLA	Academic Researcher	Anonymized monthly usage/billing and daily usage for customers with a disconnect and for a random sample of customers across 800 Zip codes.	Downloaded	1/16/2020
EES Consulting, Inc.	Local Government		Canceled / Withdrawn	1/14/2020
City of San Luis Obispo	Local Government	TBD	Canceled / Withdrawn	12/31/2019
County of Santa Barbara	Local Government	Data description never finalized.	Canceled / Withdrawn	12/31/2019
City of South San Francisco	Local Government	Aggregated monthly electric and gas consumption for 2006–2018, split by residential vs. non-residential.	Downloaded	10/8/2019
City of Benicia	Local Government	Gas usage by sector by month for 2015-16	Completed	8/8/2019
AMBAG Energy Watch	Local Government		Canceled / Withdrawn	7/31/2019
University of California, Santa Cruz	State or Federal Agency		Canceled / Withdrawn	7/31/2019
PESD; Stanford University	Academic Researcher	Billing and interval data for residential customers, plus street address, rate code, and CSI and EE program usage.	Completed	7/26/2019
County of Marin	Local Government	Yearly gas and electric usage for all the cities in Marin County, split into residential and non-residential sectors.	Completed	7/18/2019
PESD; Stanford University	Academic Researcher	Interval data from 1/1/2012 to 7/31/2018 for CSI customers and a randomly selected control group.	Canceled / Withdrawn	7/18/2019

Stream My Data – HAN	Approximate Cost Over Reporting Period: \$0.08 Million
<p>Description: PG&E's Stream My Data helps customers save energy and money by providing RT electricity data through an energy monitoring device. The device helps a customer understand how and when they are using electricity, as well as the related costs—allowing them to take actions to save energy and money. By connecting an energy monitoring device to the electric SmartMeter for the home or an SMB, the customer can do the following:</p> <ol style="list-style-type: none"> 1. Monitor your RT Electricity Usage (kilowatt (kW)) 2. See your RT Price (\$/kWh) 3. Get an Estimated Costs to Date and Estimated Electric Bill This Month 	

4. Receive DR Event Alerts (SmartRate and PDP) event alerts)

Funding Source: The funding source was based primarily from GRC funding.

Status: “Stream My Data”, aka HAN, continues its service with usage available at all SmartMeter devices, and PRICE information available to A1, A10, A6, E1, E6, and EVA rates. Commercial energy management solution providers have continued to explore HAN on a small scale and PG&E continues to support their efforts. Stream My Data has been revised to enable access to electrical usage for residential solar (Net Energy Metering Standard) SmartMeters. Price information availability remains the same for the limited set of rate plans.

Upcoming Plans (Subject to Change): Stream My Data will continue operation with current feature set levels.

Benefits Description: Customers can use validated HAN devices/technologies to receive RT usage, RT price, and DR signals via their SmartMeter. This improves their energy awareness and helps them adapt their energy consumption or load shifting behaviors to lower their monthly energy bills and makes it easier for customers to participate in DR programs.

Benefit Category: Engaged Consumer – HAN enablement allows customers with SmartMeter interoperable devices/technologies to synchronize with PG&E’s SmartMeter.

Building Benchmarking Portal (BBP)	Approximate Cost Over Reporting Period: \$0.33 Million
<p><u>Description:</u> The BBP, created in compliance with Assembly Bill (AB) 802, is a web-based system for building owners, or their authorized agents, to request aggregate whole-building energy usage data uploaded into their Energy Star Portfolio Manager accounts. The BBP is a streamlined service for procuring building energy usage data to assist customers in their benchmarking endeavors.</p> <p><u>Funding Source:</u> This project is funded through a memo account (MA). PG&E filed a Tier 2 Advice Letter (AL 3707-G/4829-E) seeking to establish memorandum accounts for gas and electric service. These MAs are being used to record costs incurred to comply with AB 802 and will be submitted in PG&E’s GRC 2020 Rate Case. Upon review and approval by the CPUC, PG&E will transfer the AB 802 MA balances to the appropriate balancing accounts, as directed by the Commission, for recovery in rates.</p> <p><u>Status:</u> During the reporting period, the BBP has received over 6,000 requests for building energy usage data. Most requests are likely driven by the Building Energy Benchmarking Program administered by the CEC as well as an increasing number of local municipalities within the PG&E service territory implementing additional benchmarking reporting requirements. The Benchmarking Program requires certain buildings to report their building’s energy usage data to the CEC. 2019 is the first year that qualifying multi-family buildings are required to submit energy usage data to the CEC, in addition to qualifying commercial buildings which began in 2018. During 2020 BBP has transitioned from MA funding to GRC funding.</p> <p><u>Upcoming Plans (Subject to Change):</u> No major changes to the BBP are under review. However, the benchmarking team continues to evaluate updates and process improvements to enhance customer experience and increase the value of the BBP for users.</p>	

Benefits Description: The BBP streamlines the procurement of energy data for benchmarking. Additionally, tenant turnover is not nearly as impactful on the benchmarking process. As more building owners benchmark their facilities, it will yield greater visibility into building energy use, and opportunities for customers to improve the performance of their buildings.

Benefit Category: Engaged Customer – By simplifying the authorization process, and designing a more resilient portal, the BBP will allow building owners to more easily track and manage building energy consumption.

Time-Varying Pricing (TVP) Rates	Approximate Cost Over Reporting Period: \$2.96 Million
<p>Description: TVP products, such as PDP, TOU, and SmartRate take advantage of SmartMeter capabilities that are now largely available across PG&E's service territory. Charging customers different rates based on varying system conditions is intended to more closely align retail and wholesale electric prices for generation, as well as create economic incentives for customers to actively manage their energy costs by shifting electricity use from when it costs more to when it costs less. PDP provides between 10-15 MW of load reduction on the hottest days of summer, equaling the load of one Peaker power plant. The SmartMeter has enabled PG&E to cost-effectively offer all customers these types of rate programs which provide significant customer and societal benefits.</p> <p>Funding Source: This project is funded as part of PG&E's Rate Design Window (D.10-02-032, D.11-05-018, and D.11-11-088 – \$97.05 million), 2011 GRC (2011 Phase 1 – \$12.61 million), and AMI Cases (D.06-07-027 – \$2.07 million).</p> <p>Status: PG&E continues to administer and offer TVP Rates to all PG&E bundled residential and nonresidential customer classes. Beginning in November 2012, SMB customers with 12 months of SmartMeter data began a mandatory transition to TOU rates and two years later, in 2014, began transitioning to PDP with an option to opt-out. Small Agricultural customers began transitioning to mandatory TOU rates annually starting in March 2013. CPUC D.15-07-001 mandates that PG&E's residential customers be defaulted to TOU rates, beginning in 2019. Eligible residential customers may also enroll in the SmartRate Program. Enrollment in SmartRate is at 65,000 residential customers as of July 2020 and provides an average of 10-15 MW of load reduction on event days.</p> <p>Over 505,000 SMB Service Agreements have transitioned to TOU rates. 104,000 Service Agreements are active participants in the PDP Program as of July 2020. In November 2019, PG&E began to offer new non-residential TOU rate plans that shift peak periods to the evening hours on an optional basis. Beginning in March 2021, PG&E will begin to transition remaining eligible commercial, industrial, and agricultural customers to these new rate plans with 4-9pm peak period for commercial and industrial customers, and 5-8pm peak for agricultural customers. This shift is being implemented to better align with the cost of energy in the later hours of the day.</p> <p>Benefit Description: TVP reduces demand during peak summer-time periods, lowering systemwide costs, by enabling customers to save money by shifting load to off-peak times of day. Customers can still use the same amount of energy and reduce their bill by shifting some of their usage to times of lower cost generation.</p> <p>Benefit Category: Engaged Consumer and Smart Utility – the program increases customer awareness and engagement in managing their energy usage.</p>	

4.2.4 Emerging Customer-Side Technology Projects

AutoDR Program	Approximate Cost Over Reporting Period: \$2.1 Million
<p>Description: PG&E's AutoDR program offers residential, small, medium (SMB) and large commercial and industrial (LC&I) customers an incentive or rebate to install equipment that has the ability to automatically reduce a customer's energy use during DR events without any manual intervention. Specifically, the technology that is incentivized ranges from smart thermostats to complex EMS and agricultural pumps and is provided for customers who agree to participate in either PG&E or third-party eligible DR programs. AutoDR provides a communication infrastructure that links PG&E's designated third-party head-end control system to either a cloud-based platform or the actual control technologies. PG&E supports commercial customers to develop pre-programmed energy management and curtailment strategies to participate in DR event days.</p> <p>Funding Source: PG&E's AutoDR program is authorized through 2023 under D.17-12-003 and further governed under D.18-11-029 which provide a balancing account mechanism.</p> <p>Status: From 2017 through 2019, PG&E developed the infrastructure to provide residential rebates on smart thermostats for customers who participate in DR programs. PG&E conducted a project to identify other residential control technologies that could be eligible for rebates in the future. The conclusion of the project was that technologies that receive other types of rebates, i.e. EE, Self Generation Incentive Program (SGIP), the DR component was not substantiated enough to provide a rebate at PG&E. PG&E will continue to monitor for market readiness. The SMB and LC&I customers continue to be supported through a third-party program implementer.</p> <p>Benefits Description: Customers receive many benefits from deploying automated technologies. Oftentimes, they are also able to take advantage of EE and AutoDR incentives to offset the cost of the technologies, which can greatly benefit businesses. In addition to the ongoing benefits of energy savings, customers benefit from the ease of participating in DR events without manual intervention. Through DR program participation, typically customers are also compensated to reduce load on DR event days which can provide longer-term benefits to customers. Compensation varies depending on which DR program the customer chooses to participate. Eligible programs range from SmartRate and PDP, which have direct enrollment with PG&E, to the third party/aggregator managed Demand Response Auction Mechanism, CBP and the Excess Supply Side Pilot. Customer compensation can be especially variable when working with an aggregator as the level is decided between the customer and the aggregator.</p> <p>Benefit Category: Technology Adoption and Customer Engagement – AutoDR provides rebates and incentives to customers to promote adoption of control technologies that can help them save energy and reduce costs on an ongoing basis. Through participation in a DR program, customers can also provide value to the grid. An overview of associated benefits is provided below:</p> <ol style="list-style-type: none"> Cumulative kWh benefit from CBP and PDP: 165 MWh <p>Explanation of lower value than 2019 report: While 19 CBP events were called in 2018, only 5 were called that included AutoDR customers in 2019. The average CBP event duration dropped from 1.63 hours to 1.2 hours. Those customers</p>	

that were called in 2019 were smaller – the average kW load shed commitment for an SAID in 2018 events was 97 kW, while the average dropped to 79 kW in 2019.

2. GHG Benefit with the 2016 factor from PG&E of 294 lbs. of CO₂ per MWh: 48,382
3. Financial Benefit: N/A – the purpose of AutoDR incentives and rebates is to promote adoption of automated technology that utilizes a specific communication protocol (Open AutoDR). The benefit of adopting technology that utilizes an open standard versus not (e.g. proprietary smart thermostat or battery management system) ensures that assets will not be stranded should there be an ownership change. The financial aspect of this benefit is not quantifiable at this time.

Smart Thermostat Study	Approximate Cost Over Reporting Period: NA
<p>Description: PG&E conducted an Emerging Technologies field assessment to evaluate gross energy savings and effectiveness of EE facilitating features in multiple smart thermostats—Nest, EcoBee3 and Radio Thermostat of America CT50 with EnergyHub service provider—with focus on learning/optimization software, occupancy sensing and geo-location. Behavioral messaging and DR were out of scope. Smart thermostats were professionally installed at no cost to 2,207 residential customers in the North Valley, Stockton and Fresno areas in 2015. Both billing data and manufacturer thermostat usage data was collected over the 24-month monitoring period and used for analysis.</p> <p>Benefits Description: In December 2016, a report providing an analysis of the first year’s results was posted to the Emerging Technologies Coordinating Council (ETCC) website (https://www.etcc-ca.com/reports/smart-thermostat-study). All three thermostats achieved annual electric savings ranging from 4-5 percent. One of the thermostats tested also achieved annual gas savings. The project’s second year of monitoring concluded in the fall of 2017 and a report detailing an analysis of the second year’s performance and the results of a survey of the study participants was posted to the ETCC site in March 2018 (https://www.etcc-ca.com/reports/smart-thermostat-study). The results indicate that savings persisted in the second year, although at a somewhat lower level. The consultant concluded that the lower level of savings was due in part to the extreme heat in the second year of the study, and that continuing the study for a second year led to sample attrition making the savings more difficult to detect. Based on the positive results from these studies, PG&E added smart thermostats to the EE portfolio in June 2017.</p> <p>Status: During the current 2019/2020 reporting period, PG&E delivered 15,080 smart communicating thermostats (SCT) through three residential EE programs, which included a downstream rebate program, a low-income Energy Saving Assistance Program and a P4P program. An additional 5,151 SCTs were offered through one of two “direct install” programs that offer a comprehensive or mix of measures, including SCTs, installed by contractors targeting income- or energy-constrained customers (the Residential Energy Fitness Program) or multifamily customers (the Enhance Time Delay Program).</p> <p>CPUC Impact Evaluation: The CPUC completed its first impact evaluation of the statewide SCT measure in April 2020. After making adjustments for several factors, the estimated, per-household annual cooling load savings is 89.8 kWh for PG&E. The estimated per-household annual heating load savings is 7.7 therms for PG&E. These PG&E savings estimates compare favorably to the statewide per-household estimates of 72.2 kWh and 2.1 therms, respectively. Electric and gas realization</p>	

rates for PG&E—that is, the ratios of savings claimed to evaluated savings—are 42% and 37%, respectively. Conducted by the firm DNV GL, this evaluation exclusively measured the impact of the retailer rebate programs on energy use at customer residences using billing analysis. Commenters to the evaluation voiced concern about differences between the participant customers and non-participant customers used as a basis for pre/post energy consumption comparisons. The evaluators acknowledge that the composition of the comparison group used as a basis for savings estimates is subject to limitations. In its second impact evaluation of SCTs that is now underway, DNV GL is undertaking additional analyses that investigate the use of comparison groups that are composed from future participants who self-select into smart thermostat acquisition.

Benefit Category: Engaged customer. The latest generation of Smart Thermostat products offers customers easier and more convenient ways to manage their heating, ventilation and air conditioning with improved functionality and integration to other connected devices. Moreover, smart thermostat as the first connected system in line is a way to enable customers to have insight and control over their energy usage pattern.

4.3 Distribution Automation and Reliability Projects

Projects in the Distribution Automation and Reliability category provide capabilities and associated technology enablement to monitor and control the electric distribution system. PG&E continues to focus on technology capabilities to increase the visibility and control enabled by Substation SCADA in the distribution system, continues to deploy FLISR technology projects first introduced by the Cornerstone project, implemented technologies to support the effective consolidation of Distribution Control Centers, and deployed EPIC demonstration projects to further distribution capabilities.

The following sections provide an update on completed, in-progress or planned projects during the July 1, 2019 through June 30, 2020 timeframe, unless otherwise noted.

ADMS	Approximate Cost Over Reporting Period: \$22.5 Million
<p>Description: This project is the first component of a multi-year effort to implement an ADMS, which will integrate several mission critical distribution control center applications that are currently spread across multiple platforms. The ADMS will become part of the core distribution operations technology tools that enable the visibility, control, forecasting, and analysis of a more dynamic grid.</p> <p>When fully deployed, the ADMS platform will bring the capabilities of today's Distribution Supervisory, Control and Data Acquisition (D-SCADA) software, DMS, and Outage Management System (OMS) into a single platform. These applications are described below.</p>	

ADMS	Approximate Cost Over Reporting Period: \$22.5 Million
<p><u>D-SCADA</u>: PG&E's D-SCADA system gathers, processes, and displays system-wide operating data to Distribution Operators at control centers. Operators use the system to remotely control and/or operate devices on the distribution network. The D-SCADA system consists of distributed IT network system and server hardware (the SCADA "platform") and a growing number of SCADA-enabled field devices which send and receive real time data over the network.</p> <p>PG&E's SCADA platform is no longer adequate to support projected growth, evolving cybersecurity threats, or the need for increasing integration with other control center systems. RT-SCADA, the current application managing data exchange between field devices, processors/servers, and displays in the control center, is nearing the end of its useful life and does not have the functionality and cybersecurity features to address future grid conditions, including an increased number of field devices and increased DER penetration. Similarly, the current hardware supporting the SCADA system does not have sufficient processing or storage capacity to address the increasing complexity of the grid, or to support advanced control and analytic applications. A major part of the project is associated with replacing the hardware and software associated with PG&E's D-SCADA platform, migrating data from the existing D-SCADA database to the new ADMS-SCADA database, and programming and testing to ensure that field devices communicate accurately with the ADMS-SCADA application.³⁶</p> <p><u>DMS</u>: DMS is a system that utilities use to maintain an As-Operated model of the electric distribution grid, can run applications that analyze the grid.</p> <p><u>OMS</u>: OMS is a network model-based system that utilities use to identify electrical outage locations and assist in the restoration of power. This system also provides utility customers with updated outage information and is the source for reliability reporting. The accuracy of OMS's identification of outage is dependent on its network model reflecting the actual as-switched state of the distribution system at any given time.</p> <p>Integrating SCADA, DMS, and OMS into a single, more efficient platform will reduce the potential for operator error, improve cybersecurity risk controls, and enable PG&E to run a new suite of advanced applications that enhance current capabilities associated with safety, reliability, and affordability, and respond to future needs associated with the growth of DERs and complexity from growing wildfire risk.</p> <p><u>Funding Source</u>: This project is funded through PG&E's GRC.</p> <p><u>Status</u>: PGE began the Analyze/Design phase of the first release the ADMS project (ADMS SCADA) in May 2019. We have completed 70% of the workshops and design of the solution and are tracking to a September 2020 completion date. We have already begun some of the software build activities for new functionality required by PGE (for example, the PGE protocol and new fire mitigation functionality). Additionally, we have begun the Substation Build portion of the Network Model build workstream.</p>	

³⁶ Funding for SCADA replacement and DMS integration was approved in the 2017 GRC. The replacement was scheduled to begin in 2017 and was forecast to be completed in 2021. As further explained below, the start date of the project was pushed back to 2018, and PG&E now forecasts that it will be completed in 2022.

ADMS	Approximate Cost Over Reporting Period: \$22.5 Million
<p><u>Upcoming Plans (Subject to Change)</u>: PG&E expects to complete the Release 1 Design phase in September 2020, and continue the software and network model build workstreams. We anticipate the software version to be released to PGE early Q2 2020. We anticipate beginning the feeder import of the Network Model build workstream in July 2020, continuing thru September 2021.</p> <p><u>Benefits Description</u>: ADMS delivers the following benefits:</p> <ul style="list-style-type: none"> • Safety – Increases ability to manage future cyber security vulnerabilities which are challenges of the existing D-SCADA application. • Situational Awareness <ul style="list-style-type: none"> ○ ADMS can estimate the behind the meter load served by DERs, showing operators, the total load consumed as well as output. This load estimation, coupled with some RT telemetry of DERs, can provide operators with estimates that provide actionable information to perform restoration in the event of an outage on a circuit with a high penetration of DERs. ○ ADMS can provide improved filtering and prioritization of alarms for operators, making the operator more efficient when evaluating and addressing grid issues. This is especially important when storms create well above average outage and alarm volume, and operators can be inundated with alarms. ○ ADMS will promote greater awareness of RT grid status by enabling sharing of information contained in the ADMS with wider audiences across utilities. In addition, PG&E looks to “mobilize” ADMS features and allow for more PG&E personnel to have access. • Training – ADMS has a training simulator that can effectively train existing and new operators. The simulator allows the creation of real-life complex training scenarios that includes SCADA related events and operations, switching management, outage management events (e.g., customer calls, SmartMeter outage notifications, hazards, damage, etc.). • Operational Efficiency <ul style="list-style-type: none"> ○ ADMS enables switching submittal, planning, and execution to be a process contained within one application, driving substantial efficiency. ADMS provides the ability for efficient scheduling with “conflict checking” as well as fast development of switch logs, with fully embedded intelligence to verify the switch log’s impact, in both real time and study mode. ○ Better load forecasting driving better grid operations: ADMS has a load forecasting engine that develops “operational time horizon” (i.e., 24 hr., 7 day) load forecasts. ○ FLISR expansion and maintenance: FLISR is an advanced application that is part of the ADMS platform. ADMS FLISR will know the topology and capacity of the grid, and the forecasted load. Therefore, ADMS FLISR requires less time to configure than PG&E’s existing FLISR, which as a standalone application must manually be configured. 	

ADMS	Approximate Cost Over Reporting Period: \$22.5 Million
<ul style="list-style-type: none"> ○ Reduce utility line losses: ADMS's optimal power flow capabilities can control SCADA-enabled capacitors to minimizing line losses while maintaining power factor and voltage compliance. Reducing line losses lowers GHG emissions and reduces PG&E's energy procurement costs. ○ Drive Conservation Voltage Reduction (CVR): ADMS's optimal power flow capabilities can control SCADA-enabled substation transformer load tap changers, line voltage regulators, and capacitors to drive CVR. CVR is a physical effect which reduces the energy consumed by customers' devices. This lowers GHG emissions and reduces PG&E's energy procurement costs. <p><u>Benefit Category:</u> Smart Utility</p>	

Distribution Substation SCADA Program	Approximate Cost Over Reporting Period: \$23.1 Million
<p><u>Description:</u> The Distribution SCADA Program focuses on increasing SCADA penetration and improving reliability for PG&E customers. This program aided in the consolidation of PG&E's Distribution Control Centers, which was completed in 2016. PG&E's goal is to achieve close to 100 percent visibility and control of all critical distribution substation breakers over the next few years, adding or replacing SCADA for approximately 530 substations and approximately 3,400 breakers.</p> <p><u>Funding Source:</u> GRC</p> <p><u>Status:</u> This project is in progress. This project started in March 2011 and is expected to achieve 99 percent penetration by December 2022. The remaining 1% are projects that are being aligned with other planned major capital projects to take advantage of execution efficiencies. This project has upgraded or replaced SCADA in 517 substations and 2230 breakers between 2011 through June 2020.</p> <p><u>Upcoming Plans (Subject to Change):</u> SCADA Installation program is planned to achieve close to 100 percent visibility and control by 2022 and will transition to focus on proactively executing SCADA replacement program to proactively replace aging assets.</p> <p><u>Benefits Description:</u> Increasing SCADA penetration enables improvements in reliability, grid planning, and operations.</p> <p><u>Benefit Category:</u> Smart Utility – PG&E's goal of 100 percent visibility using SCADA is expected to reduce outage time, personnel travel, and operations time managing the system. Improved SCADA visibility also provides data to better operate, plan and design the distribution system.</p>	

Smart Grid FLISR	Approximate Cost Over Reporting Period: \$4.29 Million
<p>Description: This project continues the installation of FLISR systems work that was funded in the Cornerstone D.10-06-048. Smart Grid FLISR will expand the implementation of the FLISR system to approximately 30% of the distribution circuits in PG&E system to improve customer service reliability.</p> <p>Funding Source: This project is funded in PG&E's 2020 GRC.</p> <p>Status: This project has been approved. The Smart Grid FLISR project began in 2014 and is expected to continue through 2022.</p> <p>Upcoming Plans (Subject to Change): The Smart Grid FLISR project is expected to continue through 2022 with lower rate of expansion during the 2020 GRC (8 circuits per year).</p> <p>Benefit Description: When installed, FLISR can reduce the impact of outages by quickly opening and closing automated switches to reduce what may have been a one- to two-hour outage to less than five minutes.</p> <p>Benefit Category: Smart Utility – the Smart Grid FLISR project improves customer service reliability, installs SCADA devices that provide RT load and voltage data which supports distribution operations and DER/distribution resource integration.</p>	

4.4 Transmission Automation and Reliability Projects

Projects included in the Transmission Automation and Reliability category provide capabilities and associated technology enablement to monitor and control the ET system. Over the past year, PG&E has focused on technology capabilities to improve wide-area monitoring, protection, and control enabled by SCADA in the transmission system, equip operators with the tools necessary to enhance bulk system reliability in coordination with the CAISO and neighboring utilities, and pilot and deploy digital substation capabilities and other Smart Grid and technology.

The following sections provide an update on completed, in-progress or planned projects during the July 1, 2019 through June 30, 2020 time period, unless otherwise noted.

Transmission Substation SCADA Program	Approximate Cost Over Reporting Period: \$2.2 Million
<p>Description: Under the Transmission Substation SCADA Program, PG&E is in the process of installing new SCADA on the transmission system to provide PG&E's Electric Operations and the CAISO with full visibility into the transmission system,</p>	

significantly improving efficiency and operational flexibility. PG&E's current goal is to achieve close to 100 percent visibility and control of all transmission substations over the next few years, adding or replacing SCADA for approximately 460 substations and approximately 2,080 breakers.

Funding Source: This project is funded under PG&E's Transmission Owner (TO) cases.

Status: This project is currently in progress. The project started in July 2010 and is expected to achieve 98.2% penetration by December 2022. The remaining 1.8 % are projects that are being aligned with other planned major capital projects to take advantage of execution efficiencies. PG&E has added or replaced SCADA at 440 substations and 2,010 breakers from 2011 through June 2020.

Upcoming Plans (Subject to Change): SCADA Installation program is planned to achieve close to 100 percent visibility and control by 2022 and will transition to focus on proactively executing SCADA replacement program to proactively replace aging assets.

Benefit Description: Increasing SCADA penetration enables improvements in reliability, grid planning, and operations.

Benefit Category: Smart Utility – PG&E's goal of 100 percent visibility using SCADA is expected to reduce outage time, personnel travel and operations time managing the system and provide data to better operate and plan the transmission system.

Modular Protection Automation and Control (MPAC) Installation Program	Approximate Cost Over Reporting Period: \$34.0 Million
<p>Description: The multi-year MPAC Program aims to deploy pre-engineered, fabricated, and standardized control buildings in transmission substations. These activities are performed in an integrated manner with other PG&E projects such as capacity expansion projects, bus conversions, deficiency and aging asset replacement, control room condition improvements, reliability, and control center consolidation efforts.</p> <p>Funding Source: This project is funded under PG&E's TO cases.</p> <p>Status: This project is currently in progress. This is an ongoing program which doesn't have a defined end date. The project began in 2005. PG&E has installed and completed 124 MPAC buildings.</p> <p>Upcoming Plans (Subject to Change): The MPAC program will continue focusing on deploying pre-engineered, fabricated, and standardized control buildings in transmission substations to support other capital projects in an integrated manner, such as capacity expansion projects, bus conversions, deficiency and aging asset replacement, control room condition improvements, reliability, and control center consolidation efforts.</p> <p>Benefits Description: The program will help improve reliability of the transmission system by replacing aging infrastructure and modernizing facilities. Over the past year, the MPAC Installation Program has avoided \$ 2.6 million in capital costs over traditional upgrade methods and has avoided a cumulative total of \$ 72.4 million.³⁷</p>	

³⁷ MPAC benefit totals reflect updated calculations for 2019 Smart Grid Annual Report.

Benefit Category: The program is a Smart Utility project designed to improve reliability of the transmission system by replacing aging infrastructure and modernizing facilities.

EMS	Approximate Cost Over Reporting Period: \$4.5 Million
<p>Description: The EMS is utilized by Transmission System Operations (TSO) to monitor and control the transmission system. The system is comprised of several modules which provide different functionality to Operations personnel. PG&E has recently completed upgrades to their hardware and software platform for the existing EMS and is continuing development work on new modules to increase EMS capabilities for System Operator, Dispatchers and Engineering to better analyze, monitor and control the transmission system and meet NERC compliance requirements.</p> <p>Funding Source: This project is funded primarily under PG&E's TO cases.</p> <p>Status: Active. EMS went live with new system on 12/2018, however development work continues to further enhance the system's functionality. Development is currently underway. Implementation and Testing for the new software modules will occur by the end of 2019, with further enhancements getting implemented in 2020.</p> <p>Current Plans:</p> <ul style="list-style-type: none"> • Development of an integrated tool to manually or automatically generate System Restoration and Outage Plans based on RT or study conditions • Implement Outage scheduler modules to interface with external software for automatic import of scheduled outage information into EMS <p>Benefit Description: Benefits include:</p> <ul style="list-style-type: none"> • Improves the ability to perform timely Operational planning analysis to maintain system reliability prior to or during system events, including PSPS. • Better demonstrate NERC compliance. • Minimizes 3rd party applications and interfaces to streamline EMS environment architecture, therefore more reliable and easier to maintain. • Better integration of operational information for more efficient RT monitoring and analysis. <p>Benefit Category: System Reliability and Operational Efficiency</p>	
Synchrophasor Project Realization	Approximate Cost Over Reporting Period: \$0.7 Million
<p>Description: Synchrophasor Applications Upgrade project will build on the previous Synchrophasor infrastructure projects, to provide additional functionality to the EMS and integration into RT operations. Data flow into control centers has been enhanced and several use cases for TSO have been implemented. Examples include, post event analysis, phase angle delta</p>	

monitoring, oscillation detection and monitoring, and model validation. Upcoming enhancements include streaming the data to the Utility Data Network (UDN) (corporate network) and building an application environment on the UDN for enterprise-wide use. Applications on the UDN will include PI, GE PhasorPoint, GE PhasorAnalytics, and others.

Funding Source: This project is funded primarily under PG&E's TO cases.

Status: Active. Communication protocol and transport layer enhancements continuing to support data availability and data quality. Installed PMUs on several 500 kilovolt buses for enhanced state estimation. Established connections to the new CAISO RC West WISP Synchrophasor network. Working with CAISO, Bonneville Power Administration, SCE, and SDG&E to improve Synchrophasor data sharing capability.

Upcoming Plans:

- a) Establish data stream to the UDN corporate network to enable PI data archival and other enterprise applications
- b) Establish a PMU/PDC lifecycle program to replace aging PMUs and PDCs
- c) Install PMUs on all PG&E tie-lines at the request of the CAISO
- d) Continue to enhance the synchrophasor system architecture and archives to improve data reliability

Benefit Description: Synchrophasor technology provides high resolution grid measurement and more accurate and synchronized measurements in RT. Benefits include:

- 1. Improvements in PG&E's system models (the basis for the EMS used by Operators) – Accurate model allows identifying true system constraints (voltage, system instability, thermal), improving transmission system performance, and evaluating true limits due to better results for on-line EMS applications supporting state estimation
- 2. More accurate Control Center understanding of the state of the Grid (Situational Awareness)
- 3. Faster operator alerts and improved visibility of the fast, dynamic grid conditions
- 4. Prompt identification of un-damped grid oscillations to prevent outages
- 5. Quick identification of the location of a grid disturbance for faster response
- 6. Compliance with NERC PRC, MOD, and TOP standards.
- 7. Compliance with CPUC Rule 21 frequency reporting requirements for SI programs

Benefit Category: System Reliability and Operational Efficiency

4.5 AM and Operational Efficiency Projects

Projects included in the AM and Operational Efficiency category provide capabilities and associated technology enablement to track and manage asset information (e.g., location, maintenance history, specifications/characteristics), as well as assess and plan asset maintenance, replacement, and capacity enhancements. Over the past year, PG&E has focused on technology capabilities to leverage industry-standard technologies to capture and provide

access to accurate, traceable, and verifiable asset information for all stakeholders to support the Electric Operations business.

The following sections provide an update on completed, in-progress or planned projects during the July 1, 2019 through June 30, 2020 time period, unless otherwise noted.

Network SCADA Monitoring Project	Approximate Cost Over Reporting Period: 2019 \$7.7 Million 2020 \$8.5 Million
<p>Description: The project is installing new monitoring and control systems on the downtown San Francisco and Oakland secondary network systems including full remote control on network protectors (including remote setting of relays), and primary switches. The monitoring itself includes voltages, currents, temperature, oil level, and chamber pressures. For vaults, the monitoring system includes SCADA battery, water detection and may include others such as DG monitoring depending on future needs and feasibility. RT data collected from the equipment is used for triggering of alarms, and for equipment condition assessment as part of the Condition-Based Maintenance (CBM) system for O&M activities. The data is also used for AM decisions on maintenance and replacement of network equipment. The new SCADA system has remote operating capabilities that include network protector open/close and station transfer trip of the network protectors for feeder clearances.</p> <p>Funding Source: This project is funded by PG&E's 2014 and 2017 GRC filings and currently filed in the 2020 GRC.</p> <p>Status: This project is currently in progress. PG&E has a total of 12 network groups. Six network groups are complete (Z-34-1, Z-34-2, Z-1, Y-4, Y-3, Y-2) with two additional network groups (Y-1 and J-1) in progress. These completed network groups have been added to the PI Historian system which is the data accumulator for all the SCADA information. This data in turn is coupled with the CBM system described above which allows PG&E to transition from time based to condition-based replacement and maintenance. This results in a safer system while at the same time generating savings through deferring work until the condition of the equipment warrants.</p> <p>Upcoming Plans (Subject to Change): Continue with this project with installation of approximately one network group per year. Planned overall completion by 2024.</p> <p>Benefit Description: The new control features included as part of this project will improve personnel safety and overall system operability.</p> <p>Benefit Category: Smart Utility – This project provides information for PG&E to better manage its assets and make informed maintenance, repair and upgrade decisions.</p>	

Pole Loading Assessments (PLA)	Approximate Cost Over Reporting Period: \$12 Million
<p>Description: Develop a scalable program to evaluate structural integrity across all Distribution poles (approx. 2.3 Million) over a 5-year period. Geo-correct pole locations using available LiDAR from Vegetation Management efforts. Objectives of this project include a greater understanding of failure modes, common repository of data gathered, and effectively updating the workflow and asset systems (GIS, SAP) to align with new data strategies. Wind loading segmentation will be performed to identify the wind loading of each asset on a support structure and integrate findings into the appropriate systems.</p> <p>Funding Source: This is Electric Line of Business funded.</p> <p>Status: In 2019, the PLA program was initiated to increase the presence of pole loading calculations with “desktop verified” or better status in the Pole Loading Database (PLDB) by 10% annually, as desktop verifications are completed. T1 deployment is planned to follow T2/T3 areas. Desktop validation of 100% of poles in T2 / T3 HFTD Areas is scheduled by 2024. Baseline pole loading calculations, Models & Pole Characteristics, performed using EDGIS information (small class, multiple circuits, treatment) help identify the priority assets for desktop verifications. Estimating resources provide quality assurance check on desktop previews performed by contractors.</p> <p>Benefits Description:</p> <ol style="list-style-type: none"> 1. Meet 100% of compliance requirement; comply with CPUC GO 95 Rule 44.1, 44.2 2. Accurate and timely mapping of poles into Electric Distribution GIS 3. Improved business and compliance tracking, reporting and document retention due to data integration 4. Integration with enterprise systems, ensuring data synchronization 5. System model to indicate wood poles that need additional attention 6. Starting point automated individual pole modeling <p>Benefit Category: System Reliability and Operational Efficiency</p>	

STAR for Transmission Line	Approximate Cost Over Reporting Period: \$3.4 Million
<p>Description: The STAR platform, which was completed in 2020, enables risk scoring and asset health evaluations to be applied at an individual-asset basis for major Electric assets across the whole PG&E territory. It enables consistent and automatic compilation of this information so that AM can focus on improving asset replacement, maintenance and inspection strategies and asset health, failure, and risk model sophistication. STAR also enables the ability to analyze likelihood of asset failure, and in the event of an asset failure, what is the consequence from a public safety and reliability standpoint.</p> <p>During the current reporting period, STAR for T-line provided asset health intelligence and the foundational data model for the improved version of the OA model used for PSPS in 2020. Asset data from multiple systems of record were combined</p>	

into a single data product using production data pipelines. Use of production data pipelines ensured that asset intelligence derived from the data product was based on fresh data sourced from the appropriate system of record, and not from stale, one-time data extractions. This project provided immediate value in 2019 by delivering asset intelligence, as well as providing continued learnings on how to cost effectively scale the building and maintenance of the foundational data model needed for scalable, auditable, and repeatable value-add asset intelligence.

Funding Source: WSIP / IT Book of Work (mixed)

Status: Completed

Benefits Description: 05 - ETD Wildfire: The STAR platform will enable understanding of where asset failures may result in severe impacts due to wildfire ignition. The platform will enable risk-based management for vegetation and overhead conductors as done for poles previously. 03 - Records and Information Management: STAR will help Electric AM maintain consistent and accurate records of asset health and risk scoring for T&D assets.

Benefit Category: System Reliability and Operational Efficiency

4.6 Smart Grid Foundational and Cross-Cutting Technology Projects

Foundational and cross-cutting projects are necessary building blocks for the development of the Smart Grid, such as grid communications, control and monitoring systems, and data management and analytics. An integrated approach in the design and development of these grid technologies will help ensure that the Smart Grid will deliver the greatest possible benefits to all stakeholder, including customers, and help ensure that the electric distribution grid will be able to accommodate high penetrations of DERs while maintaining or enhancing grid stability, resilience, and efficiency. Two foundational technology areas we report progress on in this report are integrated telecommunication systems and DERMS.

PG&E's grid modernization vision, enabled by Smart Grid investments, are largely informed by the work done through the **EPIC**. Phase 3 of the PG&E's EPIC program (2018-2020) kicked off in February 2019.

Advanced technology testing and standards certification in a realistic demonstration environment are essential before a new manufacturer's technology or product can be deployed onto the electric grid. This enables the risks associated with new technologies to be mitigated and controlled, and helps the IOUs maximize technology performance and interoperability prior to deployment.

Smart Grid foundational and cross-cutting technology development are driven by several state and federal laws and regulatory orders including SB 17, Energy Independence and Security Act, CPUC D.10-06-047, AB 32 and Executive Order S-305, SB 078 and SB X1-2.

Workforce development and advanced technology training enables the successful deployment of new technologies, ensuring that the IOUs' workforces are prepared to make use of new technologies.

Integrated Grid Communications Systems

Integrated grid telecommunications systems are a key foundational technology to achieve the grid reliability, flexibility, resiliency and security required to realize the full potential of the Smart Grid. These systems enable sensors, metering, maintenance, and grid asset control networks to allow the exchange of information required to provide real or near-real time operational visibility across the grid. In the mid- to long-term, integrated and cross cutting systems would enable information exchange with the IOU, service partners and customers using secure networks, and to enable new markets for ancillary energy services. Data management and analytics projects will improve the IOU's ability to utilize vast new streams of data from T&D automation and SmartMeter devices for improved operations, planning, AM, and enhanced services for customers.

EPIC Projects

The EPIC projects undertaken by PG&E in the area of Technology Demonstration and Deployment produce electricity ratepayer benefits in the form of increased reliability, improved safety, and/or reduced electricity costs. Projects fall into one of the following four subject areas: (i) Renewables and DERs; (ii) Grid Modernization and Optimization; (iii) Customer Service and Enablement; and (iv) Cross-Cutting/Foundational.

Following Smart Grid related projects were underway in PG&E's EPIC Program during the report cycle:

- EPIC 2.34 - *Predictive Risk Identification with Radio Frequency (RF) Added to Line Sensors* is demonstrating the use of RF sensor technology that could allow PG&E to more effectively identify and locate degrading assets and risks of failure in the distribution system, to enable proactive maintenance and further safety and resiliency. Field demonstration of RF-based sensors is underway on live distribution circuits. The technology employs the use of pole-mounted RF-based sensors for incipient fault detection by monitoring partial discharge events, which may be caused by broken insulators, mechanical damage, or vegetation contact. In parallel, an alternative technology, which uses advanced algorithms to analyze voltage and current waveform data for proactive fault anticipation, is also being demonstrated to compare the performance and effectiveness of RF-based technologies. Project closeout is underway and is scheduled to be completed in Q3 2020.
- EPIC 3.03 – *ADERMS and Advanced Distribution Management System (ADMS)* is developing a DERMS head-end system and associated interfaces for DER telemetry & control and demonstrating this system on: (1) an operational remote grid and (2) non-grid DERs participating in a NWA project. If successful, this project could inform operating strategies and produce capabilities to significantly increase the flexibility of the grid and provide fundamental capabilities to reduce overall wildfire risk exposure and increase resilience for customers. The project could also reduce the cost of telemetry associated with large scale DERs interconnected to PG&E's grid.
- EPIC 3.11, *Location Targeted DERs* is configuring the Arcata-Eureka airport's local MG controller to integrate with PG&E's distribution network and enable Distribution Control Center visibility and control of the MG. The project is developing scalable and replicable approaches to planning, designing, deploying and operating multi-customer MGs. The results of this project could inform operating strategies and produce a foundational model to significantly increase the flexibility of the grid and provide fundamental capabilities to advance system resiliency.
- EPIC 3.15, *Proactive Wire Down Mitigation* is demonstrating the REFCL technology at a PG&E substation serving a high fire-risk area. The project will assess its effectiveness at

automatic current reduction in wires-down events, with the goal of drastically reducing the likelihood of possible ignitions which may cause wildfires. The REFCL technology is only feasible for three-wire uni-grounded circuits, which make up the majority of PG&E's distribution circuits within high fire threat areas.

- EPIC 3.20, *Data Analytics for Predictive Maintenance* is leveraging Geographic Information System (GIS), weather, SmartMeter™, SCADA and other data to develop and demonstrate analytical models that predict when maintenance will be needed for distribution assets. If successful, this project could significantly improve PG&E's ability to proactively predict imminent asset failure. This will result in reducing the number of asset failures, which will reduce public safety risk and the risk of wildfire ignition.
- EPIC 3.32, System Harmonics is installing and testing the feasibility of using next generation meters to collect harmonics data on the distribution system, develop an algorithm engine for analysis, and if successful, create a new operational process for PG&E utilizing the next generation metering technology to detect, investigate, and mitigate harmonic issues. Harmonics data from next generation metering technology can also enable power quality engineers to monitor harmonics levels on the circuits and proactively address harmonics issues before they create a negative impact on PG&E and customers' equipment.
- EPIC 3.43, Momentary Outage Analytics is developing analytical models that use AMI momentary events and trap alarms to identify issues with customer service drops, insulator failures, and intermittent vegetation contact. The data model developed through this project, which analyzes SmartMeter™ data with higher granularity, could proactively predict imminent distribution equipment failures before they occur. This capability may result in more immediate or tactical recommendations for actions to mitigate distribution system risks, thereby reducing public safety risk.

<p>EPIC Program</p>	<p>Approximate Cost Over Reporting Period related to projects mentioned:</p> <p>\$8.9 Million*</p>
<p><u>Description:</u> The EPIC program provides funding to cost-effectively develop and demonstrate promising new technologies which can advance the company's core values of Safety, Reliability, and Affordability and determine their applicability to address future challenges. Additionally, the main goals of EPIC align closely with PG&E's grid modernization vision, which drives the advancement of innovative technologies that support PG&E's core values and an evolving grid. This vision calls for a secure, reliable, and resilient platform that enables continued gains for clean-energy technology to increase customer choice, prepare for climate change impacts and meet state policy goals. EPIC funded projects that are executed by PG&E are focused on four key areas: Renewables and DER Integration; Grid Modernization and Optimization; Customer Service and Enablement; and Cross-Cutting and Foundational Strategy. The program is currently authorized at the state level for three cycles, each cycle is three years.</p> <p>For more information on the CPUC EPIC decisions please visit www.pge.com/epic.</p> <p><u>Project status:</u> Information about PG&E's EPIC projects can be found in PG&E's EPIC 2019 Annual Report, which was filed on February 28, 2020, and can be found on PG&E's website at www.pge.com/epic. All final reports for projects that are complete are publicly available at the same site.</p> <p><u>Funding Source:</u> The EPIC 1 Program is authorized via D.12-05-037, and the EPIC 2 Program via D.15-04-020. The Commission authorized the three IOUs to collect funding for the EPIC Program in the total amount of \$162 million annually beginning January 1, 2013 and continuing through December 31, 2020. The total collection amount was adjusted on January 1, 2015 to \$169.9 million annually, commensurate with the average change in the Consumer Price Index, and this adjustment will occur again. PG&E's share is 50.1 percent or approximately \$81 million dollars annually. PG&E sends 80 percent of these funds to the CEC, for their use in addressing EPIC goals. The remaining 20 percent is retained by PG&E to run technology demonstrations. Note: Costs reflected in this report reflect PG&E expended projects costs over the reporting period of July 2019 – June 30, 2020 for the projects related to Smart Grid. No CEC funds are included.</p> <p><u>Status:</u> Through the course of the reporting period, PG&E's EPIC Projects made significant progress. PG&E completed 34 EPIC projects to date. During the reporting period of this report there were six projects active, one project in closing stages and three projects about to launch right after the reporting period.</p> <p>Some of PG&E's achievements in EPIC projects have also enabled PG&E was granted two patents during the reporting period:</p> <ul style="list-style-type: none"> • <i>EPIC 1.21 – Pilot Methods for Automatic Identification of Distributed Energy Resources (Such as Solar PV) as They Interconnect to the Grid to Improve Safety & Reliability:</i> Patent for an algorithm which can detect unauthorized PV interconnections. • <i>EPIC 2.29 – Mobile Meter Applications (NextGen Meter – NGM):</i> Patent on mobile meter with modular housing/board assembly <p>There are additional five provisional and non-provisional filings for patent protection in prior terms. These patents may provide potential future revenue generating opportunities that would be shared with PG&E's customers and</p>	

EPIC Program	Approximate Cost Over Reporting Period related to projects mentioned: \$8.9 Million*
<p>shareholders,³⁸ and ultimately support improved affordability if the patents lead to increased revenue. PG&E continues to consider opportunities to license patents, as well as opportunities to identify additional IP in these and other projects.</p> <p>Next Steps for EPIC Investment Plan</p> <p>Original EPIC 3 projects were filed with the commission three years ago. In order to keep the project portfolio up to date with California's evolving energy, safety and reliability needs, on June 19th, PG&E hosted a public webinar and introduced proposed projects for its wave two of EPIC 3 projects. PG&E will submit these projects in an advice letter to CPUC for approval.</p> <p>Technology innovation programs like EPIC are critical to continued advancement of the grid, both to enable increased customer choice and further California's clean energy objectives as well as to increase safety and resiliency. PG&E is excited to embark on new technology demonstrations which can help keep continuity on past projects, meet emerging grid needs and California policy objectives, and ensure that the customers and the state can leverage the maximum benefit of this program.</p> <p>*Approximate cost over reporting period only includes direct costs included of EPIC projects included in the 2020 SGAR.</p>	

Telecommunications Architecture	Approximate Cost Over Reporting Period: \$0.3 Million
<p><u>Description:</u> Telecommunications Architecture allows PG&E to meet near-term and long-term telecommunications needs by developing and implementing a multi-tier, multi-service telecommunications infrastructure architecture, consisting of a core and an edge network. Smart Grid projects require an exponential increase in the ability for customers, markets and utilities to securely and reliably communicate on a near RT basis. New communication models include customer to utility, customer to market, and smart "equipment to equipment." PG&E's telecommunication infrastructure continues to be enhanced to facilitate increased communications and be developed in a systematic, economic manner that allows for re-use of communications infrastructure.</p> <p>A blend of technologies will be needed to address the diverse performance needs and geography of the PG&E service territory. Increased SCADA density, PMUs, cyber security, and network management requirements will drive capacity, latency, and quality of service requirements that must be built into future networks.</p>	

³⁸ The revenue sharing mechanism is based on the guidance provided in CPUC D.13-110-25 OP 34, which states "(IOUs) must apply a 75 percent/25 percent (ratepayer/shareholder) revenue sharing mechanism for net revenues (from future or ongoing royalties, license fees, and other "financial benefits of Intellectual Property (IP)") related to financial benefits of IP that was developed under IOU contracts with EPIC funds."

Funding Source: This project is being funded in PG&E's 2011, 2014, 2017 and 2020 GRCs.

Status: We are continuing to consolidate the IP network edge, leveraging the completed MPLS core, to further reduce the devices in the IP network and bring the multi-service, multi-platform capability to the edge of the network. Testing of protection relay functions over carrier provided Ethernet services has been completed successfully. With the completion of this testing the migration off of legacy TDM circuits is resuming. Wireless edge technologies (Field Area Network (FAN)) deployments are continuing.

Upcoming Plans (Subject to Change): PG&E continues to consolidate remaining core and edge network technologies onto the MPLS and FAN to further reduce the device count in our networks which enhances functionality, manageability as well as security. This action is foundational in nature and targeted to meet the anticipated growth in grid devices (PG&E and DERs) which are on the rise in an accelerated fashion. These grid devices will be enabling higher resolution of grid performance and enhanced application to manage DERs, automation programs and support the CWSP.

Benefits Description: No hard benefits have been estimated for this project. As a result of successfully completing the MPLS project, PG&E has forecast soft benefits (or avoided costs) by reducing the number of routers required for asset lifecycle/replacement and their corresponding SmartNet licenses.

Benefit Category: Engaged Consumer, Smart Markets and Smart Utility – Cross-cutting initiatives apply across all three segments.

Workforce Development and Technology Training	Approximate Cost Over Reporting Period: N/A
<p>Description: The evolution of the electric grid includes much more distributed intelligence, i.e., Smart Grid. PG&E supports this evolution by developing training in a wide variety of grid-related topics, all of which include elements of distributed intelligence, and offering them to the general workforce, targeting those who can use the information most effectively.</p> <p>Funding Source: This work is funded through PG&E's EE program.</p> <p>Status: PG&E is continuing to enhance workforce skills to support a smarter, more integrated grid. <u>Between 7/1/2019 and 6/30/2020 PG&E offered 9 separate workforce education classes covering grid-related subjects through our Pacific Energy Center (PEC). A total of 1,402 attendees participated in these classes. Examples of class topics included:</u></p> <p>Demand Response: Basic Concepts, Programs, and Site Assessment</p> <p>DR can be a significant part of the energy picture for many commercial and industrial facilities, and an important way to lower energy costs. This class covers the basic concepts that building owners and facilities managers need to know to determine if and how DR might be applied to their building(s).</p> <p>PV + Batteries: Integrating Storage with Grid-Tied PV Systems</p> <p>As batteries become better and cheaper, they are increasingly being used in grid-tied solar electric systems. This course covers the latest in battery technology and how batteries of various sizes are integrated into PV systems, covering basic concepts, design criteria, and financials.</p>	

Benefit Description: PG&E's training helps develop the skilled workforce necessary to evolve the electrical grid and meet the energy goals of the state of California.

Benefit Category: Engaged Consumer, Smart Markets and Smart Utility – Cross-cutting initiatives apply across all three segments.

Supplier Diversity	Approximate Cost Over Reporting Period: N/A
<p>Description: PG&E's EPIC projects follow established program governance procedures and supplier contracting processes for externally sourced technology demonstrations. PG&E evaluates qualified suppliers on multiple factors, including but not limited to: quality, safety, value and supply chain responsibility. Through that process, PG&E continues to competitively award EPIC program work to WMDVLGBTBEs in technical assistance and other consulting services.</p> <p>PG&E engages with industry stakeholders, including WMDVLGBTBEs, by participating in and presenting at conferences, as well as, hosting workshops/symposiums. EPIC administrators (CEC, PG&E, SDG&E, SCE) jointly organized educational events in 2019 and 2020, including:</p> <ul style="list-style-type: none"> • EPIC 2019 Annual Symposium in Sacramento, that focused on project presentations and preliminary Research Administration Plan (RAP) workshop with EPIC stakeholders. • EPIC 2019 Fall Workshop in San Diego that focused on changes to the EPIC program such as the new Policy + Innovation Coordination Group, status overview of launched and upcoming EPIC 3 projects, and facilitated discussion on RAP and future stakeholder engagement plans. Public notice for these events is provided to a broad range of stakeholders including technology vendors, disadvantaged community groups, WMDVLGBTBEs, researchers, academics and energy consultants. EPIC administrators will continue to maintain transparency in the process via webinars and workshops. • EPIC Spring 2020 Public Virtual Workshop, that focused on wave two of EPIC 3 projects that PG&E is considering, so that the attendees, including WMDVLGBTBEs, understand the next steps for the projects and have the opportunity to provide feedback to the proposed projects before more detailed project execution plans are developed and launched. <p>PG&E's EPIC portfolio of active projects continues to address challenges of the changing grid landscape and the threat of climate change, including enabling an increase in DERs adoption by customers, the need to modernize the grid to ensure continued safe, reliable, and resilient operation, and the need to continue improving affordability such as through advancing how to leverage data. These achievements from the EPIC projects, and their future path forward for those technologies that are proven ready to scale, help pave the way for the grid of the future, advancing California policy objectives, and ultimately, improving the safety, reliability, resiliency, and affordability of the electric grid.</p>	

4.7 Customer Outreach & Engagement

In its March 2012 Smart Grid Workshop Report, CPUC Staff requested the following information to be included in the IOUs' SGARs:

1. Timeline that connects specific projects with specific marketing and outreach efforts, and
2. Specific steps to overcome roadblocks, as identified in the workshops and included in this report.³⁹

As requested by CPUC Staff, PG&E is providing marketing and outreach information using the sample template in Appendix 1 to the Smart Grid Workshop Report as follows:

Timeline: PG&E has adapted the CPUC Staff's template to reflect the existing and planned work that is related to the Smart Grid, including approved initiatives in place that meet the customer objectives outlined in SB 17 and D.10-06-047. Since the Marketing, Education, and Outreach proposal in the Smart Grid pilot deployment Application (A.) 11-11-017 was denied, the only outreach that provides support to the Smart Grid initiative is conducted through funding approvals of individual program and their initiatives as listed in Table 4-2.

Initiative Detail: For each of the project areas identified in the Customer Engagement timeline, PG&E has provided detail on existing or proposed outreach and resources, tools, and rates available to customers in accordance with the proposed template from the Commission's Smart Grid Workshop Report.

Table 4-2 below provides an annual illustration of PG&E's customer engagement timeline.

Customer Engagement Timeline - Table 4-2	2014	2015	2016	2017	2018	2019	2020
<u>Energy Management Enablement Tools:</u>							
PG&E Online Account Web Tools	X	X	X	X	X	X	X
Universal Audit Tools (UAT)	X	X	X	X	X	X	X
Energy Usage Alerts	X	X	X	X	X	X	X
HERs	X	X	X	X	X	X	X
Third-Party CDA Tools (e.g., Share My Data, CDA)*	X	X	X	X	X	X	X

³⁹ See Smart Grid Workshop Report: Staff Comments and Recommendations, March 1, 2012, p. 10.

EPIC**				X	X	X	X
<u>Behind-the-Meter (Customer Premise) Devices:</u>							
SmartAC	X	X	X	X	X	X	
DG (Solar Water Heating, Solar PV, etc.)	X	X	X	X	X	X	X
HAN; Local Area Network; Smart Thermostat, etc.	X	X	X	X		X	X
EV Supply Equipment	X	X	X	X	X	X	X
<u>Rates Options:</u>							
SmartRate and Related Residential Time Varying Rates	X	X	X	X	X	X	X
TOU	X	X	X	X	X	X	X
PDP	X	X	X	X	X	X	X
EV Rates	X	X	X	X	X	X	X
* These programs are available but are not being actively promoted.							
** Various EPIC demonstration projects have some component of customer outreach/marketing.							

EPIC Investment Planning Phase

During the up-front investment planning phase of each EPIC cycle, PG&E collaborates with the other IOUs to share with stakeholders sources and databases on R&D projects being undertaken by other entities⁴⁰. The goal is to help identify EPIC project needs, coordinate investment plans and ensure avoidance of redundancy in the project selection process. These activities include internal brainstorming with subject matter experts and other stakeholders to determine the status of existing technology implementation activities and identify what major voids in capabilities exist that might be filled by pre-commercial demonstration of emerging technology solutions. PG&E's internal experts also participate in the workshops and peer reviews for other major R&D program sponsors, such as DOE, EPRI, and the National Laboratories.

The routine sharing among the EPIC Administrators of results and lessons learned from projects executed in preceding investment cycles contributes to the development of EPIC applications. EPIC Administrators also hold a number of in-person and phone-based joint portfolio review meetings to coordinate investment plans and ensure funding initiatives are complementary and

⁴⁰ Joint Response of SCE (U 338-E), PG&E (U 39-E), and SDG&E (U 902-E) to Administrative Law Judge's Ruling Requiring Joint Applicant Responses to Questions, A.19-04-026

not unnecessarily duplicative. These information sharing mechanisms cast the net more widely on RD&D information sources and databases than any one EPIC Administrator could do alone. PG&E goes one step further by contributing its expertise and experience to CEC workshops that help shape the CEC EPIC program content.

The project ideas that evolve from the coordinated processes of the EPIC Administrators are vetted in public stakeholder workshops. There are at least two workshops held during the writing process for an EPIC application cycle. The first workshop screens the candidate project ideas and seeks additional ideas from public stakeholders. The second workshop reviews the Research Administration Plan (RAP) for the EPIC prospective content of the application. The participants in these workshops include stakeholders in the project results as well as entities that may bid on project contractor opportunities. Participants often provide information on external activities with which the EPIC work should be coordinated. Additionally, there are often follow-up inquiries after the workshops from prospective bidders on project opportunities.

Educating Customers on Benefits of Smart Grid and Technology

PG&E sought approval for a plan to more broadly educate customers on longer-term benefits of Smart Grid technology beyond these immediate offerings, to provide context for future technologies and customer-facing benefits that will be available in the coming years. However, since the Outreach proposal in A.11-11-017 was denied, the outreach that supports the Smart Grid initiative can only be conducted through marketing of individual programs if they are approved in new cycles with outreach funds allocated. PG&E's outreach efforts over the reporting period have been focused on meeting the goals of each program.

PG&E's efforts to ensure that customers have the tools and knowledge to benefit from the Smart Grid include:

- Customer education on available tools designed to help customers understand their energy use;
- Customer education on choices for rate options and new technology that will help customers manage their energy bills; and

- Communicating with customers through communication methods they prefer, including digital self-service, email, SMS and by mail.

4.8 Smart Grid and Technology Customer Engagement by Initiative Area

In this section PG&E describes the customer engagement elements that are promoted or are available to customers for each initiative area identified in Table 4-2 above, as requested by CPUC Staff in its March 1, 2012 Smart Grid Workshop Report.

Enablement Tool: Energy Management*	
Project Description	Marketing, Education and Outreach (ME&O) to customers about interactive tools to evaluate and manage their energy use and meet their costs saving, sustainability or energy management goals.
Target Audience	Focused on Residential and SMB Customers.
Sample Message	"PG&E offers a number of ways to help you evaluate your energy use and learn how to save time, energy and money."
Source of Message	Energy Company.
Current Customer Engagement Road Block(s)	<ul style="list-style-type: none"> • Low engagement category. • There is a low baseline incentive for customers to be interested in incremental savings on their energy statement given the low engagement level of the utility category. • While customers are increasingly interested in digital communications, not all customers prefer communications through online channels. • The COVID-19 pandemic both helps overcome and increase the barriers to customer engagement. More customers are seeking ways to manage their energy use and save money as they are sheltering at home or out of work. At the same time, the increased usage and energy costs make incremental behavior changes less effective.
Strategy to Overcome Roadblocks	<ul style="list-style-type: none"> • Continue to use a variety of outreach methods to ensure highest penetration possible of relevant and targeted information with residential customers. • Leverage new automation capabilities and retargeting with customers who show interest in tools or abandon during the engagement process. • Demonstrate available energy savings by highlighting customer case studies and relevant syndicated or internally developed content. • Ongoing, frequent customer communication through the Small Business and residential digital newsletters. • Increased personalization of messaging to generate relevance.

Enablement Tool: Behind the Meter (Customer Premises) Devices*	
Project Description	<p>ME&O to educate customers about available home or businesses devices that:</p> <ol style="list-style-type: none"> 1) Facilitate market adoption of EVs through increased access and availability of EV infrastructure. 2) Support transportation electrification through programs such as EV Fleet and EV FastCharge.
Target Audience	Residential, Large and SMB customers.
Sample Message	<p>“Save energy and money by providing RT electricity data through an energy-monitoring device.”</p> <p>“EV Fleet is a comprehensive program that encompasses incentives and rebates, site design and permitting, construction and activation, maintenance and upgrades.”</p>
Source of Message	Energy Company.
Current Customer Engagement Road Block(s)	<ul style="list-style-type: none"> • Concerns about ceding control of customer premises to utility through installed devices. • Immediate economic impact (i.e., cost savings) is not always easily seen. • Long payback periods on technology investments can make the Investment infeasible.
Strategy to Overcome Roadblocks	<ul style="list-style-type: none"> • Provide customers with information about devices, focusing on: <ul style="list-style-type: none"> ○ The benefits and energy management. ○ The potential to positively impact the customer’s economic bottom line with cost savings. ○ Positive impact on grid stability and reliability. • Provide tools and calculators where applicable to help customers understand the choices they have. Examples include: <ul style="list-style-type: none"> ○ Solar Calculator (https://pge.wattplan.com/pv/) to review a personal estimate to understand customer specific solar savings potential ○ EV Calculator (https://ev.pge.com), to estimate and compare costs including savings, incentives and charger locations
Rate Options*	
Project Description	ME&O to educate customers about rate options. Includes both opt-in and default TOU rate plans for residential customers and default rates for SMB customers.
Target Audience	Residential, Large and SMB customers.
Sample Message	“PG&E has rate options and encourages customers to choose the one that is best for their business and home.”
Source of Message	Energy Company.

Current Customer Engagement Road Block(s)	<ul style="list-style-type: none"> • Lack of customer awareness that they have rate plan options and customer understanding about how they can benefit from various rate options, rates lack differentiation from a customer's perspective. <ul style="list-style-type: none"> ○ Lack of customer understanding about why TOU rates are important for the environment in a default scenario, leads to anxiety and dissatisfaction from some customers; emphasis on customer choice, when available, helps alleviate this. • TOU and critical peak pricing requires action from the customer during peak hours or on event days; the utility perspective of peak hours may not align with all customer segments. • Late afternoon and evening hours of TOU rate plans are significant barrier for many residential customers.
Strategy to Overcome Roadblocks	<ul style="list-style-type: none"> • Sustained, ongoing outreach about default rates for both Residential and SMB (prior to and after default), including context for why rates are important to the utility and environment, as well as providing information on bill protection are critical to success of default TOU. • Encourage participation in opt-in residential rates. • Provide customers examples of how to benefit from rate options on peak event days and how to prepare for an event day, including developing an action plan. • Provide education to encourage customers to shift some of their energy usage to off-peak hours. <ul style="list-style-type: none"> ○ For residential customers, a focus on educating customers on the choices and control they have over their bill by familiarizing customers with different rate options, tools, programs and tips that can help them better manage their energy use. Emphasize that small shifts in energy can make a difference on TOU rate plans. ○ For SMB customers, the focus will be on the changing hours of TOU. Most customers will benefit from this change, but customer have several rate options to choose from depending on their energy needs and tools to help them save.

* Not all current engagement roadblocks and strategies to overcome those roadblocks may apply to every program, tool, or service listed in the charts in 2.9

4.9 Security (Physical- and Cyber-)

PG&E initially laid out its strategy for measuring, managing and mitigating both cybersecurity technology risks and physical security risks in its June 2011 Smart Grid Deployment Plan filing. The strategy described in June 2011 highlighted PG&E's fundamental cybersecurity approach at that time. The Utility business continues to evolve. New operational models depend more and more on converged Information and Operations Technologies to perform advanced business functions such as those proposed for the Smart Grid. Many of these functions are automated and will be implemented through information-rich applications or grid automation with "smart"

devices. New technologies change the risk and threat landscape. New threats continue to put pressure on and change the risk posture of the Utility requiring more protective measures and safeguards to prevent, detect, respond, and recover in a resilient manner that does not jeopardize the safe, reliable, and cost-effective delivery of energy to customers.

In December of 2019, PG&E closed out the five-year CES-21 Program in partnership with SCE, SDG&E and Lawrence Livermore National Laboratory (LLNL). CES-21 was a research effort with the primary objective of exploring the next generation of Industrial Control Systems cybersecurity and developing the foundation for Machine-to-Machine Automated Threat Response. Research programs such as CES-21 leverage IOU, academic, and/or private sector expertise and further strengthen PG&E's grid security in the presence of increased threats.

PG&E is positioned to address the risks presented by the evolving Utility business, including Smart Grid and technology integration.

Since the publication of the Smart Grid Deployment Plan, PG&E completed the Advanced Detection and Analysis of Persistent Threats (ADAPT) cybersecurity project that was primarily focused on increasing the Utility's capability to effectively anticipate, prevent, and respond to a new and emerging class of cyber and physical threats. Following the conclusion of the ADAPT project, PG&E has undertaken the implementation of a second program, the Identity and Access Management (IAM) program. This is a multi-year investment focused on improving PG&E's core access control capabilities. Discussion of PG&E's overall Cybersecurity Risk Management Program is provided in sections 4.10.1 and 4.10.2 .

The cybersecurity projects have multiple goals and provide regulatory compliance benefits (Sarbanes-Oxley (SOX), NERC Critical Infrastructure Protection (CIP), and other standards and regulations), significant risk reduction benefits, and alignment to PG&E's Risk Management Framework (RMF) as described later in this document.

Identity and Access Management Program	Approximate Cost Over Reporting Period: \$ 13.3 Million
<p>Description: The IAM Program is a multi-year, multi-project enterprise level investment that strengthens PG&E system access controls and reduces the risk of unauthorized access. The program improves centralized access controls to key PG&E systems, provides role-based access control to those systems, centralizes the authoritative source for identity attributes of authorized individuals, and provides enhanced auditing capabilities to achieve enterprise wide visibility and control of employee access to systems. Through the IAM Program, PG&E continues to implement key technologies and services in the areas of identity management, credential administration, provisioning, entitlement management, access management, and audit and compliance.</p> <p>Funding Source: This program is funded in PG&E's 2011, 2014, 2017, and 2020 GRCs, and through TO funds for the NERC CIP Program.</p> <p>Status: The program started in March 2012, is ongoing, and remains in progress.</p> <p>Upcoming Plans (Subject to Change): The program is continuing to deploy several enterprise enhancements and expansions to extend and augment existing technologies for access management. One current focus is on migrating the MyElectronicAccess (MEA) enterprise identity governance system to a new intuitive, industry leading platform. This migration reduces the cost and complexity associated with maintaining the MEA identity governance system. An additional focus is on NERC CIP regulated logical access control enhancements to improve regulatory compliance. Future work will focus on further automation and control enhancements to continue reducing the cost of ownership.</p> <p>Benefit Description: As of July 2020, PG&E has decreased the risk of unauthorized physical and logical access through: automated creation of network login credentials for approved and authorized users; automated removal of access from up to hundreds of separate facility access control systems for decommissioned users; centralized server access provisioning/de-provisioning, monitoring and reporting; improved governance processes for enterprise user access functions contributing to a reduction in Segregation of Duties violations by 91 percent; deployed controls to restrict and better monitor privileged accounts; deployed a centralized logical and physical access management portal called MyAccess for both physical and logical access; and retired the legacy provisioning system for SOX applications. The program also created controls for cross-layer segregations of duties, instituted role-based access controls for critical functions, integrated additional applications with the MEA platform including key regulatory systems (e.g., SOX, NERC CIP, and Customer Energy Usage Data systems), updated legacy technology to support customer authentication to externally facing PG&E applications, strengthened controls for shared administrative and service accounts, and increased efficiency and effectiveness of re-certification tasks. The program continues to provide benefits including improved technology and processes associated with NERC CIP logical access management, migrating to a modernized web authentication and federation platform, and improving the user experience of managing access while reducing costs and the associated architectural footprint of PG&E's identity governance system.</p> <p>Benefit Category: Engaged Consumer, Smart Market, and Smart Utility – The IAM Program enhances controls across PG&E's infrastructure and is not limited to the Smart Grid. Each of the Engaged Consumer, Smart Market, and Smart Utility areas benefit from these improved controls that protect key processes and systems across the enterprise. For example, the infrastructure that allows customers to log in to PG&E applications will be enhanced with increased security and control</p>	

mechanisms to validate that only authorized customers and their approved designees can access their customer information online.

CES-21 Program	Approximate Cost Over Reporting Period: \$0.56 Million
<p><u>Description:</u> The CES-21 Program was a public-private collaborative research and development program between PG&E, SCE, SDG&E, and LLNL. The CES-21 Program was divided into two projects which research challenges of cybersecurity and the applicability of grid flexibility metrics as the grid becomes more dynamic and complex.</p> <p>The CES-21 Program utilized a team of technical experts from the Joint Utilities and LLNL, who leveraged and extended ongoing research in grid modelling and cybersecurity. LLNL combined data integration with advanced modeling, simulation, and analytical tools to provide problem solving and planning necessary for the challenges of grid integration. On April 25, 2014, the three utilities filed a joint Advice Letter (PG&E AL 4402-E) requesting approval for two research projects and the Cooperative Research and Development Agreement (CRADA), which was approved in October 2014.</p> <p><u>Funding Source:</u> In D.14-03-029, which modified D.12-12-031 to comply with SB 96, the Commission authorized the three utilities to recover up to \$35 million over five years for the CES-21 Program.</p> <p><u>Status:</u> The CPUC approved the Advice Letter (PG&E AL 4402-E) and CRADA in October 2014, allowing the IOUs and LLNL to initiate the cybersecurity and grid integration projects at the beginning of 2015. Please note that the CES-21 initiative filed comprehensive annual reports as well as a final program report in December 2019.</p> <p>The Grid Integration Flexibility Metrics project was completed in September 2017. The results of its modeling have been socialized through the stakeholders of the Commission's Integrated Resource Planning proceeding.</p> <p>For the Cybersecurity R&D project, from July until project closeout in December of 2019, the program team focused on concluding all remaining technical workstreams, documenting results, identifying candidate topics for future work, open sourcing additional tools, and releasing a comprehensive final report to the Commission. The project was broken into three major workstreams:</p> <ol style="list-style-type: none"> 1. The development of a modeling & simulation platform, to explore the potential effects of various threat and response scenarios at grid scale 2. The establishment of a physical testbed with separate substation instances from each of the IOUs, to evaluate threats and responses on actual substation equipment 3. The development of a research package consisting of several capabilities to support the industry's evolution towards automated threat response and other next-generation cybersecurity techniques <p>Throughout the program, there was extensive collaboration between the program team and national laboratories, federal departments, academic institutions and industry organizations. Several of the tools developed through the program were made available to the open source community, to enable faster adoption and continued development of important cybersecurity capabilities. While this program began to develop much of the foundation for automated threat response, much work remains to be done, and the final program report provided a series of recommendations on next steps.</p>	

Benefit Description: Cyberattacks pose an existential threat to delivering reliable electric service to California customers. Automated response capabilities may reduce the number of outages, minimize their impact, and improve response and recovery times. The Grid Integration Flexibility Metrics project may reduce operating and capital costs and improve reliability by reducing uncertainty around appropriate metrics to gauge reliability, operating flexibility, and the adequacy of planned resources as adoption of intermittent renewables increases.

Benefit Category: Smart Markets and Smart Utility – Cross-cutting initiatives apply across all various segments.

Operational Data Network (ODN) Security Program	Approximate Cost Over Reporting Period: \$6.0 Million
<p>Description: The landscape of threats is increasing and evolving. Attack “playbooks”, attack tools, and basic computing technologies are becoming more commonly available and more powerful. The defenses crafted in past years are no longer a viable means to protect against advanced attacks. Sophisticated attackers understand not only the tools and processes to breach defenses but to do so in a way that does not attract attention.</p> <p>Threats to the Operational Technology environment is evolving with legacy and new assets. Our vendors are not complying with the latest security and regulatory compliance requirements. We have legacy assets that no longer are supported and open us to unnecessary risk to our critical assets.</p> <p>The current protections and security controls for the components of this network vary, as does the ability to detect anomalous activity. Compromise of the ODN in a small unmonitored substation can result the same level of disruption as compromise in a large capacity substation.</p> <p>Funding Source: This program is funded in PG&E’s 2017 and 2020 GRCs, and through TO funds.</p> <p>Status: The program started in 2017, is ongoing, and remains in progress.</p> <p>Upcoming Plans (Subject to Change): ODN security shall introduce cybersecurity industry best practices as part of the design, build, and implementation of the new/enhance security capabilities. To enable these best practices, certain technological investments must be made, including:</p> <ul style="list-style-type: none"> • High-availability next-generation firewall technology at each Electric Transmission Control Centers; • Next-generation firewall technology for critical transmission substations; • Identity and privilege access management infrastructure; • Security monitoring tools specific to operational technology environments and systems; • Vulnerability management systems and endpoint protection; • Incident response and forensic tooling; • New threat monitoring use cases and event collection infrastructure; and • Enhanced and secured remote engineering access control systems. <p>Benefit Description:</p> <p>Cyber-attack: ODN security reduces the probability and effects of cyber-attacks against distribution infrastructure by enabling a flexible and proactive response to emerging cybersecurity threats through cybersecurity solutions: Enhanced firewall technology to significantly reduce attack surfaces on critical systems. Vulnerability management systems to expedite the</p>	

discovery and closure of cybersecurity gaps present in critical systems. Security intrusion detection and prevention capabilities to enable response to threats and to restrict their propagation from higher risk environments to critical transmission systems and applications. Implement cybersecurity solutions that reduces the possibility of cyber-attacks by increasing monitoring and automated response of control center systems. The investments will address Cyber Security Session D items, including ODN compromise (P95) and Real-Time Supervisory Control and Data Acquisition (RTSCADA) compromise.

Physical Attack: ODN Security limits exposure to a physical attack by building to NERC Critical Infrastructure Protection (CIP) design standards and creating a single redundant platform backed up at multiple control centers and data centers that can be run from any connected facility. Physical attacks are further mitigated through the upgrade to an IP-based network that is more resilient to physical and cyber-attacks. We will implement solutions that allow user access to be controlled and monitored for malicious behaviors to a far greater degree than is possible today.

Benefit Category: Smart Markets and Smart Utility – Cross-cutting initiatives apply across

Integrated Grid Platform (IGP) Security Program	Approximate Cost Over Reporting Period: \$2.0 Million
<p><u>Description</u>: IGP will modernize PG&E's distribution control systems to improve cybersecurity, situational awareness, operational efficiency, and DER integration capabilities through a coordinated portfolio of software and infrastructure investments starting in July 2018 and completing overall project closure by December 2024. The expected future distribution network presents exciting opportunities together with complex problems. The scale of change requires us to act now by investing in fundamental capabilities to communicate, manage data and control a more complex two-way grid, with multiple owners, new DERs, new markets and new cyber security threats.</p> <p>The electric grid is facing an increasing number of cybersecurity threats, which have advanced in capability over the last few years. In January 2019, Daniel R. Coats, Director of National Intelligence, provided testimony to the Senate Committee on Intelligence that certain nation-states, including China and Russia, have capabilities to launch attacks against critical infrastructure. In this same testimony, United States (U.S.) Intelligence also indicated that Russia is "actively mapping our critical infrastructure, with the long-term goal of being able to cause substantial damage." Furthermore, new malware frameworks specifically targeting industrial controls systems and applications, such as Crash override and Triton, have emerged over the last 5 years. This new family of malware pose threats to distribution management systems and SCADA. Current cyber tools and processes applied to DMS and SCADA systems are limited in their effectiveness and have not evolved to these new threat capabilities. Cyber technology and tools, along with ADMS itself, will need to be upgraded to ensure the new ADMS platform is positioned for resiliency against both current and future states of the threat landscape.</p> <p><u>Funding Source</u>: This program is funded in PG&E's 2020 GRCs.</p> <p><u>Status</u>: The program started in 2018, is ongoing, and remains in progress.</p> <p><u>Upcoming Plans (Subject to Change)</u>: IGP security shall introduce cybersecurity industry best practices as part of the design, build, and implementation of the new ADMS platform. To enable these best practices, certain technological investments must be made, including:</p> <ul style="list-style-type: none"> • High-availability next-generation firewall technology at each Electric Distribution Control Centers; • Next-generation firewall technology for critical distribution substations; 	

- Identity and privilege access management infrastructure;
- Security monitoring tools specific to operational technology environments and systems;
- Vulnerability management systems and endpoint protection;
- Incident response and forensic tooling;
- New threat monitoring use cases and event collection infrastructure; and
- Enhanced and secured remote engineering access control systems.

Benefit Description:

Cyber-attack: IGP security reduces the probability and effects of cyber-attacks against distribution infrastructure by enabling a flexible and proactive response to emerging cybersecurity threats through cybersecurity solutions: Enhanced firewall technology to significantly reduce attack surfaces on critical systems. Vulnerability management systems to expedite the discovery and closure of cyber security gaps present in critical systems. Security intrusion detection and prevention capabilities to enable response to threats and to restrict their propagation from higher risk environments to critical distribution systems and applications. Implement cybersecurity solutions that reduces the possibility of cyber-attacks by increasing monitoring and automated response of control center systems. The investments will address Cyber Security Session D items, including ODN compromise (P95), RTSCADA compromise, and DMS workstation compromise scenarios.

Physical Attack: IGP limits exposure to a physical attack by building to NERC Critical Infrastructure Protection (CIP) design standards and creating a single redundant platform backed up at multiple control centers and data centers that can be run from any connected facility. Physical attacks are further mitigated through the upgrade to an IP-based network that is more resilient to physical and cyber-attacks. We will implement solutions that allow user access to be controlled and monitored for malicious behaviors to a far greater degree than is possible today.

Benefit Category: Smart Markets and Smart Utility – Cross-cutting initiatives apply across

4.10 Key Risks Overview

The electric grid is facing an increasing number of cybersecurity threats, which have advanced in capability over the last few years. In January 2019, Daniel R. Coats, Director of National Intelligence, provided testimony to the Senate Committee on Intelligence that certain nation-states, including China and Russia, have capabilities to launch attacks against critical infrastructure. In this same testimony, U.S. Intelligence also indicated that Russia is “actively mapping our critical infrastructure, with the long-term goal of being able to cause substantial damage.” Furthermore, new malware frameworks specifically targeting industrial controls systems and applications, such as Crash override and Triton, have emerged over the last 5 years. This new family of malware pose threats to distribution management systems, SCADA, and the grid.

4.10.1 Key Risks and Actions Taken to Address Them

PG&E takes a risk-based, all-hazards approach to protecting the resilience, reliability, and recovery of the computers, control systems, and other digital infrastructure that operates the electric grid. PG&E ensures executive support for cyber and physical risk management activities, and that risks are understood and managed throughout the enterprise. PG&E also maintains collaborative relationships with government, regulatory, and industry bodies to collectively protect the cybersecurity of the bulk electric power system, prioritize assets, address vulnerabilities, manage emerging risks, and maintain open lines of communication.

Since June 2011, PG&E's cybersecurity strategy has matured in numerous ways, one of which is the implementation of a new method for proactively identifying cybersecurity risk through the Risk Assessment Methodology (RAM), which complements existing efforts across the enterprise for managing risk and compliance. PG&E recognizes that focusing solely on compliance management without a holistic cybersecurity risk management approach will not achieve the desired optimal outcome to adequately protect the Utility and the Smart Grid. The RAM provides a new mechanism to identify cybersecurity risks across the enterprise. Another significant milestone is in the maturity of PG&E's overall security strategy, realized by the centralization of the security organization, which both the physical and cybersecurity groups now reside in. From a cybersecurity perspective, physical security is leveraged as part of the overall defense-in-depth strategy; a critical protection layer for the widely distributed systems and devices planned for the evolving Smart Grid.

In 2016, PG&E took several actions to strengthen the security posture of the Smart Grid, including increasing security evaluation, oversight and governance, and implementing more holistic NIST-based assessments. Moving forward, the newly implemented RAM will work in concert with PG&E's annual integrated planning process to identify new cyber risks related to the Smart Grid and plan the necessary actions to address them.

The 2016 consolidation of physical and cyber security into one organization supports an approach to system security in a holistic manner. Now that Corporate Security aligns with cybersecurity strategy, they continue to remain abreast of changes in the regulatory landscape and closely follow all Critical Cyber Assets outlined in the NERC Cyber Security Standards,

CIP 006 as well as industry standards from NIST, such as those outlined in the industry guideline NISTIR 7628, Guidelines for Smart Grid Cyber Security.

4.10.2 Managing Cyber Security Risk Through Control Baseline

Controls are the system safeguards that mitigate various types of risk, and PG&E has developed a set of standardized, baseline controls that align to multiple best practice governing bodies and regulations. PG&E has established the following 17 control families as part of its baseline controls which are aligned with the NIST's Cybersecurity Controls Framework:

- Access Control
- Security Awareness and Training
- Audit and Accountability
- Security Assessment and Authorization
- Configuration Management
- Contingency Planning
- Cybersecurity Program
- Identification and Authentication
- Incident Response
- System Maintenance
- Media Protection
- Physical and Environmental Protection
- Security Planning
- Risk Assessment
- System and Services Acquisition
- System and Communications Protection
- System and Information Integrity

These control families provide a baseline for risk measurement and inform controls implementation across people, process, and technology.

4.10.3 PG&E's Compliance with NERC Security Rules and Other Security Guidelines and Standards as Identified by NIST and Adopted by FERC

PG&E has developed and established formal standards that form the foundation for controls implementation and adherence. Examples of those standards include password management, user access management, information classification, information security, training, and privacy. PG&E's standards leverage industry best practice standards such as NIST. PG&E also participates in industry peer groups to understand changes in technology and regularly updates applicable standards. PG&E has implemented a Guidance Document Management initiative to make standards more intuitive and easy to understand. This helps improve compliance with both the spirit and intent of the guidance.

PG&E's RMF enables compliance with multiple state and federal regulations and is aligned to leading industry practices and standards including the following:

- NERC CIP
- Industry Guidelines
- Privacy
 - CPUC Privacy D.11-07-056
 - California SB 1476
 - California SB 1386
- SCADA System Security
 - International Electro Technical Commission 62351
- Others
 - International Organization for Standardization/IEC 27000 Series
 - Federal Communication Commission Regulations
 - Sarbanes Oxley
 - Health Insurance Portability and Accountability Act

PG&E participates in multiple forums to ensure that its control design is current, comprehensive and remains in alignment with the standards and industry groups mentioned above. PG&E also engages with external partners related to cybersecurity and cyber risk management, including industry bodies, government-related security forums, and academia.

4.10.4 Key Risks Conclusions

PG&E continues to improve upon its ability to measure, manage, communicate, and mitigate potential cybersecurity, privacy, and technology risks that could impact the systems that PG&E depends on to deliver safe and reliable electric and gas services to its customers. PG&E's risk management approach is focused on ensuring that risks are well understood at all levels of the Company and that there is executive support for mitigating and managing operational risks, physical security risks as well as cyber security risk. PG&E's risk management efforts are focused on continuous improvement to effectively predict and proactively manage risk by integrating risk management strategies, plans and practices into everyday business activities.

CHAPTER 5

SMART GRID METRICS AND GOALS

5 Smart Grid Metrics and Goals

In this section, PG&E provides an update on the consensus Smart Grid metrics approved by the Commission in D.12-04-025. PG&E continues to support the Commission's position that these consensus metrics will provide parties and the Commission with information that will allow for better understanding of PG&E's Smart Grid investments and provide the foundation for moving forward with Smart Grid investments. This year, PG&E has added metrics around AMI, per CPUC request.

5.1 Customer/Advanced Metering Infrastructure Metrics

Metric 1: Number of advanced meter malfunctions where customer electric service is disrupted, and the percentage this number represents of the total of installed advanced meters. The reporting period for all Metric 1 values is July 1, 2019 – June 30, 2020.

Number of PG&E Advanced Meter Malfunctions Where Customer Electric Service is Disrupted; Percentage of Total Installed Advanced Meters	
Metric	Value
Number of Meter Malfunctions	41 meters
Percentage of Total Meters	0.00075%
<u>Note:</u> Reporting date: July 1, 2019 through June 30, 2020	

Metric 1a,1b, 1c, 1d:

Other Advanced Meter Malfunctions Metrics	
Metric	Value
1a. Amount of Electric Smart Meters Installed	5,491,222
1b. Amount of Electric Smart Meters Activated	5,281,640
1c. Number of Electric Opt-Out SPIDs	41,103
1d. Amount of Electric non-Smart Meters and/or amount of meters still manually read **	69,310
<u>Notes:</u> ** Counts as of end of June 2020. **The count of meters still manually read includes Opt-Out meters.	

Metric 2: Load impact in MW of peak load reduction from the summer peak and from winter peak due to Smart Grid-enabled, utility administered DR programs (in total and by customer class).

Load Impact in MW of Peak Load Reduction From the Summer Peak and From the Winter Peak Due to Smart Grid-enabled, Utility Administered DR (in total and by customer class) – Automated DR Program	
Metric	Value
From the Summer Peak (May 2019 – October 2019)	
Residential*	0.62 MW
Non-Residential < 200 kW	1.96 MW
Non-Residential ≥ 200 kW	5.90 MW
Other (Agricultural)	2.63 MW
From the Winter Peak (November 2019 – April 2020)**	
Residential	0 MW
Non-Residential < 200 kW	0 MW
Non-Residential ≥ 200 kW	0 MW
Other (Agricultural)	0 MW
<p>Note: The MW values are the average kW shed across all of the events in 2019 on a per Service Account Identification (SAID) basis and then summed. Therefore, this is not the cumulative MW load impact but the average load impact that could be expected on a per event basis. The Non-Residential <200 was determined on an SAID basis the average baseline kW for each event and if that average baseline across the events was <200 it was included in that sum.</p> <p>*Residential value is estimated based on the number of smart thermostat recipients multiplied by .43 kW per customer as based on the PG&E's 2016 T&D Third-Party Bring Your Own Thermostat Pilot results.</p> <p>**DR programs eligible for AutoDR are active over the timeframe of May-October.</p>	

Metric 3: Percentage of DR enabled by AutoDR in each individual DR impact program.

Percentage of PG&E DR Enabled by AutoDR in Each Individual DR Impact Program (2018)	
Metric	Value
Percentage of DR enabled by AutoDR –PDP Program	12.4%
Percentage of DR enabled by AutoDR –CBP	60.3%
<p>Note: Percentage represents the Verified kW load reductions (engineering analysis) available for DR programs in 2019, divided by total DR portfolio kW, with the resulting number multiplied by 100. This table is not referencing cumulative load shed across the 2019 DR season.</p>	

Metric 4: The number and percentage of utility-owned advanced meters with consumer devices with HAN or comparable consumer energy monitoring or measurement devices registered with the utility (by customer class, California Alternate Rates for Energy (CARE) status, and climate zone).

Number and Percentage of PG&E Owned Advanced Meters with Consumer Devices with HAN or Comparable Consumer Energy Monitoring or Measurement Devices Registered With PG&E		
Metric	Number	Percentage
Residential	4242	<1%
Non-Residential < 200 kW	86	<1%
Non-Residential ≥ 200 kW	4	<1%
Other	0	0%
Total	4332	<1%
CARE	222	0%
Non-CARE	4110	<1%
Total (CARE and Non-CARE)	4332	<1%
Climate Zone P	86	<1%
Climate Zone Q	44	<1%
Climate Zone R	146	<1%
Climate Zone S	427	<1%
Climate Zone T	971	<1%
Climate Zone V	15	<1%
Climate Zone W	46	<1%
Climate Zone X	2576	<1%
Climate Zone Y	18	<1%
Climate Zone Z	3	<1%
Total by Climate Zone	4332	<1%
Note: Percentage is defined as the number of advanced meters with consumer devices with HAN or comparable consumer energy devices registered with the utility divided by the number of advanced meters installed for the group of concern, with the resulting number multiplied by 100.		

Metric 5: Number and percentage of customers that are on a time-variant or dynamic pricing tariff (by type of tariff, by customer class, by CARE, and by climate zone).

Number and Percentage of Customers on a Time-Variant or Dynamic Pricing Tariff		
Metric	Number	Percentage
Residential	695,407	14%
Non-Residential < 200 kW	536,582	79%
Non-Residential ≥ 200 kW	11,250	2%
Total	1,243,239	23%
CARE	116,618	9%
Non-CARE	1,126,621	27%
Total (CARE and Non-CARE)	1,243,239	23%
Climate Zone P	45,822	26%
Climate Zone Q	3,509	24%
Climate Zone R	167,912	27%
Climate Zone S	254,513	27%
Climate Zone T	223,816	18%
Climate Zone V	12,676	21%
Climate Zone W	82,331	27%
Climate Zone X	431,473	21%
Climate Zone Y	19,491	29%
Climate Zone Z	1,696	7%
Total by Climate Zone	1,243,239	23%
Note: Percentage is defined as the number of customers that are on a time-variant or dynamic pricing tariff divided by the number of customers in the group of concern, with the resulting number multiplied by 100.		

Metric 6: Number and percentage of escalated customer complaints related to: (1) the accuracy, functioning, or installation of advanced meters; or (2) the functioning of a utility-administered HAN with registered consumer devices.

Number and Percentage of Escalated PG&E Customer Complaints Related to (a) Accuracy, Functioning or Installation of Advanced Meters; or (b) Functioning of a PG&E-Administered HAN with Registered Consumer Devices		
Metric	Number	Percentage
Escalated customer complaints related to the accuracy, functioning or installation of advanced meters	1	10%
Escalated customer complaints related to the functioning of a PG&E-administered HAN with registered consumer devices	0	0%
Note: Percentage is defined as the number of escalated complaints related to: (1) the accuracy, functioning, or installation of advanced meters; or (2) the functioning of a utility-administered HAN with registered consumer devices. To derive percentages, the number provided is divided by the number of escalated complaints in total for each category, with the resulting number multiplied by 100.		

Metric 7: The number and percentage of advanced meters replaced before the end of their expected useful life for one year, reported annually, with an explanation for the replacement.

Number and Percentage of Advanced Meters Replaced Before the End of Their Expected Useful Life for One Year, Reported Annually, With an Explanation for the Replacement		
Metric	Number	Percentage
Advanced meters replaced	26,990	0.49%
Explanation for the replacements: These advanced electric meters were replaced due to a malfunction before the end of their expected useful life (e.g., damaged meter, etc.).		
Note: Percentage is defined as the number of advanced meters replaced before the end of their expected useful life for one year, reported annually, divided by the number of advanced meters installed, with that resulting number multiplied by 100.		

Metric 8: Number and percentage of advanced meters field tested at the request of customers pursuant to utility tariffs providing for such field tests, and the number of advanced meters tested measuring usage outside the Commission-mandated accuracy bands.

Number and Percentage of Advanced Meters Field Tested at the Request of Customers Pursuant to Utility Tariffs Providing for Such Field Tests, and the Number of Advance Meters Tested Measuring Usage Outside the Commission-Mandated Accuracy Bands		
Metric	Number	Percentage
Advanced meters field tested at the request of customers ^(a)	2,698	0.05%
Advanced meters tested measuring usage outside the Commission-mandated accuracy bands ^(b)	25	0.93%
(a) Percentage is defined as the number of advanced meters field tested divided by the number of advanced meters installed, with that resulting number multiplied by 100.		
(b) Percentage is defined as the number of advanced meters field tested found outside of the Commission-mandated accuracy bands divided by the number of advanced meters tested at the request of the customer between 7/1/19 and 6/30/20 with that resulting number multiplied by 100.		

Metric 9: Number and percentage of customers using a utility web-based portal to access energy usage information or to enroll in utility energy information programs or who have authorized the Utility to provide a third-party with energy usage data.

Number and Percentage of Customers Using a PG&E Web-based Portal to Access Energy Usage Information or to Enroll in PG&E Energy Information Programs or Who Have Authorized PG&E to Provide a Third-Party with Energy Usage Data		
Metric	Number	Percentage
Customers using a PG&E web-based portal to access energy usage information ⁽¹⁾	1,854,829	33.6%
Customers using a PG&E web-based portal to enroll in PG&E energy information programs	2,436,948	44.2%
Customers who have authorized PG&E to provide a third-party with energy usage data ⁽²⁾⁽³⁾	201,798	3.6%
(1) This number represents the unique number of customers who have accessed their usage information online within Your Account at least one time during the reporting period (July 1, 2019 through June 30, 2020).		
(2) Total number and percentage provided covers multiple programs.		
(3) This number includes Share My Data and BBP.		

5.2 Plug-In Electric Vehicle (PEV) Metric

Metric 1: Number of residential customers enrolled in time-variant EVs tariffs.

5.2 Plug-In Electric Vehicle (PEV) Metric

Metric 1: Number of residential customers enrolled in time variant EVs tariffs.

Number of PG&E Residential Customers Enrolled in a Time-Variant EV Tariffs	
Metric	Value
Number of EV-A Customers	16,385 customers
Number of EV2-A Customers	46,407 customers
Number of EV-B Customers	394 customers
Number of identified EV owners* on other time-variant tariffs	13,625 customers
<p><u>Note:</u> Utilities currently have limited ability to determine which customers have EVs, outside of enrollment in EV rate schedules, and participation in EV rebate programs.</p> <p>*Identified EV owners include customers that have applied for and received PG&E's Clean Fuel Rebate. Customers included in this count are on the following time-variant rates: E-6, ETOU-A, ETOU-B, or other time-variant tariffs.</p>	

5.3 Energy Storage Metric

Metric 1: MW and MWh per year of utility-owned or operated energy storage interconnected at the transmission or distribution system level. As measured at the storage device electricity output terminals as of June 30, 2020

MW and MWh of PG&E-Owned or Operated Energy Storage Interconnected at the Distribution System Level		
Metric	Location	Value
Sodium Sulfur Batteries	Vaca Dixon	1MW/7MWh*
	Yerba Buena	4MW/28MWh
Lithium Ion Batteries	Brown Valley	0.5MW/2MWh
<p><u>Note:</u> A 2 MW/14 MWh battery storage system was commissioned at a PG&E substation near Vacaville in August 2012 and a 4 MW/28 MWh battery storage system on a distribution circuit in San Jose California in May 2013.</p> <p>*In December 2019, 1 MW of the 2 MW of the Vaca Dixon BESS nameplate capacity was permanently retired in PowerPlan (the ratebase system of record) due to an unexpected module cooling event. It was determined, through conversations with the manufacturer and internal PG&E environmental teams, that the cooled modules can safely stay onsite until the whole system is decommissioned in the future.</p>		

5.4 Grid Operations Metrics

Note for reliability metrics 1 to 4: Data for all reporting periods are pulled and refreshed from the Integrated Logging and Information System (ILIS) Operations Database, which may have resulted in differences compared to prior year reported values. ILIS is used by Distribution Operators to log outage switching operations (and ancillary information about network state for System Average Interruption Duration Index (SAIDI)/Customer Average Interruption Duration Index calculations) and other relevant operations data (i.e., equipment out of service, etc.). The data used includes both unplanned and planned outages that were reported on the T&D systems. The historical Major Events determined from each annual study was used.

Metric 1: The systemwide total number of minutes per year of sustained outage per customer served as reflected by the SAIDI Major Events Included and Excluded for each year starting on July 1, 2011 through the latest year that this information is available. There were 23 major events in the latest time period of July 1, 2019 through June 30, 2020.

PG&E's System Average Interruption Duration Index, Major Events Included and Excluded		
Period	Metric	Value
2019-2020	SAIDI – Major Events Included	1,300.1
2019-2020	SAIDI – Major Events Excluded	144.4
2018-2019	SAIDI – Major Events Included	458.4
2018-2019	SAIDI – Major Events Excluded	138.7
2017-2018	SAIDI – Major Events Included	229.8
2017-2018	SAIDI – Major Events Excluded	116.5
2016-2017	SAIDI – Major Events Included	267.7
2016-2017	SAIDI – Major Events Excluded	109.4
2015-2016	SAIDI – Major Events Included	136.4
2015-2016	SAIDI – Major Events Excluded	109.8
2014-2015	SAIDI – Major Events Included	174.1
2014-2015	SAIDI – Major Events Excluded	99.7
2013-2014	SAIDI – Major Events Included	123.8
2013-2014	SAIDI – Major Events Excluded	110.6
2012-2013	SAIDI – Major Events Included	160.9
2012-2013	SAIDI – Major Events Excluded	122.2
2011-2012	SAIDI – Major Events Included	171.9
2011-2012	SAIDI – Major Events Excluded	132.0

Metric 2: How often the systemwide average customer was interrupted in the reporting year as reflected by the System Average Interruption Frequency Index (SAIFI), Major Events Included and Excluded for each year starting on July 1, 2011 through the latest year that this information is available. There were 23 major events in the latest time period of July 1, 2019 through June 30, 2020.

PG&E's SAIFI Major Events Included and Excluded		
Period	Metric	Value
2019-2020	SAIFI – Major Events Included	1.781
2019-2020	SAIFI – Major Events Excluded	1.121
2018-2019	SAIFI – Major Events Included	1.505
2018-2019	SAIFI – Major Events Excluded	1.104
2017-2018	SAIFI – Major Events Included	1.141
2017-2018	SAIFI – Major Events Excluded	1.005
2016-2017	SAIFI – Major Events Included	1.462
2016-2017	SAIFI – Major Events Excluded	0.959
2015-2016	SAIFI – Major Events Included	1.132
2015-2016	SAIFI – Major Events Excluded	1.002
2014-2015	SAIFI – Major Events Included	1.155
2014-2015	SAIFI – Major Events Excluded	0.884
2013-2014	SAIFI – Major Events Included	1.090
2013-2014	SAIFI – Major Events Excluded	1.038
2012-2013	SAIFI – Major Events Included	1.211
2012-2013	SAIFI – Major Events Excluded	1.067
2011-2012	SAIFI – Major Events Included	1.191
2011-2012	SAIFI – Major Events Excluded	1.097

Metric 3: The number of momentary outages per customer systemwide per year as reflected by the Momentary Average Interruption Frequency Index (MAIFI), Major Events Included and Excluded for each year starting on July 1, 2011 through the latest year that this information is available. There were 23 major events in the latest time period of July 1, 2019 through June 30, 2020.

PG&E's MAIFI Major Events Included/ Major Events Excluded		
Period	Metric	Value
2019-2020	MAIFI – Major Events Included	1.571
2019-2020	MAIFI – Major Events Excluded	1.264
2018-2019	MAIFI – Major Events Included	1.899
2018-2019	MAIFI – Major Events Excluded	1.465
2017-2018	MAIFI – Major Events Included	1.807
2017-2018	MAIFI – Major Events Excluded	1.638
2016-2017	MAIFI – Major Events Included	2.208
2016-2017	MAIFI – Major Events Excluded	1.493
2015-2016	MAIFI – Major Events Included	1.856
2015-2016	MAIFI – Major Events Excluded	1.684
2014-2015	MAIFI – Major Events Included	1.698
2014-2015	MAIFI – Major Events Excluded	1.393
2013-2014	MAIFI – Major Events Included	1.506
2013-2014	MAIFI – Major Events Excluded	1.443
2012-2013	MAIFI – Major Events Included	1.820
2012-2013	MAIFI – Major Events Excluded	1.650
2011-2012	MAIFI – Major Events Included	1.636
2011-2012	MAIFI – Major Events Excluded	1.501

Metric 4: Number and percentage of customers per year and circuits per year experiencing greater than 12 sustained outages for each year starting on July 1, 2011 through the latest year that this information is available. There were 23 major events in the latest time period of July 1, 2019 through June 30, 2020.

Number and Percentage of PG&E's Customers Per Year and Circuits Per Year Experiencing Greater Than 12 Sustained Outages Per Year (Major Events excluded)			
Period	Metric	Number	Percentage
2019-2020	Customers Experiencing Greater Than 12 Sustained Outages Per Year	2,781	0.05%
2019-2020	Circuits Experiencing Greater Than 12 Sustained Outages Per Year	39	1.17%
2018-2019	Customers Experiencing Greater Than 12 Sustained Outages Per Year	2,540	0.05%
2018-2019	Circuits Experiencing Greater Than 12 Sustained Outages Per Year	30	0.97%
2017-2018	Customers Experiencing Greater Than 12 Sustained Outages Per Year	538	0.01%
2017-2018	Circuits Experiencing Greater Than 12 Sustained Outages Per Year	13	0.42%
2016-2017	Customers Experiencing Greater Than 12 Sustained Outages Per Year	2,532	0.05%
2016-2017	Circuits Experiencing Greater Than 12 Sustained Outages Per Year	26	0.84%
2015-2016	Customers Experiencing Greater Than 12 Sustained Outages Per Year	1,287	0.02%
2015-2016	Circuits Experiencing Greater Than 12 Sustained Outages Per Year	17	0.55%
2014-2015	Customers Experiencing Greater Than 12 Sustained Outages Per Year	327	0.01%
2014-2015	Circuits Experiencing Greater Than 12 Sustained Outages Per Year	6	0.20%
2013-2014	Customers Experiencing Greater Than 12 Sustained Outages Per Year	284	0.01%
2013-2014	Circuits Experiencing Greater Than 12 Sustained Outages Per Year	6	0.20%
2012-2013	Customers Experiencing Greater Than 12 Sustained Outages Per Year	812	0.02%
2012-2013	Circuits Experiencing Greater Than 12 Sustained Outages Per Year	15	0.49%
2011-2012	Customers Experiencing Greater Than 12 Sustained Outages Per Year	2,115	0.04%
2011-2012	Circuits Experiencing Greater Than 12 Sustained Outages Per Year	34	1.12%
<p>Note: Percentage of customers experiencing greater than 12 sustained outages per year equals [(the number of customers experiencing greater than 12 sustained outages in a year) divided by (the total number of customers)] with the resulting number multiplied by 100.</p> <p>Percentage of circuits experiencing greater than 12 sustained outages per year equals [(the number of circuits experiencing greater than 12 sustained outages in a year) divided by (the total number of circuits)] with the resulting number multiplied by 100.</p>			

Metric 5: System load factor and load factor by customer class for January 1, 2019 through December 31, 2019. Load factors are calculated on a calendar year basis.

PG&E's Load Factors	
Metric	Value
System Load Factor	51.14%
Residential Load Factor	34.92%
Non-Residential < 200 kW Load Factor	Small L&P: 48.96% Medium L&P: 47.10%
Non-Residential ≥ 200 kW Load Factor	Large L&P: 67.30%
Other (Agriculture) Load Factor	41.13%
Note: Some residential, small C&I, and small agriculture customers, don't have interval meters, therefore, for these, load factors will be calculated using estimates, rather than measured directly.	

Metric 6: Number of and total nameplate capacity of customer-owned or operated, grid-connected DG facilities. The data are cumulative through June 30, 2020.

Number and Total Nameplate Capacity of PG&E's Customer-Owned or Operated Grid Connected DG Facilities		
Technology Category	Count	Capacity (MW)
Solar	494,191	4,775
Storage	12,223	159
Fuel Cells	277	136
Wind	271	21
Other DG	254	381
Totals	507,216	5,472

Notes:

PG&E defines DG as generation less than 20 MW in size, designed primarily to offset on-site load, that is interconnected on the customer side of the utility meter under CPUC jurisdiction (Rule 21).

D.12-04-025 defines DG as “Customer-owned or operated generating systems that are enrolled with a utility in the SGIP or the California Solar Initiative (CSI) or otherwise operating under a Feed in Tariff (FIT).” Generation facilities receiving FITs are generally not designed to offset customer load and so are not included in the Table for Metric 6.

At this time, most DG facilities interconnected in PG&E’s service territory were not incentivized through the CSI or SGIP program, but rather through Net Energy Metering that provides credits for exports to the grid. Additionally, some DG is simply installed by customers on a Non-Export tariff to offset onsite load without exporting to the grid. PG&E thus believes it is more useful to present a table for Metric 6 that shows the installed count and capacity of DG by technology type rather than by incentive program as was presented in prior years. We also include storage in the table though it is not a generation technology, as it plays an important role in shaping customer load served by PG&E’s grid.

The capacity for solar generating facilities is reported as the PV CEC-AC rating, while for non-solar facilities, capacity is reported as the nameplate capacity of the generation facility. Counts reference distinct service points in each category. Totals will include duplicate service points in the case where one customer has multiple technologies installed (ex: Solar plus Storage customer will be counted twice in Totals.)

The CSI is the solar rebate Program for California consumers that are customers of the IOUs such as PG&E. This program funds solar on existing homes, existing or new commercial installations, agricultural sites as well as government and non-profit buildings.

CSI also funds a rebate program, administered by Grid Alternatives, for low-income residents that own their own single-family home and meet a variety of income and housing eligibility criteria. This program is called the Single-family Affordable Solar Homes Program. Additionally, PG&E administers a CSI-funded solar rebate Program for multifamily affordable housing. This program is called the Multifamily Affordable Solar Housing Program.

The SGIP provides incentives for storage and generation technologies installed behind the meter to offset all or a portion of on-site load. SGIP’s goals include grid support, GHG reduction and market transformation.

Metric 7: Total electricity deliveries from customer-owned or operated, grid-connected DG facilities, reported by month. This information is for July 1, 2019 through June 30, 2020.

Year	Month	Approximate Exports* (GWh)
2019	Jul	434.0
2019	Aug	372.8
2019	Sept	337.7
2019	Oct	305.1
2019	Nov	199.1
2019	Dec	152.2
2020	Jan	195.1
2020	Feb	339.7
2020	Mar	363.8
2020	Apr	459.7
2020	May	533.3
2020	Jun	511.0

Note: Information and estimates about production of DG facilities that serve on-site customer load is produced annually by the CEC in their California Energy Demand Forecast.

*Exports listed are approximate and subject to slight variation due to changes to PG&E's internal database structures and rounding.

* Information for GWh exports sourced through service point interval usage data maintained in PG&E Teradata database. Detailed Sub Load Aggregation Point (SubLAP) data not shown due to temporal nature of SubLAP and Service Point ID mapping (i.e. one service point ID could be mapped to different SubLAPs at different points in time based on grid configuration.)

Metric 8: Number and percentage of distribution circuits equipped with automation or remote-control equipment, including SCADA systems. The measure is for July 1, 2019 through June 30, 2020.

Number and Percentage of PG&E's Distribution Circuits Equipped with Automation or Remote-Control Equipment, Including SCADA			
Metric	# of Automated Circuits	Total Circuits	Percentage
PG&E Distribution Circuits Equipped with SCADA at the Breaker	3,126	3,165	98.8%

Note: Percentage of distribution circuits equipped with automation or remote-control equipment equals the number of distribution circuits equipped with automation or remote-control equipment) divided by the total number of distribution circuits with the resulting number multiplied by 100.

CHAPTER 6

APPENDIX I

6 Appendix I

2019/2020 Smart Grid Annual Report Approximate Recorded Smart Grid Project Costs from July 1, 2019 Through June 30, 2020⁴¹

Project Name	7/1/19 to 6/30/20 Approximate Recorded Amount
Community Wildfire Safety Program	
PGE.com Portal Enhancements	\$0.58 Million
DMS/OMT/ILIS Enhancements	NA
Enhanced Asset Inspections – Drone/AI	\$5.8 Million
Weather Station Deployment / Hi-Def Camera Deployment	\$8.5 Million
Wildfire Spread Modelling	\$6 Million
POMMS Enhanced Fire-Risk Modelling	\$3.5 Million
Temporary MGs – Preinstalled Interconnection Hub (PIH)	\$13.7 Million
Accelerated Vegetation Management – IT Field Tool	\$2.4 Million
Customer Engagement and Empowerment Projects	
Supply Side (SSP) / SSP II DR Pilot (Continuation of Intermittent Resource Management Pilot Phase 2)	\$0.47 Million
XSP	\$0.36 Million
AC Cycling Next Generation Technology Assessment	\$2.5 Million
EV Rates	\$0.1 Million
EV Infrastructure	\$35 Million
ED&M	\$3.96 Million
BFA	NA
Share My Data (CDA) Project	\$0.4 Million
Energy Data Access	\$0.2 Million
Stream My Data aka HAN	\$0.08 Million
BBP	\$0.33 Million
TVP Rates	\$2.96 Million
AutoDR Program	\$2.1 Million
Smart Thermostat Study	NA
Distribution Automation and Reliability Projects	
ADMS	\$22.5 Million
Distribution Substation SCADA Program	\$23.1 Million

⁴¹ For information on project costs in former years, please reference past Smart Grid Deployment Plan Updates on CPUC's California Smart Grid website at: <http://www.cpuc.ca.gov/General.aspx?id=4693>.

Project Name	7/1/19 to 6/30/20 Approximate Recorded Amount
Smart Grid FLISR	\$4.29 Million
Transmission Automation and Reliability Projects	
Transmission Substation SCADA Program	\$2.2 Million
MPAC Installation Program	\$34 Million
Synchrophasor Project Realization	\$0.7 Million
EMS	\$4.5 Million
AM and Operational Efficiency Projects	
Network SCADA Monitoring Project	2018 \$7.7Million / 2019 \$8.5 Million
Wind Loading Assessments	\$12 Million
STAR for Transmission Line	\$1.96 Million
Security (Physical and Cyber) Projects	
Identity and Access Management (IAM) Project	\$13.3 Million
ODN Security Program	\$6.0 Million
IGP Security Program	\$2.0 Million
Integrated and Cross-cutting Systems Projects	
Telecommunications Architecture	\$0.3 Million
CES-21 Program	\$0.56 Million
EPIC Program	\$8.9 Million

2019/2020 Smart Grid Annual Report
Closed Smart Grid Projects

Project Name (Closed)	Completion Date
Customer Engagement and Empowerment Projects	
Intermittent Renewable Resource Management (IRRM) Pilot Phase 1 In the IRRM Pilot Phase 1, PG&E leveraged work performed under the C&I DR Participating Load Pilot to provide regulation services to the CAISO. The objective of the IRRM Pilot Phase 1 was to demonstrate whether customers can provide second by second frequency-regulation service needs to the CAISO.	2011
Plug-In Hybrid Electric Vehicle (PHEV)/EV Smart Charging Pilot In the PHEV/EV Smart Charging Pilot, PG&E and the EPRI tested baseline functionalities of PEV charging hardware by conducting an end-to-end system connectivity to evaluate potential residential smart charging capabilities utilizing the load management software over the SmartMeter network.	December 2011
UAT PG&E provides the Home Energy Checkup and Business Energy Checkup (also known as UATs) for residential and SMB customers through My Energy. These tools utilize SmartMeter data along with other customer insights to make it easy for our customers to find energy savings ideas that are particular to how they use energy. The tools are progressive in nature, continually learning based on the information the customer provides, and include recommendations across EE, DR, DG, and behavioral changes.	September 2012
The Green Button Initiative In PG&E's Green Button Initiative, the Green Button tool provides customers with a means of easily accessing and downloading their energy use online in a standardized format that can be shared with energy service providers.	October 2012
My Energy Web Tools PG&E's customer website – My Energy – allows residential, SMB, and small agricultural customers to view usage, price and cost, and take advantage of various rate analysis tools. The usage information is displayed in a variety of formats including year-to-year comparison, peak/ off-peak, hourly and 15-minute interval data (depending on the granularity of the SmartMeter data), bill to date and monthly bill forecast. The "My Energy" website will also include a rate calculator which will calculate the customer bill under a variety of available rate plans.	November 2012
PDR Program Phase 1 As part of the Commission's vision of integrating retail-wholesale DR programs, in the PDR Program Phase 1, PG&E is in the process of enabling its retail DR programs to directly participate in the CAISO's wholesale market – PDR product. Phase 1 of this project was focused on assembling the proper tools (i.e., telemetry, forecasting) and integrating interfaces (procurement back-end systems to schedule, notify and settle) that PG&E needs to operate when bidding available DR resources in the CAISO market.	2013
Energy and Carbon Management System (ECMS) In the ECMS, PG&E has developed tools specifically for PG&E's large C&I customer account representatives to identify opportunity customers and enable a consultative energy discussion with those customers using advanced usage analytics and financial metrics for proposed EE projects.	December 2013

Project Name (Closed)	Completion Date
SmartMeter Program PG&E's SmartMeter Program launched the deployment of foundational technology to help PG&E's customers understand how and when they use energy, including through automated home energy management. The SmartMeter system improved infrastructure integrity, helped PG&E manage energy demand, and enabled PG&E to provide more reliable service. Through these broad systemwide enhancements, the SmartMeter Program has served the vital foundational step to enable creation of the Smart Grid, which in turn fosters a clean energy economy and sustainable economic expansion.	December 2013
HAN Enablement Program – Phase 1 & Phase 2 PG&E's HAN Enablement Program is an infrastructure that allows customers to register and commission a standards compliant device with PG&E's AMI network to receive near RT data from their SmartMeter. In HAN Phase 1 (Initial Deployment), which ran from March 1, 2012 through April 30, 2013, PG&E installed and supported 430 in-home displays with residential customers. Starting in January 2013, PG&E launched HAN as a platform, making the capability to register a device and received near real time usage information from a customer's electric SmartMeter available to all eligible customers across its service territory.	April 2013 and February 2014
Opower/Honeywell Smart Thermostat Assessment Pilot PG&E conducted a Smart Thermostat field assessment with Opower and Honeywell to evaluate the energy benefits that accrue to customers who utilize internet-enabled thermostats, when exposed to behavioral energy saving messaging. This effort was a component of the EE Portfolio's Emerging Technologies Program. PG&E successfully installed Honeywell Smart Thermostats in 505 residential homes in the San Francisco Bay Area and the Central Valley in February 2013. Opower and PG&E monitored usage differences between the test and control groups for a 12-month period.	July 2014
Opower/Honeywell Smart Thermostat Assessment Pilot PG&E conducted a Smart Thermostat field assessment with Opower and Honeywell to evaluate the energy benefits that accrue to customers who utilize internet-enabled thermostats, when exposed to behavioral energy saving messaging. This effort was a component of the EE Portfolio's Emerging Technologies Program. PG&E successfully installed Honeywell Smart Thermostats in 505 residential homes in the San Francisco Bay Area and the Central Valley in February 2013. Opower and PG&E monitored usage differences between the test and control groups for a 12-month period.	July 2014
Green Button Connect (GBC) Beta GBC is a software interface that allows PG&E customers to easily share their SmartMeter enabled energy usage data with other energy service providers. These developers can then "mash up" the data in unique ways to provide valuable insights to customers. GBC was retired when PG&E launched its Share My Data platform.	March 2015
DR T&D System Integration In T&D System Integration, PG&E evaluated areas where existing and future DR programs can be implemented and designed to support PG&E's T&D planning and operations. The first phase included a study of the required DR resource characteristics to meet distribution needs. The pilot conducted field demonstration projects as part of 2015-2016 DR Bridge Funding Activities (D.14-05-025). Demonstration projects included the deployment of local DR resource zones that can be called by Distribution Operations to maintain local system reliability, development of behavioral DR resources that can be locally called by Distribution Operations and testing the feasibility of automated calling of DR resources linked to SCADA.	April 2017

Project Name (Closed)	Completion Date
DR PEV Pilot <p>The DR PEV Pilot demonstrated the technical feasibility as well as the value of managed charging of EVs as a flexible and controllable grid resource. The main goal of this project was to understand the potential of using EVs for grid services, which can result in cost savings associated with operating and maintaining the grid as well as owning and operating a vehicle. The pilot required Bavarian Motor Works (BMW) to provide a minimum of 100 kW of capacity at any given time, regardless of how many BMW i3 EVs are charging. Once an event is called, BMW utilized proprietary aggregation software to delay charging of participating customers (via telematics embedded in the vehicle) to reduce load on the grid. The algorithm prioritized the reduction of electricity consumption from charging without interfering on customers' mobility needs; however, drivers can opt-out of event participation at any time. To address uncontrollable fluctuations regarding managed charging capacity, BMW developed a stationary battery system made up of eight used MINI E batteries (100 kW/225 kWh) as back-up storage to fill the gap between available load drop from managed charging and the required DR capacity.</p>	December 2016
Demonstrate Subtractive Billing With Submetering for EVs to Increase Customer Billing Flexibility <p>This project evaluated 3rd party submetering for EVs to separately meter EV charging load with the goal of saving EV owners money on charging costs while better aligning EV charging with periods of low electricity demand. Subtractive billing paired with submetering utilizes charging data from submeters, embedded in or associated with EV charging stations, and subtracts it from a customer's standard utility bill. This system allows utilities to offer a customer one electric rate for their EV charging, and a different rate for their primary source of load. The results of EPIC 1.22 have led PG&E to determine that third-party submeters cannot currently provide the reliability and data accuracy required for retail billing, and that there is currently no path to production for such a use. The customer benefits in terms of saving on charging equipment are modest when compared to installing a separate utility grade meter and the upgrades required to accommodate third-party submeter data.</p>	November 2019

Project Name (Closed)	Completion Date
Distribution Automation and Reliability Projects	
Cornerstone Improvement Project – Feeder Automation <p>The Cornerstone Improvement Project includes the installation of distribution feeder FLISR systems on select urban and suburban circuits. The project is expected to result in reliability improvements for PG&E customers. The Feeder Automation component of Cornerstone Improvement Project involves implementing feeder automation on approximately 400 distribution circuits. The project scope includes automating mainline protection equipment utilizing FLISR schemes to restore unaffected customers within five minutes.</p>	December 2013
Regional Synchrophasor Investment Project <p>As part of this project, PG&E installed or upgraded Synchrophasor technology, also known as PMUs, throughout its service territory, has networked them together, and provided the data in a secured interface to PG&E's ET operators, Western Electricity Coordinating Council (WECC), neighboring utilities, and the CAISO. The data exchange portion of the project includes positioning PG&E to share data with WECC. Nine other partner entities can coordinate and exchange data amongst partner entities, including PG&E.</p>	May 2014

Project Name (Closed)	Completion Date
SmartMeter Outage Management Integration Project The SmartMeter Outage Management Integration project integrates the SmartMeter “Last Gasp” and Restoration messages into PG&E’s OMS for outage notification to operators and dispatchers and improved outage restoration. Phase I project delivered: (1) the capability to create trouble reports from AMI alarms when an associated customer call has been received; (2) the capability to ping a transformer to determine if an outage is larger than it was inferred to be; and (3) the capability to ping individual meters to determine whether they have been restored. Phase 2 of the project delivered functionality to identify and isolate downstream outages that have occurred prior to a larger upstream outage. Additionally, it will enhance the capability introduced in Phase 1 by removing the requirement for an associated customer call and automatically creating trouble reports using AMI only reports.	November 2015
EPIC 1.01: Energy Storage for Market Operations EPIC 1.01 Energy Storage for Market Operations project successfully utilized PG&E’s Vaca-Dixon and Yerba Buena BESSs to gain experience and data by participating in CAISO’s NGR market model. PG&E developed and deployed an automated communications and control solution to fully utilize and evaluate BESS fast-response functionalities.	September 2016
Install Smart Grid Line Sensors Pilot The objective of the project was to pilot how line sensors can: (1) provide more accurate information about the fault location area, allow faster outage restoration by reducing outage response time, and improve customer satisfaction; (2) provide accurate current flow information to operators and engineers to plan and reconfigure the system without overloading equipment based on actual current measurements instead of models; and (3) provide more accurate current flow information to engineers to support better planning of the distribution system rather than relying exclusively on models.	December 2016
Voltage and Reactive Power (Volt/Var) Optimization System Pilot This project piloted a voltage and reactive power (Volt/Var) optimization technology to evaluate the technology’s ability to reduce customer energy usage and reduce utility system losses by managing the distribution voltage from the substation to the customer’s service point (distribution primary, secondary and service systems). Volt-Var Optimization (VVO) is a software based solution that analyzes grid conditions, determines the device-level adjustments necessary to regulate voltage, and communicates coordinated commands to grid devices in real time. VVO control systems act as a centralized voltage and reactive power control “brain” of the electric distribution system, for evaluating and signaling the actions needed for better voltage and reactive power regulation.	December 2016
Detect and Locate Faulted Circuit Conditions Pilot This project installed and evaluated a fault-finding software system and systems that assist in more precisely locating failed equipment that caused an outage and determined if there are additional benefits of providing a more accurate location to utility first responders to outages.	December 2016
Transmission Automation and Reliability Projects	
Compressed Air Energy Storage (CAES) Demonstration Project The purpose of this demonstration project was to determine the technical and economic feasibility of an approximately 300 MW CAES plant using a porous rock structure for up to 10 hours of air storage at a location within California. CAES technology consists of compressing air into an underground porous rock formation during periods of excess generation and then releasing the stored air to generate electricity during periods of peak demand.	2017
AM and Operational Efficiency Projects	
Transformer Load Management Project The SmartMeter Transformer Loading Management project enables T&D electric planning engineers and estimators to access actual customer usage data from SmartMeter for analysis in equipment sizing and voltage analysis. The solution will enable PG&E to report transformer (or multiple transformers) load based on interval usage data and the ability to drill down to month, week, day, and Service Point level to see the peak usage. The solution will also identify	June 2012

Project Name (Closed)	Completion Date
transformer (or multiple transformers) by load category (over loaded, under loaded) over the entire SmartMeter population.	
Load Forecasting Automation Program The Load Forecasting Automation Program will automate existing manual electric distribution system load forecasting to increase accuracy of the process and improve forecast documentation. Current and future SCADA data will be gathered and stored within the existing data historian system and will become an input to the new forecasting tool. Circuits with SCADA will provide hourly load data into the historian system and non-SCADA circuits will provide a single monthly peak load from monthly substation inspections. Additionally, this project will replace analog bank demand meters with electronic recording meters.	October 2012
CBM – Substation Project The CBM Substation Project was a PG&E initiative to convert substation inspections collected on paper to a centralized electronic form. Centralizing the data aids in identifying problematic substation assets based on inspected condition trends in a predictive manner. The CBM technology solution for substation provides the platform for equipment inspection readings, temperature, and other data points to provide equipment predictive maintenance. The solution will automate many of the manual processes that are used today including: (1) review of station inspection and test data to identify abnormal conditions; (2) update maintenance trigger plans from oil condition assessment results, counter readings, etc.; and (3) equipment ranking for replacement decisions. The tool is also designed to provide easy access to inspection and test data to asset strategy and engineering personnel that do not have it readily available today. The data will be used to adjust maintenance triggers and for capital investment strategy.	February 2013
Electric Distribution Geographic Information System and Asset Management (Electric Distribution GIS/AM) Project The Electric Distribution GIS/AM project is a continuation of and enhanced approach to the Automated Mapping and Facilities Management (AM/FM) Project, where PG&E upgraded hardware and software components from 2008 2010 and completed alignment of electric and gas maps to a common coordinate scheme or “land base,” to prepare the maps for migration and conversion into a new enterprise GIS solution. While the purpose and scope of the Electric Distribution GIS/AM project is consistent with and leverages work completed as part of the predecessor AM/FM project, key enhancements are being made to drive increased business value with the integrated GIS and enterprise AM system (SAP) data. A significantly more rigorous approach to assure data quality and implement data governance processes is included as part of the new Electric Distribution GIS/AM project. In addition, the scope of the Electric Distribution GIS/AM project has been expanded to include web based analytics for multiple Electric Distribution functions. These and other capabilities are more fully detailed and scoped in the GIS/AM project as compared to the 2011 GRC AM/FM forecast, resulting in a more comprehensive and longer duration project.	December 2015
Security (Physical and Cyber) Projects	
ADAPT Cyber Security Project The ADAPT project is focused on increasing PG&E’s ability to effectively anticipate, prevent, and respond to current and shifting cyber and physical threats by enhancing the following three control areas: <ul style="list-style-type: none"> a) Intelligence and threat management controls: Build specific “early-warning” controls that electronically collect, analyze, and correlate information on Utility targeting threats before they “approach” the Utility’s logical perimeter. b) Advanced detective and preventative controls: Develop controls that “harden” the Utility’s cyber security infrastructure with multiple layers of technology to filter, quarantine, and send alarms on questionable data. c) Adaptive response controls: Enhance incident monitoring, response, and investigation capabilities to quickly respond to potential security incidents. 	May 2012
Integrated and Cross-Cutting Systems Projects	
SmartMeter™ Operations Center (SMOC)	July 2012

Project Name (Closed)	Completion Date
The SMOC project implements telecommunication network operations management capabilities to support PG&E's SmartMeter network to handle growth in the number of deployed meters, effectively monitor the increased amount of data communications from the meters, bring new SmartMeter-related customer services on-line efficiently, and enable timely customer response as well as proactive reliability and availability management. This scope includes designing and implementing a new SMOC for the day to day operations of the existing installed systems and ensure vendor production and operational commitments.	
Applied Technology Services (ATS) Distribution Test Yard (DTY) The DTY will serve as an electrical laboratory that includes simulated distribution capabilities for monitoring and evaluating various new distribution tools, equipment, and applications. It will include the necessary primary line equipment with isolated communications networks to allow safe and thorough testing without risking network security issues. This DTY is part of the overall ATS end to end test capability for distribution systems of the future.	September 2012
Data Historian Foundation Project This project will implement enhanced data historian software for managing and analyzing operational data with select user groups in ET, gas operations, power generation, and energy procurement. When deployed and integrated with other electric systems such as EMS and SCADA, the new data historian will serve as the central data archiving and analysis system for all-time series operational data. This solution enables PG&E operators, engineers, managers and executives to analyze, visualize, and share operational and business data in a manner that not only makes the most sense to them, but also informs intelligent decision-making throughout the utility value chain. The benefits of this capability include productivity improvements, situational awareness, reliability improvements, and regulatory compliance. A separate project is required to enable these capabilities for electric distribution.	July 2014
Information Management Architecture PG&E proposed to invest in a core set of Information Management and processing capabilities to allow participants in the Smart Grid to have timely access to the best available data to drive their energy related decisions. The Information Architecture foundation includes enhanced decision support tools to more accurately analyze, predict, and respond to energy impacting events based on data processed from a multitude of systems and stakeholders. The approach to information management is being optimized and will launch as a new project in 2017.	January 2016
EPIC 2.22-Demand Reduction - Analytics This project used load, interval and other sources of data to develop a new analytical tool to identify strategic customers and target demand reduction in local areas by combining and integrating multiple DSM technologies (e.g., EE, DR, DER, Consumer-oriented Energy Tools). The project investigated whether PG&E can achieve a sufficient amount of demand reduction, give visibility into the customer-side resources and improve the reliability of customer-side resources at the local level in order to delay the need for local capacity expansion expenditures. Main project phases: 1) Screening tool 2) TDSM dashboard 2.0, capturing algorithm insight for 3rd parties, and 3) Tracking/monitoring.	February 2018
EPIC 2.14-Phase ID This project successfully developed and demonstrated automated analytical methods for determining meter phasing and meter-to-transformer connectivity using SmartMeter™, SCADA and GIS data.	July 2018
EPIC 2.07 - Real Time Loading Data for Distribution Operations and Planning This project developed analytical methods for generating near RT load forecast information. The project successfully built and demonstrated a platform to ingest and process SmartMeter™, SCADA, PV system generation, GIS and weather data for two of the eight Areas of Responsibility (AOR) within PG&E's service territory.	November 2018
EPIC 2.14 - Automatically Map Phasing Information This project successfully developed and demonstrated automated analytical methods for determining meter phasing and meter-to-transformer connectivity using SmartMeter™, SCADA and GIS data. The distribution network model is central to multiple existing control systems,	December 2018

Project Name (Closed)	Completion Date
<p>system analyses, and work processes. As the load characteristics of the distribution network evolve, such as with the growth of DER, it is becoming more important to have accurate and up-to-date network model information to be able to actively manage the distribution system. Automated approaches for obtaining this information can offer a more efficient alternative to the conventional boots-on-the-ground approach.</p>	
<p>EPIC 2.02- DERMS</p> <p>This project provided an opportunity for PG&E to define and deploy a DERMS and supporting technology to uncover barriers and specify requirements to prepare for the increasing challenges and opportunities of DERs at scale. The DERMS Demo was a ground-breaking field demonstration of optimal control of a portfolio of 3rd party aggregated behind-the-meter (BTM) solar and energy storage and utility front-of-the-meter (FTM) energy storage to provide distribution capacity and voltage support services while also allowing for participation of these same DERs in the CAISO wholesale market.</p>	December 2018
<p>EPIC 2.03A SIs</p> <p>This project conducted field demonstration of commercial SIs on a high PV-penetration distribution feeder ("Location 2"), the evaluation of a vendor-agnostic SI aggregation platform, and lab testing of multiple SI models. The project established that there is significant potential for local voltage support from SIs to help mitigate local secondary voltage challenges caused by high PV penetration in a cost-effective manner. Efforts undertaken within the project were not able to establish that individual or aggregations of SIs were able to substantially affect primary voltage.</p>	February 2019
<p>EPIC 2.05 - Inertia Response Emulation for DG Impact Improvement</p> <p>This project explored the capabilities of inverter-based energy resources to provide a set of functions related to system inertia which support the electric system. The project demonstrated via transmission system modeling and Power-Hardware-In-Loop testing that advanced inverter control methods can provide active power support that improves the system's frequency response in the face of reduced conventional inertia from synchronous machine generators. Inverter control methods were explored including inertia-like response (derivative control) and grid-forming (voltage source) modes for respective benefits in bulk system and isolated distribution system use cases.</p>	February 2019

APPENDIX I - IE ANALYSIS 2020 ACTUAL VS. 2020 PLAN V2

\$Ms						
2020 WMP Initiative # 2021 WMP Initiative # Description			2020 Total		Var.	Notes
			Plan	Actual		
5.3.3.11-1	7.3.3.11.1	7.3.3.11.1 Mitigation of impact on customers a	\$434	\$174	(\$259)	<p>Strategy shift for the DGEM program where initially we had planned to do a lot of make ready capital work and permanent generation. Company strategy is to now pursue much less of this. Temp Gen expense was also lower than planned mainly due to timing of some invoices/costs for 2020 that hit in 2021, also less operating/event cost due to smaller deployment of temp gen during PSPS events.</p> <p>We incurred less than planned PSPS event costs (investments to mitigate PSPS events are showing less costs per event as we operationalize our investments ie fire risk modeling, system hardening, sectionalizing devices)</p> <p>Primarily driven by lower unit costs (budgets based off of actuals we incurred in 2019, which were compared to historicals and future contracts rates due to the accelerated nature of the work in 2019 and the need to bring in contract labor to perform the majority of the work)</p> <p>Primary driver is that substation transformer maintenance under ran due to Covid 19 impacts of work/projects being reprioritized and pushed out to 2021</p> <p>Primarily driven by lower unit costs (budgets based off of actuals we incurred in 2019, which were compared to historicals and future contracts rates due to the accelerated nature of the work in 2019 and the need to bring in contract labor to perform the majority of the work)</p> <p>Primarily driven by lower unit cost (enhanced program management oversight driving efficiency gains) and lower volume where notifications were assigned to a program but ended up being completed in another program</p> <p>Primarily driven by Covid 19 impacts and resources diverted to emergency response efforts related to fires</p> <p>2020 Plan assumed a substantial amount of the PSPS event work that were booked to Distribution orders would be related to Transmission based off of high level assumptions (# of line miles impacted). After analysis with the PSPS team, minimal amount of PSPS event work booked to distribution orders should be realigned to transmission</p> <p>Transmission sub Inspections focused primarily on HFTD, Non-HFTD was overplanned incorrectly</p> <p>Primarily driven by Covid 19 impacts and resources diverted to emergency response efforts related to fires</p> <p>Initiative is a percentage allocation based upon SME input (~71%)of the Transmission veg mgmt program. Total transmission program under run is driven by operational underruns in Routine, Orchard Removal, and IVM</p> <p>Primarily driven by project dependencies (gating factors), which includes delay in switch gear replacement, design delays, equipment requirements, lack of resources due to COVID 19 and fire response</p>
5.3.6.5-1	7.3.6.5-D	7.3.6.5-D PSPS events and mitigation of PSPS in	\$139	\$80	(\$59)	
5.3.4.2	7.3.4.2	7.3.4.2 Detailed inspections of transmission ele	\$142	\$90	(\$52)	
5.3.3.14	7.3.3.14	7.3.3.14 Transformers maintenance and replaci	\$120	\$89	(\$31)	
5.3.4.1	7.3.4.1	7.3.4.1 Detailed inspections of distribution elec	\$156	\$133	(\$23)	
5.3.3.15	7.3.3.15	7.3.3.15 Transmission tower maintenance and	\$108	\$92	(\$16)	
5.3.3.6	7.3.3.6	7.3.3.6 Distribution pole replacement and reinf	\$258	\$244	(\$14)	
5.3.6.5-2	7.3.6.5-T	7.3.6.5-T PSPS events and mitigation of PSPS in	\$15	\$0	(\$14)	
5.3.4.15-1	7.3.4.15-T	7.3.4.15-T Substation inspections, Enhanced Tr	\$24	\$11	(\$13)	
5.3.3.5	7.3.3.5	7.3.3.5 Crossarm maintenance, repair, and repl	\$79	\$68	(\$11)	
5.3.5.3	7.3.5.3	7.3.5.3 Detailed inspections of vegetation arou	\$140	\$131	(\$9)	
5.3.3.9-3	7.3.3.9.1	7.3.3.9.1 Installation of system automation equ	\$23	\$17	(\$6)	

5.3.2.7-1	7.3.2.7	7.3.2.7 Other, Wildfire Safety Operations Center	\$9	\$4	(\$5)
5.3.9.5	7.3.9.5	7.3.9.5 Preparedness and planning for service restoration	\$8	\$4	(\$4)
5.3.4.11	7.3.4.11	7.3.4.11 Patrol inspections of distribution electrical	\$13	\$9	(\$4)
5.3.3.9-2	7.3.3.9.2	7.3.3.9.2 Installation of system automation equipment	\$3	\$0	(\$3)
5.3.3.12-1	7.3.3.12.1	7.3.3.12.1 Other corrective action, Distribution	\$13	\$9	(\$3)
5.3.9.6	7.3.9.6	7.3.9.6 Protocols in place to learn from wildfire	\$5	\$2	(\$2)
5.3.5.8	7.3.5.8	7.3.5.8 LiDAR inspections of vegetation around	\$28	\$25	(\$2)
5.3.9.1	7.3.9.1	7.3.9.1 Adequate and trained workforce for service	\$4	\$2	(\$2)
5.3.3.8-2	7.3.3.8.2	7.3.3.8.2 Grid topology improvements to mitigate	\$51	\$49	(\$2)
5.3.2.2-3	7.3.2.2.5	7.3.2.2.5 Continuous monitoring sensors, Line S	\$4	\$3	(\$1)
5.3.3.2-2	7.3.3.2-Baseline-T	7.3.3.2-Baseline-T Circuit breaker maintenance	\$32	\$31	(\$1)
5.3.4.4	7.3.4.4	7.3.4.4 Infrared inspections of distribution electrical	\$2	\$2	(\$1)
5.3.10.4	7.3.10.4	7.3.10.4 Forest service and fuel reduction cooperation	\$3	\$3	(\$0)
5.3.3.7	7.3.3.7	7.3.3.7 Expulsion fuse replacement	\$8	\$8	(\$0)
5.3.6.3	7.3.6.3	7.3.6.3 Personnel work procedures and training	\$1	\$1	(\$0)
5.3.5.18-2	7.3.5.18.2	7.3.5.18.2 Substation vegetation management,	\$3	\$3	(\$0)
5.3.2.1-1	7.3.2.1.3	7.3.2.1.3 Advanced weather monitoring and weather	\$9	\$8	(\$0)
5.3.3.8-5	7.3.3.17.5	7.3.3.17.5 Updates to grid topology to minimize	\$1	\$1	(\$0)
5.3.5.9	7.3.5.9	7.3.5.9 Other discretionary inspections of vegetation	\$1	\$1	(\$0)
5.3.3.12-2	7.3.3.12.2	7.3.3.12.2 Other corrective action, Transmission	\$3	\$3	(\$0)
N/A - Not in Sept 2020	7.3.2.1.1	7.3.2.1.1 Advanced weather monitoring and weather	\$1	\$0	(\$0)
5.3.2.6	7.3.2.6	7.3.2.6 Weather forecasting and estimating impacts	\$1	\$0	(\$0)
5.3.7.3	7.3.7.3	7.3.7.3 Documentation and disclosure of wildfire	\$1	\$0	(\$0)
5.3.2.1-3	7.3.2.1.5	7.3.2.1.5 Advanced weather monitoring and weather	\$0	\$0	(\$0)
N/A - Not in Sept 2020	7.3.2.1.6	7.3.2.1.6 Advanced weather monitoring and weather	\$0	\$0	(\$0)
N/A - Not in Sept 2020	7.3.1.6	7.3.1.6 Weather-Driven Risk Map and Modeling	\$1	\$0	(\$0)
5.3.7.4	7.3.7.4	7.3.7.4 Tracking and analysis of near miss data	\$1	\$1	(\$0)
5.3.5.17-2	7.3.5.17.2	7.3.5.17.2 Substation inspection , Transmission	\$0	\$0	(\$0)
5.3.4.12	7.3.4.12	7.3.4.12 Patrol inspections of transmission electrical	\$0	\$0	(\$0)
5.3.1.4	7.3.1.4	7.3.1.4 Initiative mapping and estimation of wildfire	\$0	\$0	(\$0)
5.3.2.2-5	7.3.2.2.1	7.3.2.2.1 Continuous monitoring sensors, Electrical	\$1	\$1	\$0
5.3.2.3	7.3.2.3	7.3.2.3 Fault indicators for detecting faults on electrical	\$1	\$1	\$0
5.3.3.3	7.3.3.3	7.3.3.3 Covered conductor installation	\$0	\$0	\$0
5.3.3.16	7.3.3.16	7.3.3.16 Undergrounding of electric lines and/or	\$0	\$0	\$0
5.3.4.9	7.3.4.9	7.3.4.9 Other discretionary inspection of distribution	\$0	\$0	\$0
5.3.4.10	7.3.4.10	7.3.4.10 Other discretionary inspection of transmission	\$0	\$0	\$0
5.3.4.5	7.3.4.5	7.3.4.5 Infrared inspections of transmission electrical	\$1	\$1	\$0
N/A - Not in Sept 2020	7.3.4.7	7.3.4.7 LiDAR Inspections of Distribution Electrical	\$6	\$6	\$0
N/A - Not in Sept 2020	7.3.4.8	7.3.4.8 LiDAR Inspections of Transmission Electrical	\$0	\$0	\$0
5.3.5.10	7.3.5.10	7.3.5.10 Other discretionary inspections of vegetation	\$0	\$0	\$0
5.3.5.11	7.3.5.11	7.3.5.11 Patrol inspections of vegetation around	\$0	\$0	\$0
5.3.5.12	7.3.5.12	7.3.5.12 Patrol inspections of vegetation around	\$0	\$0	\$0
5.3.5.16	7.3.5.16	7.3.5.16 Removal and remediation of trees with	\$0	\$0	\$0

Underspend primarily driven by an incorrect overhead planning assumption. Each headcount group is part of a PCC (Provider cost center) where each type of PCC bears different overheads. Planning assumptions assumed a PCC with higher overheads. This group ended up being part of another PCC type with lower overheads.

5.3.5.20	7.3.5.20	7.3.5.20 Vegetation management to achieve cl	\$0	\$0	\$0
5.3.6.1	7.3.6.1	7.3.6.1 Automatic recloser operations	\$0	\$0	\$0
N/A - Not in Sept 2020	7.3.9.7	7.3.9.7 Other, Mutual Assistance	\$0	\$0	\$0
5.3.10.2	7.3.10.2	7.3.10.2 Cooperation and best practice sharing	\$0	\$0	\$0
5.3.5.17-1	7.3.5.17.1	7.3.5.17.1 Substation inspection , Distribution s	\$0	\$0	\$0
5.3.5.14	7.3.5.14	7.3.5.14 Recruiting and training of vegetation n	\$0	\$0	\$0
N/A - Not in Sept 2020	7.3.2.1.2	7.3.2.1.2 Advanced weather monitoring and we	\$0	\$0	\$0
N/A - Not in Sept 2020	7.3.3.8.3	7.3.3.8.3 Grid topology improvements to mitig	\$0	\$0	\$0
5.3.5.18-1	7.3.5.18.1	7.3.5.18.1 Substation vegetation management,	\$3	\$3	\$0
5.3.5.7.1	7.3.5.7	7.3.5.7 LiDAR inspections of vegetation around	\$3	\$3	\$0
5.3.2.2-6	7.3.2.2.4	7.3.2.2.4 Continuous monitoring sensors, Senc	\$2	\$2	\$0
5.3.1.2	7.3.1.2	7.3.1.2 Climate-driven risk map and modelling l	\$1	\$1	\$0
5.3.4.3	7.3.4.3	7.3.4.3 Improvement of inspections	\$0	\$0	\$0
5.3.1.1	7.3.1.1	7.3.1.1 A summarized risk map that shows the c	\$0	\$1	\$0
5.3.1.3	7.3.1.3	7.3.1.3 Ignition probability mapping showing th	\$0	\$1	\$0
5.3.5.5	7.3.5.5	7.3.5.5 Fuel management and reduction of "sla	\$23	\$24	\$0
5.3.1.5	7.3.1.5	7.3.1.5 Match drop simulations showing the po	\$3	\$4	\$0
5.3.2.2-1	7.3.2.2.2	7.3.2.2.2 Continuous monitoring sensors, Smar	\$1	\$1	\$0
5.3.6.4-2	7.3.6.4-T	7.3.6.4-T Protocols for PSPS re-energization, Tr	\$1	\$1	\$0
5.3.7.2	7.3.7.2	7.3.7.2 Collaborative research on utility ignitor	\$1	\$1	\$0
5.3.5.6	7.3.5.6	7.3.5.6 Improvement of inspections	\$1	\$1	\$0
5.3.2.5	7.3.2.5	7.3.2.5 Personnel monitoring areas of electric li	\$3	\$3	\$0
5.3.6.6	7.3.6.6	7.3.6.6 Stationed and on-call ignition preventio	\$3	\$3	\$0
5.3.8.2	7.3.8.2	7.3.8.2 Risk reduction scenario development ar	\$0	\$1	\$0
5.3.2.7-2	7.3.2.8	7.3.2.8 Other, Meteorology Analytics/Operation	\$0	\$1	\$1
5.3.7.1	7.3.7.1	7.3.7.1 Centralized repository for data	\$0	\$1	\$1
5.3.2.2-4	7.3.2.2.6	7.3.2.2.6 Continuous monitoring sensors, Distri	\$0	\$1	\$1
5.3.2.4	7.3.2.4	7.3.2.4 Forecast of a fire risk index, fire potenti	\$1	\$2	\$1
5.3.9.3	7.3.9.3	7.3.9.3 Customer support in emergencies	\$3	\$4	\$1
5.3.3.11-2	7.3.3.11.2	7.3.3.11.2 Mitigation of impact on customers a	\$11	\$11	\$1
5.3.2.2-2	7.3.2.2.3	7.3.2.2.3 Continuous monitoring sensors, Distri	\$0	\$1	\$1
5.3.5.19	7.3.5.19	7.3.5.19 Vegetation inventory system	\$7	\$7	\$1
5.3.5.1	7.3.5.1	7.3.5.1 Additional efforts to manage communit	\$21	\$22	\$1
5.3.5.4	7.3.5.4	7.3.5.4 Emergency response vegetation manag	\$5	\$6	\$1
5.3.6.2	7.3.6.2	7.3.6.2 Crew-accompanying ignition prevention	\$9	\$10	\$1
5.3.3.1	7.3.3.1	7.3.3.1 Capacitor maintenance and replacemen	\$8	\$9	\$1
5.3.3.17-2	7.3.3.17.3	7.3.3.17.3 Updates to grid topology to minimiz	\$62	\$63	\$1
5.3.5.15	7.3.5.15	7.3.5.15 Remediation of at-risk species	\$115	\$116	\$1
5.3.8.3	7.3.8.3	7.3.8.3 Risk spend efficiency analysis	\$0	\$2	\$2
5.3.4.14	7.3.4.14	7.3.4.14 Quality assurance / quality control of i	\$0	\$2	\$2
5.3.10.1	7.3.10.1	7.3.10.1 Community engagement	\$8	\$10	\$2
5.3.8.1	7.3.8.1	7.3.8.1 Allocation methodology development a	\$2	\$4	\$2
5.3.9.2	7.3.9.2	7.3.9.2 Community outreach, public awareness	\$4	\$6	\$3
5.3.3.4	7.3.3.4	7.3.3.4 Covered conductor maintenance	\$17	\$19	\$3
5.3.3.13	7.3.3.13	7.3.3.13 Pole loading infrastructure hardening a	\$11	\$14	\$3
5.3.4.6	7.3.4.6	7.3.4.6 Intrusive pole inspections	\$15	\$17	\$3
5.3.3.2-3	7.3.3.2-Enhanced-D	7.3.3.2-Enhanced-D Circuit breaker maintenanc	\$1	\$4	\$3

5.3.5.13	7.3.5.13	7.3.5.13 Quality assurance / quality control of v	\$9	\$12	\$3
5.3.3.2-4	7.3.3.2-Enhanced-T	7.3.3.2-Enhanced-T Circuit breaker maintenanc	\$0	\$4	\$3
5.3.2.1-2	7.3.2.1.4	7.3.2.1.4 Advanced weather monitoring and we	\$4	\$7	\$3
5.3.9.4	7.3.9.4	7.3.9.4 Disaster and emergency preparedness p	\$1	\$5	\$4
5.3.10.3	7.3.10.3	7.3.10.3 Cooperation with suppression agencie	\$1	\$5	\$4
5.3.9.7	7.3.6.7	7.3.6.7 Other, Aviation Support	\$2	\$6	\$4
5.3.4.15-2	7.3.4.15-D	7.3.4.15-D Substation inspections, Enhanced Di	\$6	\$10	\$4
5.3.4.13	7.3.4.13	7.3.4.13 Pole loading assessment program to d	\$14	\$19	\$4
5.3.3.10	7.3.3.10	7.3.3.10 Maintenance, repair, and replacement	\$5	\$9	\$4
5.3.3.17-3	7.3.3.17.4	7.3.3.17.4 Updates to grid topology to minimiz	\$5	\$11	\$6
5.3.3.8-1	7.3.3.8.1	7.3.3.8.1 Grid topology improvements to mitig	\$63	\$70	\$7
5.3.3.2-1	7.3.3.2-Baseline-D	7.3.3.2-Baseline-D Circuit breaker maintenance	\$11	\$19	\$8
5.3.10.5-1	7.3.10.5	7.3.10.5 Other, PMO and General Wildfire Supp	\$21	\$32	\$11
N/A - Not in Sept 2020	7.3.3.17.6	7.3.3.17.6 Updates to grid topology to minimiz	\$16	\$30	\$14
5.3.7.5	7.3.7.5	7.3.7.5 Other, IT projects to support wildfire mi	\$88	\$113	\$25
N/A - Not in Sept 2020	7.3.3.11.3	7.3.3.11.3 Mitigation of impact on customers a	\$11	\$39	\$28
N/A - Not in Sept 2020	7.3.3.17.2	7.3.3.17.2 Updates to grid topology to minimiz	\$160	\$203	\$43
5.3.3.12-4	7.3.3.12.4	7.3.3.12.4 Other corrective action, Maintenanc	\$289	\$348	\$60
5.3.6.4-1	7.3.6.4-D	7.3.6.4-D Protocols for PSPS re-energization, Di	\$9	\$81	\$72
5.3.3.17-1	7.3.3.17.1	7.3.3.17.1 Updates to grid topology to minimiz	\$367	\$460	\$93
5.3.3.12-3	7.3.3.12.3	7.3.3.12.3 Other corrective action, Maintenanc	\$435	\$552	\$117
5.3.5.2	7.3.5.2	7.3.5.2 Detailed inspections of vegetation arou	\$909	\$1,098	\$188
Total			\$4,623	\$4,821	\$198



BUREAU
VERITAS



Appendix J - Surge Arrestors

OBJECTID	Latitude	Longitude	Field_Verifiable_Item	Field_Status	GlobalID
1	37.977237	-120.388453	Non-Exempt Surge Arrestor	Completed	{21A14252-A538-40B6-B7B1-1CF400A3A5C0}
2	37.977112	-120.388062	Non-Exempt Surge Arrestor	Completed	{F7B59E5B-8359-4E18-B6BC-879BEF1AC3BE}
3	37.976638	-120.388287	Non-Exempt Surge Arrestor	Completed	{9B235C24-134C-44A2-8E08-62122E0FED66}
4	37.975348	-120.389162	Non-Exempt Surge Arrestor	Completed	{F5F92B1D-A81C-4D45-A190-2AA753F2AD08}
5	37.974712	-120.390318	Non-Exempt Surge Arrestor	Completed	{A9095E05-3F1B-4B09-B3FA-F4CFF37A0361}
6	37.984365	-120.393708	Non-Exempt Surge Arrestor	Completed	{0D470142-BD61-4B84-A698-66D0BF82D047}
7	37.984373	-120.393737	Non-Exempt Surge Arrestor	Completed	{A6692AC4-9AFA-4FAC-B735-818EE0B63A54}
8	37.983378	-120.391345	Non-Exempt Surge Arrestor	Completed	{850832C0-5F5A-43DD-A61D-760E1A399C42}
9	37.987737	-120.389307	Non-Exempt Surge Arrestor	Completed	{879D59C9-F3ED-4797-9430-2421FE415F9E}
10	37.987695	-120.389387	Non-Exempt Surge Arrestor	Completed	{32EB2B14-9DBA-4D02-B685-DCE1EE984EBA}
11	37.988433	-120.390088	Non-Exempt Surge Arrestor	Completed	{DC8A04C9-0DBF-461D-A03D-1A93AF3B0685}
12	37.987227	-120.39034	Non-Exempt Surge Arrestor	Completed	{7312D50D-F2E7-4D55-8BA4-DB16908534BF}
13	37.986303	-120.390797	Non-Exempt Surge Arrestor	Completed	{E0BA27F8-50AF-4273-BD42-BD489C109176}
14	37.98652	-120.390658	Non-Exempt Surge Arrestor	Completed	{1CF71D58-830A-4A4D-A62A-D64C68739F59}
15	37.981153	-120.384538	Non-Exempt Surge Arrestor	Completed	{1E0CD8A0-1579-44C3-9632-2051360147E3}
16	37.980843	-120.38513	Non-Exempt Surge Arrestor	Completed	{368FF9DB-2CD9-43FC-AE7D-C1EF76987791}
17	37.98827	-120.409412	Non-Exempt Surge Arrestor	Completed	{C484A832-1AE3-4ADB-931E-FCE13110CB21}
18	37.986033	-120.408268	Non-Exempt Surge Arrestor	Completed	{062D518F-011B-46D9-BE1F-05CCC18D0B6D}
19	37.985512	-120.40806	Non-Exempt Surge Arrestor	Completed	{DD24C1C6-1E7D-4F25-BDE0-1E0EBDE48DA2}
20	37.989473	-120.406752	Non-Exempt Surge Arrestor	Completed	{FE2BD90B-FB71-40A7-A3F1-3424B7DD9442}
21	37.988472	-120.406362	Non-Exempt Surge Arrestor	Completed	{E87CA2D2-B180-4826-88E1-6FB50F523D2A}
22	37.991588	-120.400852	Non-Exempt Surge Arrestor	Completed	{4F2B2606-AFC0-4D00-A1A8-9306D5660CB9}
23	37.997385	-120.414355	Non-Exempt Surge Arrestor	Completed	{443AF44C-C2CF-4D44-B4E3-8ECC8CAA58FD}
24	37.996285	-120.417175	Non-Exempt Surge Arrestor	Completed	{F1FB1F56-41A5-4AFF-8653-E7D07B617447}
25	38.002635	-120.40835	Non-Exempt Surge Arrestor	Completed	{001277E9-10E5-4DDC-B7FF-3DF702E02D8A}
26	38.003762	-120.407267	Non-Exempt Surge Arrestor	Completed	{B004ECF2-9272-4AA6-B4E1-303F66EA37E2}
27	38.005593	-120.404683	Non-Exempt Surge Arrestor	Completed	{FE1E53EC-202A-47E1-959C-7DA3CEB066E5}
28	38.00385	-120.402657	Non-Exempt Surge Arrestor	Completed	{13EAF690-33B9-4D83-BA96-091F7B0B5EB9}
29	37.99075	-120.416787	Non-Exempt Surge Arrestor	Completed	{404EA17F-CE3B-40CE-A03D-C52D5744DA21}
30	37.99216	-120.415492	Non-Exempt Surge Arrestor	Completed	{F093803B-39DD-494D-8726-0CF2A8E3AC35}
31	37.984188	-120.407035	Non-Exempt Surge Arrestor	Completed	{F1574063-622F-4B36-9C63-7D08DE9BFE9E}
32	37.9824	-120.406417	Non-Exempt Surge Arrestor	Completed	{27BE1916-1A80-4B27-AE90-DF9B7A925538}
33	37.982062	-120.407203	Non-Exempt Surge Arrestor	Completed	{939193BE-257B-4C4C-943E-E3004F48892E}
34	37.981178	-120.407368	Non-Exempt Surge Arrestor	Completed	{FBD8A385-D007-4FDF-9C5B-27B4D8CC0D0E}
35	37.982775	-120.40846	Non-Exempt Surge Arrestor	Completed	{362218F2-3AD4-4054-BA3D-FF7366D8459C}
36	37.982643	-120.409038	Non-Exempt Surge Arrestor	Completed	{E96EA5A6-CD7D-48B7-AB76-9B0B5F230D05}
37	37.983375	-120.408533	Non-Exempt Surge Arrestor	Completed	{B3B47EE0-35FF-4225-9E99-EF7C0B271DC7}
38	37.983663	-120.409245	Non-Exempt Surge Arrestor	Completed	{957650A2-AC13-4BCC-99C3-0C23FC85B5AB}
39	37.981353	-120.410172	Non-Exempt Surge Arrestor	Completed	{9635CDA5-FA94-47EB-BC5D-D6E2BF0058B7}
40	37.980782	-120.410238	Non-Exempt Surge Arrestor	Completed	{2911931F-05C5-4B79-9343-DD14919847AB}
41	37.981363	-120.411177	Non-Exempt Surge Arrestor	Completed	{808FB2CE-4D9B-46D4-83D3-67297830C1DB}
42	37.982448	-120.409477	Non-Exempt Surge Arrestor	Completed	{AD9FF13A-491E-4178-94A4-7E63A700B704}
43	37.98297	-120.411253	Non-Exempt Surge Arrestor	Completed	{3E3A99D2-B78F-4CF2-B68F-D6D4F47249F4}
44	37.982478	-120.413508	Non-Exempt Surge Arrestor	Completed	{3B80DBDB-4027-499E-B78C-11CD909D21FF}

45	38.005895	-120.406693	Non-Exempt Surge Arrestor	Completed	{6BBA6033-0CF2-41D9-BADA-817D12032B1D}
46	38.006252	-120.40723	Non-Exempt Surge Arrestor	Completed	{DD5E8714-3335-42D5-8E13-892216A308D4}
47	38.23734	-119.99254	Non-Exempt Surge Arrestor	Completed	{2A46F538-BD11-4538-900E-80FEC8541378}
48	38.237678	-119.991702	Non-Exempt Surge Arrestor	Completed	{FC137990-7AB5-4D03-81E3-AA709CD10B2F}
49	38.237953	-119.992495	Non-Exempt Surge Arrestor	Completed	{B2B5E8A1-A4A9-4D23-A57E-E8C776F13482}
50	38.064145	-120.18886	Non-Exempt Surge Arrestor	Completed	{822DD824-0BD7-4D12-B4BD-0FE96DF29D12}
51	38.082702	-120.204607	Non-Exempt Surge Arrestor	Completed	{B122589B-9D27-4C0D-A050-A70D0DFA159F}
52	38.189925	-119.990028	Non-Exempt Surge Arrestor	Completed	{978EE7FF-677C-4228-83DB-ACD28C09342D}
53	38.151767	-120.04534	Non-Exempt Surge Arrestor	Completed	{F2A1794E-9A77-42F9-8D74-E187FC7FF72B}
54	38.152497	-120.056492	Non-Exempt Surge Arrestor	Completed	{0320C12A-31F9-444B-9D37-EA20B6C443A2}
55	38.152595	-120.05661	Non-Exempt Surge Arrestor	Completed	{7656ED2B-76D7-4E46-8A75-1DD438D273D2}
56	38.151868	-120.053647	Non-Exempt Surge Arrestor	Completed	{6693CFC5-940F-45A0-B0CB-DDA54E7CBA00}
57	38.154917	-120.052255	Non-Exempt Surge Arrestor	Completed	{62FB59E0-E4C8-4E2C-AE65-A51BCE099490}
58	38.154127	-120.051523	Non-Exempt Surge Arrestor	Completed	{304BD6A7-EC40-458A-AE13-5B8ACAD46DB9}
59	38.154492	-120.048515	Non-Exempt Surge Arrestor	Completed	{E9ED98DF-B244-45A1-AC73-E7C574E0855B}
60	38.154447	-120.048363	Non-Exempt Surge Arrestor	Completed	{2D41E768-39E4-493B-89DF-58AEAA9EAD1}
61	38.154763	-120.050432	Non-Exempt Surge Arrestor	Completed	{95E3FA55-97B5-43FA-A809-0A8B9B751A1D}
62	38.1546	-120.050515	Non-Exempt Surge Arrestor	Completed	{796FC9C7-1594-4C18-9F3F-557CFA91E7B5}
63	38.157623	-120.051243	Non-Exempt Surge Arrestor	Completed	{C6DA6C98-AA60-49E6-B532-F53583568F8E}
64	38.0496	-120.19946	Non-Exempt Surge Arrestor	Completed	{C4C918B0-A696-410F-9A8B-A1D4777620A1}
65	38.039363	-120.216583	Non-Exempt Surge Arrestor	Completed	{F19AF65F-FAE0-45E8-BBC4-64778B4EEDF4}
66	38.15782	-120.051932	Non-Exempt Surge Arrestor	Completed	{EC802CEF-71AE-460D-BAF8-D279B6B23DAD}
67	38.159815	-120.053638	Non-Exempt Surge Arrestor	Completed	{CED0A6BB-D924-4269-B807-82BB65D89CAE}
68	38.160277	-120.052165	Non-Exempt Surge Arrestor	Completed	{D6741798-EBE8-4B76-B59A-C21F4944D5E7}
69	38.160717	-120.050895	Non-Exempt Surge Arrestor	Completed	{9CF9E5F0-D8ED-4E29-AF87-9B8033569EFF}
70	38.16103	-120.052935	Non-Exempt Surge Arrestor	Completed	{C71BA98E-289C-496F-848D-6AA840EE0C71}
71	38.16101	-120.052842	Non-Exempt Surge Arrestor	Completed	{CE4498F2-F1FD-4B69-8BF5-120B59AE61DC}
72	38.161685	-120.050558	Non-Exempt Surge Arrestor	Completed	{AF22DD6F-46DF-49B0-8DCF-FB75080D52AA}
73	38.175023	-120.036308	Non-Exempt Surge Arrestor	Completed	{7783B934-9A1B-48AF-92D2-3E0484F5CFD1}
74	38.17772	-120.035178	Non-Exempt Surge Arrestor	Completed	{B3C188F9-CB93-4209-BDAA-74B0E6FB4886}
75	38.177862	-120.03532	Non-Exempt Surge Arrestor	Completed	{054D06B4-8CB5-48F3-A52B-F5A7754CD5BA}
76	38.178572	-120.03576	Non-Exempt Surge Arrestor	Completed	{2C4B4646-0E4B-412D-B291-7992486B743E}
77	38.179198	-120.036335	Non-Exempt Surge Arrestor	Completed	{22FB0CE0-FF23-4DF1-B2CF-78B561CBD303}
78	38.178243	-120.0365	Non-Exempt Surge Arrestor	Completed	{009581B7-91D1-4DC6-A593-B197BD1D1864}
79	38.177822	-120.037523	Non-Exempt Surge Arrestor	Completed	{ADB2248E-B604-44A2-A65C-ECBEF3E8DA14}
80	38.177675	-120.038137	Non-Exempt Surge Arrestor	Completed	{5C9FF39E-FD99-49F0-99F1-EE2A80AEB5EB}
81	38.177687	-120.038045	Non-Exempt Surge Arrestor	Completed	{3807A21F-9893-4D8F-A1F8-609879EBE9E9}
82	38.179603	-120.03244	Non-Exempt Surge Arrestor	Completed	{7529F922-6BE7-4740-858C-00E9D8425619}
83	38.197533	-120.01642	Non-Exempt Surge Arrestor	Completed	{5F6F82B0-8AFB-4098-B79A-CF9870DDB46F}
84	38.194723	-120.016493	Non-Exempt Surge Arrestor	Completed	{AA3A48B3-F482-4E21-B64D-E95224909BE8}
85	38.17842	-120.046202	Non-Exempt Surge Arrestor	Completed	{A91174F1-03E5-4C74-9C05-90051FFA03A7}
86	38.226097	-119.996618	Non-Exempt Surge Arrestor	Completed	{14AD519E-DBA6-47CB-9FBC-A45127C92035}
87	38.18821	-120.004283	Non-Exempt Surge Arrestor	Completed	{7405981F-5DEA-4B37-AFBA-434D77DAFB17}
88	38.190492	-120.001273	Non-Exempt Surge Arrestor	Completed	{7BF77CB8-8FF1-4D56-8155-A48ECD8855EC}
89	38.193077	-119.997817	Non-Exempt Surge Arrestor	Completed	{95625E2A-2984-42CB-AF33-26F14B7ADD9B}
90	38.19229	-119.995945	Non-Exempt Surge Arrestor	Completed	{434928BF-DD66-49E2-AA23-3713F386AE81}
91	38.1906	-119.997402	Non-Exempt Surge Arrestor	Completed	{0A6854B1-F9B7-41FC-A8DC-450905CDB23F}
92	38.190247	-119.9972	Non-Exempt Surge Arrestor	Completed	{1E97C59F-96F0-44A0-97FC-6A75C839A98D}
93	38.187963	-119.995093	Non-Exempt Surge Arrestor	Completed	{39D08F62-DFEF-4B9E-B0EC-5B86C21FD465}
94	38.188448	-119.999307	Non-Exempt Surge Arrestor	Completed	{9AD299A3-6AF1-407B-9328-EE8F27F616BA}
95	38.18609	-120.000667	Non-Exempt Surge Arrestor	Completed	{BEA6677A-1994-4FDC-9F3E-5DB178F3BDB1}
96	38.183968	-120.005245	Non-Exempt Surge Arrestor	Completed	{9B0C7F7D-4AF9-4710-A81E-7BFC643B0827}

97	38.027473	-120.224358	Non-Exempt Surge Arrestor	Completed	{EEB375B3-5487-456C-BE53-4C9A42AF3610}
98	38.185933	-119.991932	Non-Exempt Surge Arrestor	Completed	{7AE04452-0626-4FF6-BD50-D4DCE1C42B2E}
99	38.037365	-120.220627	Non-Exempt Surge Arrestor	Completed	{3FBFB440-5B7C-4698-B0FF-C2649C778D5B}
100	38.03324	-120.219297	Non-Exempt Surge Arrestor	Completed	{325E5DD5-1431-4A7E-9745-304046716EC8}
101	38.029165	-120.222603	Non-Exempt Surge Arrestor	Completed	{22429CC5-AAF4-486B-AF67-3676600E3B0C}
102	38.02775	-120.223165	Non-Exempt Surge Arrestor	Completed	{084F8AB3-2BE7-4345-9113-27099018DD4E}
103	38.031417	-120.222643	Non-Exempt Surge Arrestor	Completed	{C72CE8F2-28EE-4CAD-B405-A06DC1B98C3F}
104	38.032105	-120.220478	Non-Exempt Surge Arrestor	Completed	{B5FA4171-547D-4D34-9FEE-19712375A17F}
105	38.027475	-120.224375	Non-Exempt Surge Arrestor	Completed	{A4C6040C-E300-4E1B-B19D-72B3F5C5C41F}
106	38.02768	-120.224455	Non-Exempt Surge Arrestor	Completed	{6869F562-346A-4363-8C50-80DB9EFC214C}
107	38.027715	-120.224373	Non-Exempt Surge Arrestor	Completed	{E7DB9A05-60C5-4003-A209-B1D4F50532BB}
108	38.031772	-120.22092	Non-Exempt Surge Arrestor	Completed	{285EE682-DB1F-4D61-A4D7-BEC177799CA3}
109	38.02788	-120.223965	Non-Exempt Surge Arrestor	Completed	{575D76A1-3F14-4607-A7B4-8F5BED8AD525}
110	38.031958	-120.224895	Non-Exempt Surge Arrestor	Completed	{2614747D-8FBF-4562-BB81-FE317FC2D2CC}
111	38.024298	-120.221305	Non-Exempt Surge Arrestor	Completed	{B6577D1C-2606-4E1C-AC33-E8FBE1D0D9D6}
112	38.035	-120.223212	Non-Exempt Surge Arrestor	Completed	{A69447CB-7A46-463E-AE6A-B044D4D49A3C}
113	38.038052	-120.226753	Non-Exempt Surge Arrestor	Completed	{7D10AEA6-67DD-4836-89D4-C51ED78FA865}
114	38.054147	-120.197877	Non-Exempt Surge Arrestor	Completed	{730D80B2-D107-459B-B083-E3AC4CFBD478}
115	38.060543	-120.193322	Non-Exempt Surge Arrestor	Completed	{DF2A54FE-2D16-41C7-9AEE-C1D48D8E9010}
116	38.062073	-120.193287	Non-Exempt Surge Arrestor	Completed	{8A2E01FC-8FC6-4AD0-8EFC-432E896024CD}
117	38.058843	-120.198327	Non-Exempt Surge Arrestor	Completed	{9315F921-A558-4CE7-BC93-B02676AE01D6}
118	38.05777	-120.198263	Non-Exempt Surge Arrestor	Completed	{9E841C3B-071C-4848-BD9D-739BDBB9C0B6}
119	38.058597	-120.194242	Non-Exempt Surge Arrestor	Completed	{87A8B9CE-E892-4479-814E-56A67884E27E}
120	38.058847	-120.19556	Non-Exempt Surge Arrestor	Completed	{755606D3-F18A-48FA-86EB-3FB837D3E553}
121	38.06288	-120.18234	Non-Exempt Surge Arrestor	Completed	{61DA6D30-46CE-4A05-9A30-C26653606310}
122	38.057187	-120.183995	Non-Exempt Surge Arrestor	Completed	{ACC85A4C-DD40-42E0-B4E9-E7F857589947}
123	38.056772	-120.185447	Non-Exempt Surge Arrestor	Completed	{8098B078-3E98-48D1-A346-30DEF502F902}
124	38.057597	-120.179022	Non-Exempt Surge Arrestor	Completed	{258EC099-98FB-40C1-B690-6C2726C1990B}
125	38.061582	-120.176628	Non-Exempt Surge Arrestor	Completed	{73E3E703-5D82-40F2-8A5E-F42F90BD9C6A}
126	38.082757	-120.148425	Non-Exempt Surge Arrestor	Completed	{C66668B1-0F94-4697-AA2A-036E1E7FC193}
127	38.090802	-120.137902	Non-Exempt Surge Arrestor	Completed	{7F740B90-8F33-4D17-A4D6-69AFF4DB5277}
128	38.089337	-120.138232	Non-Exempt Surge Arrestor	Completed	{5C2FEB62-2FB1-4C8E-AB4C-7CCE04E1D35D}
129	38.08729	-120.138102	Non-Exempt Surge Arrestor	Completed	{4C1CDCBD-8B23-4C02-ACC2-B771F028C096}
130	38.090628	-120.135058	Non-Exempt Surge Arrestor	Completed	{8DEF89BE-FD3A-43FF-B996-D96224FCE41}
131	38.096385	-120.126427	Non-Exempt Surge Arrestor	Completed	{807C9D9F-24FE-4BE4-B8D1-0ACD780EFF97}
132	38.097937	-120.124057	Non-Exempt Surge Arrestor	Completed	{38E93824-DE27-4A0D-B1EE-4E7739045F4A}
133	37.81528	-120.109465	Non-Exempt Surge Arrestor	Completed	{9CC83A30-A64C-40A7-A41E-22A82FBAC8D4}
134	37.820335	-120.023722	Non-Exempt Surge Arrestor	Completed	{B56E01C5-37FD-43A8-9E44-FAAC9B97EB58}
135	37.828097	-119.96554	Non-Exempt Surge Arrestor	Completed	{45116E06-9D26-4DCE-99C2-4A3FD5D37AD2}
136	37.81189	-120.12834	Non-Exempt Surge Arrestor	Completed	{0458A691-CB05-4ED1-875C-C405F9CE1218}
137	37.801908	-120.120335	Non-Exempt Surge Arrestor	Completed	{6AEA20F8-814C-4026-8AF4-897D8529044A}
138	37.778878	-120.10784	Non-Exempt Surge Arrestor	Completed	{4AE51158-D498-40B0-89EA-FEEC7071088E}
139	37.778353	-120.110653	Non-Exempt Surge Arrestor	Completed	{41CA048D-467F-4E12-8CC1-9EB1D6FA24B8}
140	37.81671	-120.133438	Non-Exempt Surge Arrestor	Completed	{2D0F1499-F69C-4CB3-A3AA-64BEB7F35F5B}
141	37.818273	-120.105663	Non-Exempt Surge Arrestor	Completed	{E5A77006-F665-4E0C-9217-621F9BE53E98}
142	37.817397	-120.05866	Non-Exempt Surge Arrestor	Completed	{E00CFC11-C08B-49A7-888A-E8EC418A81D2}
143	37.798333	-119.866548	Non-Exempt Surge Arrestor	Completed	{F8B8DB61-4793-45E9-9C53-5A7AF2A6AF9D}
144	37.812012	-119.947018	Non-Exempt Surge Arrestor	Completed	{4C454337-8D95-4BCD-BC1D-08FB6E43BB74}
145	37.813268	-120.119883	Non-Exempt Surge Arrestor	Completed	{53CBFE02-9127-4BEE-A4D2-1BF96B777FEB}
146	37.764672	-120.108973	Non-Exempt Surge Arrestor	Completed	{1E36502F-E525-4CBE-BE18-B6CB7AFEDC65}
147	37.762767	-120.10797	Non-Exempt Surge Arrestor	Completed	{ED5DC961-5AE9-4347-A5A6-F7393DD332FD}
148	37.733433	-120.070555	Non-Exempt Surge Arrestor	Completed	{9A2B56EE-59F9-4DE9-BA68-9DFAF2CDB80E}

149	37.734435	-120.06826	Non-Exempt Surge Arrestor	Completed	{ADEF798C-B51B-454A-AB3A-78B761F903AC}
150	37.745783	-120.058868	Non-Exempt Surge Arrestor	Completed	{FAB575CD-B57B-4120-800C-5A1EE8170F10}
151	37.735403	-120.074765	Non-Exempt Surge Arrestor	Completed	{C095CC37-DF75-4E97-B625-EE58B2B013E7}
152	37.755455	-120.059673	Non-Exempt Surge Arrestor	Completed	{25E86E94-3E45-4988-ABAO-E5169F57A2CB}
153	37.734625	-120.071673	Non-Exempt Surge Arrestor	Completed	{0DB84ED7-35CD-4689-BD02-69BBD6C07B6A}
154	37.765155	-120.110495	Non-Exempt Surge Arrestor	Completed	{AC7DD936-767B-4ABA-92FA-02FCABFB3DAF}
155	37.997052	-120.445958	Non-Exempt Surge Arrestor	Completed	{D37794B3-A815-41FB-87F3-2629BA5863A5}
156	38.021928	-120.417943	Non-Exempt Surge Arrestor	Completed	{6D83591D-54D5-419D-A59D-48FAA99C3FDB}
157	37.96839	-120.453388	Non-Exempt Surge Arrestor	Completed	{B7A2E90A-A199-4274-AFDE-45198765FFB8}
158	37.970257	-120.450647	Non-Exempt Surge Arrestor	Completed	{E8CE3A55-600C-43E9-B3D6-FEA154BB8106}
159	37.97428	-120.450238	Non-Exempt Surge Arrestor	Completed	{3367AB10-D0EA-496B-A616-B04857F41D97}
160	37.965368	-120.395337	Non-Exempt Surge Arrestor	Completed	{91EEDFB4-8C7E-46B7-BD1D-C22FB0547C71}
161	37.966458	-120.402825	Non-Exempt Surge Arrestor	Completed	{1F32B728-9150-42B1-B8E2-A19512D2EBC9}
162	37.967072	-120.403112	Non-Exempt Surge Arrestor	Completed	{FD143F26-9874-494C-8D54-84954E00918A}
163	37.968467	-120.404507	Non-Exempt Surge Arrestor	Completed	{1F5A21D6-7E1F-494A-9EC6-79DE817AB73A}
164	37.967725	-120.40436	Non-Exempt Surge Arrestor	Completed	{B7DFEF40-363B-4402-B484-534E1DDCD67B}
165	37.963402	-120.4041	Non-Exempt Surge Arrestor	Completed	{15126EF9-3434-4C0D-80E3-371682AB6B9D}
166	38.027567	-120.401305	Non-Exempt Surge Arrestor	Completed	{6A9091C8-7142-4463-8B67-2B3CD5541478}
167	38.025362	-120.400733	Non-Exempt Surge Arrestor	Completed	{A798858C-B7DB-471F-B634-AD821C45FA53}
168	38.024785	-120.400612	Non-Exempt Surge Arrestor	Completed	{8CF59EF4-2EE3-4A88-AF2B-760ECB69ADF6}
169	38.02496	-120.397937	Non-Exempt Surge Arrestor	Completed	{F7C66E01-FDE1-4813-9E18-7A2B66CC0BCD}
170	38.02769	-120.410733	Non-Exempt Surge Arrestor	Completed	{90AD092E-49F5-4AF7-8E51-8B3E6C9A9B68}
171	38.01772	-120.385243	Non-Exempt Surge Arrestor	Completed	{C2CF908F-80DA-4678-A74F-109C63D741D8}
172	38.02249	-120.38511	Non-Exempt Surge Arrestor	Completed	{0F9BC19D-9230-4C73-B19E-39949E1FFBAE}
173	38.025837	-120.38092	Non-Exempt Surge Arrestor	Completed	{F721E665-2979-47EA-8687-16D4C5011729}
174	38.021588	-120.397015	Non-Exempt Surge Arrestor	Completed	{6ADC5F33-241D-47F7-BEC2-AE88325C8B9A}
175	38.019092	-120.393425	Non-Exempt Surge Arrestor	Completed	{05AA2B52-BFF9-4EEB-8E5F-C7668014C87A}
176	38.018808	-120.389817	Non-Exempt Surge Arrestor	Completed	{0420CBD7-47D6-44BF-A0FD-EA72B6454B29}
177	38.017488	-120.38984	Non-Exempt Surge Arrestor	Completed	{D3E4F577-4FB5-4391-A778-81D6FEB744AC}
178	38.019507	-120.38791	Non-Exempt Surge Arrestor	Completed	{D6D43E74-422F-4999-A6A0-B6EE2E455438}
179	38.017818	-120.396257	Non-Exempt Surge Arrestor	Completed	{CCE2DBDC-DB13-40E1-ABE0-65AFD0673F63}
180	38.015288	-120.395705	Non-Exempt Surge Arrestor	Completed	{E8D992E5-038A-44CB-9450-846C0A23D0E9}
181	38.011645	-120.423048	Non-Exempt Surge Arrestor	Completed	{C8361914-6D1E-4BD4-AD37-6FB3B59A4309}
182	37.967622	-120.402933	Non-Exempt Surge Arrestor	Completed	{15AFB1FB-0D43-4601-9971-C13C6D95C891}
183	37.962248	-120.388907	Non-Exempt Surge Arrestor	Completed	{DF0DA40D-ED64-4215-9DB2-BF726A2F2AF3}
184	37.964498	-120.389283	Non-Exempt Surge Arrestor	Completed	{B6585050-6AB3-46BB-93BA-7D9F0CF02700}
185	37.962865	-120.39027	Non-Exempt Surge Arrestor	Completed	{3AE28171-50A8-4F7E-8DFD-1485818CAFB2}
186	37.962727	-120.383175	Non-Exempt Surge Arrestor	Completed	{B0502182-563C-4E8D-8529-0A3B2EDA90B6}
187	37.963887	-120.38252	Non-Exempt Surge Arrestor	Completed	{C1B41B37-B1EE-42AA-B69C-90DC53BB5CF0}
188	37.958808	-120.403902	Non-Exempt Surge Arrestor	Completed	{0988EA49-A5C4-43DA-A97E-C2A57960A77F}
189	37.959202	-120.419788	Non-Exempt Surge Arrestor	Completed	{612F2F12-ECE2-4B6E-B0B5-7162CDEC6F8A}
190	37.95796	-120.420457	Non-Exempt Surge Arrestor	Completed	{2042413D-9970-4DCF-87DE-1E4D937EADAF}
191	37.957565	-120.420738	Non-Exempt Surge Arrestor	Completed	{CB257D11-02D6-4112-9250-0005595A990A}
192	37.957095	-120.421423	Non-Exempt Surge Arrestor	Completed	{A11D70BC-47F3-49F2-A476-010A299437A1}
193	37.992283	-120.436553	Non-Exempt Surge Arrestor	Completed	{488485DA-EF6C-4630-A57B-C0B1B57159E3}
194	37.99711	-120.456628	Non-Exempt Surge Arrestor	Completed	{D6F1C08E-215E-4632-BC1D-2E795D8D62B8}
195	37.996463	-120.45797	Non-Exempt Surge Arrestor	Completed	{47E2D2D9-E106-4FEB-B767-6B6373C8B7B3}
196	38.00063	-120.434705	Non-Exempt Surge Arrestor	Completed	{2E57614C-9DA6-4BF0-8553-3CE835EAE45E}
197	38.003337	-120.4346	Non-Exempt Surge Arrestor	Completed	{E31C3626-1DD3-4F66-98D4-EC2CB5ED40C4}
198	38.004155	-120.434893	Non-Exempt Surge Arrestor	Completed	{151A8FF1-DC68-47BF-83A4-E535BF4A80E3}
199	37.976453	-120.446993	Non-Exempt Surge Arrestor	Completed	{6160DF39-9384-40E4-A992-B25EFE26EE99}
200	37.977062	-120.449513	Non-Exempt Surge Arrestor	Completed	{52E0159D-B3BF-4097-88E3-10CD7DB23F98}

201	37.977655	-120.451328	Non-Exempt Surge Arrestor	Completed	{F62DEB42-A20A-4855-9F90-1B8C6D62C7B0}
202	37.976233	-120.442893	Non-Exempt Surge Arrestor	Completed	{44612E28-F041-4F6E-AC60-10AB1548E02B}
203	37.976978	-120.442617	Non-Exempt Surge Arrestor	Completed	{9C38153B-CED3-4EC6-96EE-6162E15969E7}
204	37.981745	-120.445363	Non-Exempt Surge Arrestor	Completed	{7C76EA5A-0203-438A-A54C-2D062B54DF67}
205	38.02581	-120.396317	Non-Exempt Surge Arrestor	Completed	{AFF45461-A660-43DE-821B-88FAC20A022A}
206	38.019308	-120.409343	Non-Exempt Surge Arrestor	Completed	{5B606AD9-25CB-4AC3-B7AD-CF8620278F30}
207	38.020618	-120.413807	Non-Exempt Surge Arrestor	Completed	{05021185-C228-46B6-9B19-1D1AB7D09F60}
208	38.02869	-120.40671	Non-Exempt Surge Arrestor	Completed	{9AFBE481-3EA4-42C0-AD7A-1714647978C1}
209	38.017633	-120.397255	Non-Exempt Surge Arrestor	Completed	{FF42DF73-3AA2-4ADA-8A46-6F15B816B2A4}
210	38.016352	-120.401128	Non-Exempt Surge Arrestor	Completed	{B3089082-81B1-4DCF-ABE7-06AC593B5E79}
211	38.018405	-120.400297	Non-Exempt Surge Arrestor	Completed	{5D23F6E9-61B8-46C8-8CE8-04D19811969A}
212	38.007538	-120.403507	Non-Exempt Surge Arrestor	Completed	{0934271D-784B-4589-891F-5383ACF88964}
213	38.00857	-120.404233	Non-Exempt Surge Arrestor	Completed	{CCEE8AE2-BCCF-4EDF-83F5-F5F80A551A49}
214	38.01348	-120.402195	Non-Exempt Surge Arrestor	Completed	{83EFAD1F-978D-4C3E-90BE-417ADC41CB8D}
215	38.013213	-120.39866	Non-Exempt Surge Arrestor	Completed	{4BA294E6-9E86-43B6-96A6-5C82263FB416}
216	37.973818	-120.382778	Non-Exempt Surge Arrestor	Not Accessible	{AF10D871-0109-4FEA-982F-B58873A06EAE}
217	37.974905	-120.382988	Non-Exempt Surge Arrestor	Not Accessible	{AFB2B3EE-842F-402C-9F81-358AA05BA2FA}
218	37.973338	-120.384902	Non-Exempt Surge Arrestor	Not Accessible	{A6B2195B-9A4B-4E7F-BE7C-2713E75D9DF8}
219	37.964628	-120.379487	Non-Exempt Surge Arrestor	Completed	{E8F9C572-029A-43E7-A0FC-FC9736FDF0B}
220	38.0077	-120.25962	Non-Exempt Surge Arrestor	Completed	{FD1BCFC3-7FF5-418B-A4DE-09E33A671688}
221	38.006522	-120.260463	Non-Exempt Surge Arrestor	Completed	{F84DAECC-2BBB-4140-8A9B-A828BD059BB9}
222	38.050913	-120.22438	Non-Exempt Surge Arrestor	Completed	{BE300904-74EC-4110-AA34-2695BC21173B}
223	38.04889	-120.22345	Non-Exempt Surge Arrestor	Completed	{05FCB552-7B39-444D-B614-36DCE6047E5A}
224	38.048743	-120.223772	Non-Exempt Surge Arrestor	Completed	{96EC7766-E5E1-4E44-984C-31E4389F4DE3}
225	38.048062	-120.225487	Non-Exempt Surge Arrestor	Completed	{607D8188-D192-482D-A0CC-521CF5E30477}
226	38.048273	-120.228765	Non-Exempt Surge Arrestor	Completed	{FDD8271E-288E-43E6-B67C-4AC5D548502D}
227	38.04803	-120.231217	Non-Exempt Surge Arrestor	Completed	{45F5858D-7391-40B8-BA57-CDF5EC92160A}
228	38.047777	-120.225423	Non-Exempt Surge Arrestor	Completed	{0E2CF58E-50FD-47CC-A910-91EA1AF84B5F}
229	38.047642	-120.223075	Non-Exempt Surge Arrestor	Completed	{74298CCF-121A-4B92-9481-D83BB440784A}
230	38.047007	-120.222745	Non-Exempt Surge Arrestor	Completed	{A13D3A5D-14E0-4C24-B9AD-F7F1F9BC8EA4}
231	38.048092	-120.2221	Non-Exempt Surge Arrestor	Completed	{56D86CE6-D8FB-411A-A2EB-7DE0B754C3C2}
232	38.049045	-120.22133	Non-Exempt Surge Arrestor	Completed	{6C4E3B1E-B9DC-4CF8-985D-26CE9E07A42B}
233	38.050912	-120.22063	Non-Exempt Surge Arrestor	Completed	{3CF92009-25FF-4B84-AE86-8077374C905B}
234	38.05144	-120.219713	Non-Exempt Surge Arrestor	Completed	{D4F99FE0-D808-41C9-BD54-5508F0C2ACC8}
235	38.052593	-120.230577	Non-Exempt Surge Arrestor	Completed	{E2E72892-98F8-4863-85FA-91794DC4AD21}
236	38.046207	-120.2222	Non-Exempt Surge Arrestor	Completed	{A85FE83E-79CC-49FC-AF87-672DAE0C56AC}
237	38.045693	-120.219578	Non-Exempt Surge Arrestor	Completed	{A1A829C3-4C2C-4CB1-86B5-5993FAFA0E8A}
238	38.047188	-120.220255	Non-Exempt Surge Arrestor	Completed	{8CAAC29B-BC59-4FC0-8365-1666BF766D4D}
239	38.047852	-120.217803	Non-Exempt Surge Arrestor	Completed	{7D77D899-8F37-4566-A401-DAC4451E5879}
240	38.049287	-120.21989	Non-Exempt Surge Arrestor	Not Accessible	{0B8DC6E1-A2BF-4A7E-8D54-B8B2B6261606}
241	38.051552	-120.228928	Non-Exempt Surge Arrestor	Completed	{9EA2CBF2-A24B-46FF-9F58-F971455B3EEE}
242	38.052242	-120.23354	Non-Exempt Surge Arrestor	Completed	{BD071D3B-8F0C-4A66-974B-EEC516B3CFC4}
243	38.052948	-120.2337	Non-Exempt Surge Arrestor	Completed	{E627A438-D9A5-4E2E-B000-9C7317F6E491}
244	38.055335	-120.234562	Non-Exempt Surge Arrestor	Completed	{515021D1-CCD3-4E29-9831-123712D36250}
245	38.054893	-120.234252	Non-Exempt Surge Arrestor	Completed	{ED039D08-A139-4D06-9559-AD433A9D8C7E}
246	38.053763	-120.234587	Non-Exempt Surge Arrestor	Completed	{84B10F63-C248-49D0-A941-3DF35A440203}
247	38.054637	-120.234865	Non-Exempt Surge Arrestor	Completed	{8A37649C-4F88-4107-B930-450E569039D1}
248	38.043687	-120.229432	Non-Exempt Surge Arrestor	Completed	{B8CB51F2-8DE8-4E4F-A50F-B448FCABDBBA}
249	38.044987	-120.227182	Non-Exempt Surge Arrestor	Completed	{13A3875B-5559-440D-AD82-63BABF9AE728}
250	38.043312	-120.238978	Non-Exempt Surge Arrestor	Completed	{A09ABBD2-2092-4433-BE67-B9E409386242}
251	38.045812	-120.247575	Non-Exempt Surge Arrestor	Completed	{2D679F29-720F-4BE1-90AC-9EA7C15142BB}
252	38.045402	-120.24997	Non-Exempt Surge Arrestor	Completed	{AF7FCD25-8C61-4A42-BFCE-06D4BE0E096B}

253	38.045127	-120.25069	Non-Exempt Surge Arrestor	Completed	{B5FBB36A-3FDF-4E63-B71E-28F7A9AC9A14}
254	38.04405	-120.250565	Non-Exempt Surge Arrestor	Completed	{A3650E14-BD29-4D60-A479-65D9D15C23BE}
255	38.04431	-120.250243	Non-Exempt Surge Arrestor	Completed	{4A256555-8FFA-4D43-B13B-8F4236FEFF33}
256	38.044468	-120.249525	Non-Exempt Surge Arrestor	Completed	{C74B9A5F-1DAB-4B06-A6F3-70BCB3E2AAFC}
257	38.04325	-120.248903	Non-Exempt Surge Arrestor	Completed	{B452AF06-87AE-4789-AA59-EDD84C933D04}
258	38.022855	-120.253187	Non-Exempt Surge Arrestor	Completed	{785751B5-9E7C-4885-9BFF-8BCE4EAF15E4}
259	38.025948	-120.250565	Non-Exempt Surge Arrestor	Completed	{0448C4AE-EDDB-4C04-9835-F6B901A21CB6}
260	38.026578	-120.248192	Non-Exempt Surge Arrestor	Completed	{98C8FE23-C552-4C82-8540-B0362D8FA099}
261	38.030248	-120.253108	Non-Exempt Surge Arrestor	Completed	{65E4EACC-5DB8-4F16-AF01-AD2BF024CC94}
262	38.031642	-120.253028	Non-Exempt Surge Arrestor	Completed	{A31733C8-16C9-45C3-8653-1FB926A3AD97}
263	38.029828	-120.252127	Non-Exempt Surge Arrestor	Completed	{09C27E90-F5E5-4253-8CC6-89A3B4104FB8}
264	38.013152	-120.255477	Non-Exempt Surge Arrestor	Not Accessible	{1A266DC5-F75F-4EA7-8026-35A6D12C2825}
265	38.01009	-120.258538	Non-Exempt Surge Arrestor	Completed	{F8F88DA7-0BE5-4897-A05C-C5C9954E898D}
266	37.706527	-120.197592	Non-Exempt Surge Arrestor	Completed	{DC1DB29A-CA77-4353-88A9-3467BDE8DFF7}
267	37.710822	-120.194277	Non-Exempt Surge Arrestor	Completed	{FA7CDA7F-4601-420E-A1BE-1BA239D269DC}
268	37.720835	-120.092603	Non-Exempt Surge Arrestor	Completed	{CFAD2E5C-A6A7-45CF-AD26-80599944A0FF}
269	37.73074	-120.087887	Non-Exempt Surge Arrestor	Completed	{6B99FAB0-6534-4308-AC9D-C3B675B4F638}
270	37.729717	-120.085212	Non-Exempt Surge Arrestor	Completed	{58F6CC3F-2F30-4A50-8E51-5CCAF584BC1A}
271	37.711143	-120.193565	Non-Exempt Surge Arrestor	Completed	{A994B317-3932-474A-8B1C-80F3F7F4D908}
272	37.718382	-120.199288	Non-Exempt Surge Arrestor	Completed	{4E13D129-95C9-40A3-A0AD-36F2078B13C7}
273	37.69639	-120.099398	Non-Exempt Surge Arrestor	Completed	{85216A34-E8A3-4BDA-9BA9-829D27CB6DEB}
274	37.69393	-120.097183	Non-Exempt Surge Arrestor	Completed	{CBE5B7EC-924A-43EE-B07B-4E31AFC8434C}
275	37.706337	-120.173378	Non-Exempt Surge Arrestor	Completed	{C6C69C24-6FB5-4237-96AB-E52A26219FB7}
276	37.706158	-120.148937	Non-Exempt Surge Arrestor	Completed	{C93F1574-03A3-407D-9D8D-1942A8075454}
277	37.70865	-120.17569	Non-Exempt Surge Arrestor	Completed	{753B729E-6356-454C-91B7-46ED6AC5DBB9}
278	37.716218	-120.203265	Non-Exempt Surge Arrestor	Completed	{3ECEE235-F839-46F6-8B51-B3662B67DB97}
279	37.72383	-120.20456	Non-Exempt Surge Arrestor	Completed	{4DC0FAC4-B197-4320-A136-51075BBD309D}
280	37.718213	-120.196655	Non-Exempt Surge Arrestor	Completed	{F31872C9-72A1-444D-8F67-52ECB7F63AAA}
281	37.717062	-120.1983	Non-Exempt Surge Arrestor	Completed	{C5C2F62E-F2AC-475E-BDDC-8FEAFD1BCE84}
282	37.709873	-120.17828	Non-Exempt Surge Arrestor	Completed	{3215563A-8873-45D9-9E3D-EF8239D0F494}
283	37.71535	-120.197992	Non-Exempt Surge Arrestor	Completed	{08A3C0E2-A85A-4E58-89E8-853CF10EB14F}
284	37.707947	-120.09788	Non-Exempt Surge Arrestor	Completed	{D27B083D-AF74-422B-A598-C9F34C756A33}
285	37.701062	-120.097398	Non-Exempt Surge Arrestor	Completed	{1D4138E6-BCA2-4BBA-B793-CF43594A5FD0}
286	37.703	-120.093893	Non-Exempt Surge Arrestor	Completed	{0DBC208D-EECB-4661-A016-D1C65D16A926}
287	37.698455	-120.091663	Non-Exempt Surge Arrestor	Completed	{5D43A86D-9C70-40A9-BC1E-DB47FFCEAF11}
288	37.6968	-120.093907	Non-Exempt Surge Arrestor	Completed	{FF7B4921-334A-48C3-8472-C38609D73F53}
289	37.698393	-120.09915	Non-Exempt Surge Arrestor	Completed	{61FA00E7-5EF2-4E8D-9587-A919CD0D54FB}
290	37.695222	-120.099575	Non-Exempt Surge Arrestor	Completed	{E219FC0E-72A0-4B1D-B525-FEF640D60141}
291	37.69404	-120.099798	Non-Exempt Surge Arrestor	Completed	{F4B10EBA-082B-484E-B30D-29291F2A25D5}
292	37.695422	-120.096432	Non-Exempt Surge Arrestor	Completed	{A54B3A63-2EB8-43D0-BA2F-4C60B06E5D97}
293	37.718623	-120.09907	Non-Exempt Surge Arrestor	Completed	{076AE374-F942-4F25-BC55-995653C55DA1}
294	37.678308	-120.124755	Non-Exempt Surge Arrestor	Completed	{7BCC2C4B-BFDE-49DB-8066-AD707FA85C12}
295	37.675398	-120.134245	Non-Exempt Surge Arrestor	Completed	{94C79918-E975-456A-BA08-1E5E8935EE42}
296	37.701122	-120.096102	Non-Exempt Surge Arrestor	Completed	{17339DE8-6F4C-454D-B8A8-FD099886F46C}
297	37.937043	-120.355468	Non-Exempt Surge Arrestor	Completed	{93B23C80-6590-4A7F-B527-5AD42F34950B}
298	37.91922	-120.359433	Non-Exempt Surge Arrestor	Completed	{70FF625C-C922-4B18-A15A-54108B5DFCFD}
299	37.955038	-120.32832	Non-Exempt Surge Arrestor	Completed	{36BB1F91-009F-48F6-AD35-02CE6DDDD4C0}
300	37.953835	-120.328167	Non-Exempt Surge Arrestor	Completed	{82BA38EE-09BA-4E25-B624-D2495B4553D2}
301	37.952585	-120.329523	Non-Exempt Surge Arrestor	Completed	{14DED085-D176-4244-865B-9111FC162545}
302	37.947797	-120.328867	Non-Exempt Surge Arrestor	Completed	{24A9D94E-3D37-42EF-9690-1E1769F3B60B}
303	37.947138	-120.327448	Non-Exempt Surge Arrestor	Completed	{2D117BD8-872C-43B2-BD3C-B6900164DD74}
304	37.951937	-120.355145	Non-Exempt Surge Arrestor	Completed	{93EF1C63-0B2F-4CB6-BC39-20282E3904B6}

305	37.952455	-120.34707	Non-Exempt Surge Arrestor	Completed	{7A2DE8DB-FF75-4FAC-BC17-B852530CAC39}
306	37.952118	-120.348688	Non-Exempt Surge Arrestor	Completed	{4F1E32C5-9214-4AE7-82A6-BC36B8ACD9A8}
307	37.949808	-120.346863	Non-Exempt Surge Arrestor	Completed	{A124D521-B72A-47F4-8293-E5F9D33B8EB2}
308	37.944365	-120.347033	Non-Exempt Surge Arrestor	Completed	{3F5E3313-74C2-4825-93B0-92E0AB113A21}
309	37.949043	-120.339113	Non-Exempt Surge Arrestor	Completed	{EB81A1D9-3FA1-4F75-8D53-0C30E3E36A38}
310	37.942602	-120.3597	Non-Exempt Surge Arrestor	Completed	{3FD6D2E7-8747-473D-A8A3-D27F45F92EA7}
311	37.942737	-120.3512	Non-Exempt Surge Arrestor	Completed	{95381F67-467C-46BD-B7E2-3642F3EE6946}
312	37.939782	-120.355547	Non-Exempt Surge Arrestor	Completed	{8637EBB3-0BFA-493A-B0DE-61E369C6548D}
313	37.938617	-120.353187	Non-Exempt Surge Arrestor	Completed	{760A9772-A5FA-472D-818A-1B962AB1F3CF}
314	37.935077	-120.347648	Non-Exempt Surge Arrestor	Completed	{F2FB5B1B-CC91-451C-AEC0-19606088E4C5}
315	37.936597	-120.346027	Non-Exempt Surge Arrestor	Completed	{749CC0E5-CACD-49C2-A8B2-6FDE8BFD67E9}
316	37.940232	-120.346078	Non-Exempt Surge Arrestor	Completed	{F36B1425-08AC-4D80-9D51-23D259A8120F}
317	37.949185	-120.361778	Non-Exempt Surge Arrestor	Completed	{6DD64367-7A7A-40ED-BBD8-BE3594208BAF}
318	37.954183	-120.364372	Non-Exempt Surge Arrestor	Completed	{920EDE21-41AB-434B-BCE7-89D01ABC53CC}
319	37.956347	-120.358387	Non-Exempt Surge Arrestor	Completed	{44B7CEB5-FBD8-4F6D-993A-2487721CCC5B}
320	37.961648	-120.357758	Non-Exempt Surge Arrestor	Completed	{86D28F52-5041-4898-84E1-64337AE226BE}
321	37.962112	-120.360132	Non-Exempt Surge Arrestor	Completed	{9E3F2C0B-E630-4A70-B280-8561A78E9E04}
322	37.958135	-120.321732	Non-Exempt Surge Arrestor	Completed	{066DA429-03CE-4FDA-AE86-869EDBB995C4}
323	38.038398	-120.404083	Non-Exempt Surge Arrestor	Completed	{8D57AC19-66CB-410E-9691-AB10C71F66D0}
324	38.039952	-120.406003	Non-Exempt Surge Arrestor	Completed	{B09F4352-10DC-41E8-9E60-7CAD4717365E}
325	38.03826	-120.408173	Non-Exempt Surge Arrestor	Not Accessible	{E2EC7563-B152-417F-9289-FB4E2BC26C04}
326	38.039195	-120.409123	Non-Exempt Surge Arrestor	Completed	{54B46FD7-6189-46D7-9A89-CC549526F8D0}
327	38.035588	-120.430648	Non-Exempt Surge Arrestor	Completed	{55E30F03-A3E2-414F-99BF-E467C05E0EBF}
328	38.036827	-120.415353	Non-Exempt Surge Arrestor	Completed	{3DE787D4-29BD-41A7-9C6A-2E15D9EF745A}
329	38.034778	-120.402798	Non-Exempt Surge Arrestor	Completed	{61D849EF-6B00-41BF-BFF1-DB42EB642495}
330	38.03319	-120.403192	Non-Exempt Surge Arrestor	Completed	{A587FB5F-862D-40E8-A6DD-0E2F7E6DFBAD}
331	37.966233	-120.431677	Non-Exempt Surge Arrestor	Completed	{E899EE08-9C32-4463-8317-D4D68AFC2C07}
332	37.969068	-120.433663	Non-Exempt Surge Arrestor	Completed	{3567A451-E504-4D93-B019-F755B9D22506}
333	37.969558	-120.434047	Non-Exempt Surge Arrestor	Completed	{C3D998E6-E1AA-43A8-8DC2-145B6FDD991A}
334	37.969792	-120.434718	Non-Exempt Surge Arrestor	Completed	{5D4C2CCA-8A12-45D4-A88D-43EFE40514B2}
335	37.969125	-120.435552	Non-Exempt Surge Arrestor	Completed	{04C625A4-7DEC-4164-8500-19F35641C101}
336	37.966403	-120.433908	Non-Exempt Surge Arrestor	Completed	{63C5DA2B-D37E-42C2-BCD6-7A5FFF7CF241B}
337	37.966897	-120.434452	Non-Exempt Surge Arrestor	Completed	{13AA3BEB-126C-490C-806D-09D38E3B0CDE}
338	37.92798	-120.416412	Non-Exempt Surge Arrestor	Completed	{3C60A2BA-FAD2-4952-AFF5-41587BB6D6D2}
339	37.929475	-120.415263	Non-Exempt Surge Arrestor	Completed	{911BE478-B989-48DB-9804-DF1F87D32BA6}
340	37.922122	-120.404682	Non-Exempt Surge Arrestor	Completed	{25566C95-605C-4FD0-B408-1ECB88A15C1B}
341	37.875107	-120.38797	Non-Exempt Surge Arrestor	Not Accessible	{13D3E4A0-E63C-42AD-BE24-D0BFC2153D68}
342	37.879173	-120.380937	Non-Exempt Surge Arrestor	Completed	{3E3CCBB3-EC81-408F-BE73-7C2EAD222B8F}
343	37.885252	-120.445318	Non-Exempt Surge Arrestor	Not Accessible	{171C1204-F34D-4E84-86D5-040109E32D3D}
344	37.912987	-120.472202	Non-Exempt Surge Arrestor	Completed	{A7E1EC81-BEAF-4DD3-BCBF-2A8811BA8395}
345	37.90448	-120.47308	Non-Exempt Surge Arrestor	Completed	{7D9C05BB-AEE8-4245-8B65-E2BEF8C2092D}
346	37.936638	-120.414433	Non-Exempt Surge Arrestor	Completed	{CEAD23CF-C938-4549-A11D-BA843FFBA30F}
347	37.938592	-120.416813	Non-Exempt Surge Arrestor	Completed	{BBB6B34E-F60F-4C92-82C4-F00172F3B516}
348	37.915072	-120.464143	Non-Exempt Surge Arrestor	Not Accessible	{6EA4CE0B-F66E-4217-990A-D74E8089507F}
349	37.909222	-120.4515	Non-Exempt Surge Arrestor	Completed	{A593B837-550F-40AE-9BA9-6F302367D315}
350	38.038822	-120.422222	Non-Exempt Surge Arrestor	Completed	{74677701-1A6E-4EC6-9496-1080B6FCAA37}
351	38.03841	-120.414438	Non-Exempt Surge Arrestor	Completed	{1625954E-643B-443E-A2A5-ED219E9F1E71}
352	38.030803	-120.405477	Non-Exempt Surge Arrestor	Completed	{BD24B4DE-D223-48AE-9C06-96D38094B4C3}
353	37.936983	-120.353825	Non-Exempt Surge Arrestor	Completed	{9D4451F2-131C-4B8F-A247-1EF33741DC6D}
354	37.924645	-120.35723	Non-Exempt Surge Arrestor	Completed	{C6284121-D513-4E76-9F3B-AFF4D53F623C}
355	37.918143	-120.355085	Non-Exempt Surge Arrestor	Completed	{FFE4E6EB-7F60-40A1-909C-B2B96A9C0CE4}
356	37.914398	-120.359715	Non-Exempt Surge Arrestor	Completed	{7B6CF245-6065-46E3-9668-5B683BE6FD99}

357	37.88399	-120.360812	Non-Exempt Surge Arrestor	Not Accessible	{5C3DA7D5-A3EC-415F-86E4-B4A748E70B63}
358	37.995115	-120.273187	Non-Exempt Surge Arrestor	Completed	{0E52FB3E-0D0C-45C5-AE91-B549E0CED29C}
359	38.00115	-120.267717	Non-Exempt Surge Arrestor	Completed	{C20A8F3D-ECD9-4504-ADDF-3B558EE14AAF}
360	38.00047	-120.264563	Non-Exempt Surge Arrestor	Completed	{C51CFC26-21BC-4A5E-B58A-3CBB580671C5}
361	38.003593	-120.265317	Non-Exempt Surge Arrestor	Completed	{4AF31A3B-5D01-480A-9EA4-DCCA5BDB6050}
362	38.003433	-120.264565	Non-Exempt Surge Arrestor	Completed	{331B4E0A-BE9B-4D9A-AF84-0285615C2238}
363	38.00565	-120.267533	Non-Exempt Surge Arrestor	Completed	{E61FEE52-DDE5-4622-94E9-C18D65104245}
364	38.012027	-120.27145	Non-Exempt Surge Arrestor	Completed	{810ED0D0-F81A-46CE-A134-E2EDF869AD4C}
365	38.012198	-120.27074	Non-Exempt Surge Arrestor	Completed	{E38004E7-798F-4D13-9422-3D233EA5DD3D}
366	38.012442	-120.270552	Non-Exempt Surge Arrestor	Completed	{904B5407-301B-40E3-955F-6FDB8A58B008}
367	38.01295	-120.270417	Non-Exempt Surge Arrestor	Completed	{1397AFC6-52CA-40CA-B86D-515FB8C24611}
368	38.0102	-120.269863	Non-Exempt Surge Arrestor	Completed	{4890ABDF-D6E7-488C-95E6-3427FBDEA740}
369	38.014358	-120.270932	Non-Exempt Surge Arrestor	Completed	{CBE3F863-F7C9-4667-BD78-F774ABD73278}
370	38.014025	-120.27056	Non-Exempt Surge Arrestor	Completed	{07EE62A1-012E-481F-AF77-32C3CACCB3EC}
371	38.01477	-120.271642	Non-Exempt Surge Arrestor	Completed	{D1ACF2C0-B5DA-4906-8D84-32CF1DBDD8BF}
372	38.01918	-120.269587	Non-Exempt Surge Arrestor	Completed	{E135FF3C-9C9A-4649-BF8F-001617458FBD}
373	38.019463	-120.26947	Non-Exempt Surge Arrestor	Completed	{FFF6C7B1-D101-44D5-8726-B52B46C6788C}
374	38.022627	-120.270177	Non-Exempt Surge Arrestor	Completed	{A3905E4F-D7FB-4822-B872-8E2E4D4E5528}
375	38.017257	-120.268395	Non-Exempt Surge Arrestor	Completed	{577399CE-FA22-4718-92FC-23DF2BCD5D97}
376	38.016622	-120.26574	Non-Exempt Surge Arrestor	Completed	{C95FAA01-1CAF-4A05-A9BA-6CFAE1347BF1}
377	38.015	-120.267033	Non-Exempt Surge Arrestor	Completed	{633DDF4E-22DB-4499-B9F1-9ECA90576869}
378	38.017883	-120.268105	Non-Exempt Surge Arrestor	Completed	{D21CDB46-53A7-4ACA-8D32-A69C0D6B8A06}
379	38.018887	-120.268325	Non-Exempt Surge Arrestor	Completed	{0C87426A-C98D-4EE2-9475-39C0E04CFA2F}
380	38.019242	-120.268508	Non-Exempt Surge Arrestor	Completed	{37E8D42C-5DC3-404E-92BE-E8897B9A617E}
381	38.017842	-120.285183	Non-Exempt Surge Arrestor	Completed	{0A57C9FB-DCD3-4FC3-9EAD-E9FF76921EDB}
382	38.017147	-120.285233	Non-Exempt Surge Arrestor	Completed	{5ED764BA-5A40-4535-AF45-F9CC746CA730}
383	38.017202	-120.281967	Non-Exempt Surge Arrestor	Completed	{3488FC4A-0906-4E8F-A46D-F6FC5C00AEC4}
384	38.017423	-120.282053	Non-Exempt Surge Arrestor	Completed	{6A6A335C-E009-42D3-BB5B-AD0FF4655052}
385	38.015748	-120.281888	Non-Exempt Surge Arrestor	Completed	{B5485117-50C4-47FD-B3BD-1C562C36B6F5}
386	38.013092	-120.267682	Non-Exempt Surge Arrestor	Completed	{79867E44-AE05-4FB9-B275-4141F3E6F2F1}
387	38.01433	-120.268508	Non-Exempt Surge Arrestor	Completed	{0D1F02E0-DED8-488E-B7FA-C7DDB81543B5}
388	38.010765	-120.28009	Non-Exempt Surge Arrestor	Completed	{15830BA9-40EF-49BD-A1EF-96C54961D371}
389	38.010247	-120.28027	Non-Exempt Surge Arrestor	Completed	{CD4D59FB-DD94-4194-885F-7E71213CD0EA}
390	38.012917	-120.272557	Non-Exempt Surge Arrestor	Completed	{54D78331-E389-4346-AE7C-F3536FF35A9B}
391	38.006695	-120.27576	Non-Exempt Surge Arrestor	Completed	{94989081-9AF9-44BD-96D3-7FD981F78BE3}
392	38.004493	-120.276272	Non-Exempt Surge Arrestor	Completed	{2CB1E94C-C9F2-4B48-899A-89E778056535}
393	38.011107	-120.274213	Non-Exempt Surge Arrestor	Completed	{4553976A-1E87-4CA2-8D5F-563E148B1119}
394	38.01047	-120.273913	Non-Exempt Surge Arrestor	Completed	{925D05E2-626E-4002-AD32-041A010B22DC}
395	38.008212	-120.275527	Non-Exempt Surge Arrestor	Completed	{6D03C703-8FF4-4291-913E-7950AD7C120D}
396	38.00838	-120.27488	Non-Exempt Surge Arrestor	Completed	{061221DB-0C53-4225-98EF-1C4A2415A7F1}
397	38.011512	-120.272407	Non-Exempt Surge Arrestor	Completed	{3528BCD8-BCB1-4E0F-A262-09F24050AA1C}
398	38.004892	-120.267202	Non-Exempt Surge Arrestor	Completed	{5DBCAAD5-6F95-4ECD-8977-21EEA647920B}
399	38.014145	-120.272985	Non-Exempt Surge Arrestor	Completed	{567C7A4F-A032-46CB-82B6-124EE02AF452}
400	38.013902	-120.27335	Non-Exempt Surge Arrestor	Completed	{4CCEAD6A-D1B8-4E9B-A78C-1DF561DBDB8C}
401	38.013367	-120.273683	Non-Exempt Surge Arrestor	Completed	{5D9008BC-5453-4762-8416-5EE078740414}
402	38.009882	-120.276188	Non-Exempt Surge Arrestor	Completed	{9E062A2B-71DD-4BCA-B453-9B13943F58F9}
403	38.012048	-120.277303	Non-Exempt Surge Arrestor	Completed	{1D575ADC-28A6-4C46-9CDE-075874A9D141}
404	38.011895	-120.27768	Non-Exempt Surge Arrestor	Completed	{E29CD68F-6E28-4C72-AA27-F204124D9715}
405	38.011783	-120.27824	Non-Exempt Surge Arrestor	Completed	{7A157AFA-3E13-4F7F-AEB5-80D58BAF68E7}
406	38.01081	-120.277698	Non-Exempt Surge Arrestor	Completed	{290C09C5-2949-4993-AEEF-224D02E09D13}
407	38.01056	-120.284353	Non-Exempt Surge Arrestor	Completed	{DFBE4043-002E-4A19-BF80-E5DBB94E1D85}
408	38.01014	-120.285983	Non-Exempt Surge Arrestor	Completed	{A0753A8F-0479-47AB-A7F6-4445D20B99FC}

409	38.010627	-120.286748	Non-Exempt Surge Arrestor	Completed	{FD6F1AC3-1501-4BC4-8C1F-529B60F91F81}
410	38.010883	-120.29149	Non-Exempt Surge Arrestor	Completed	{F66480D7-8A38-42E5-933B-7EE9A6A61FE1}
411	38.00836	-120.300818	Non-Exempt Surge Arrestor	Completed	{0BF412EC-3FB2-4B51-AE02-842F126301FB}
412	38.008675	-120.300183	Non-Exempt Surge Arrestor	Completed	{7BD11D13-7D35-4316-A584-BCFF995039AE}
413	38.008978	-120.299675	Non-Exempt Surge Arrestor	Completed	{B01CDD59-2134-4413-8822-DB783C313AFB}
414	38.0083	-120.29628	Non-Exempt Surge Arrestor	Completed	{54872D74-7C71-4590-B5DA-2438CC264E3C}
415	38.015215	-120.2849	Non-Exempt Surge Arrestor	Completed	{6AF02B53-62E6-4AEB-8CFF-7240BAF9E9DF}
416	38.015653	-120.284458	Non-Exempt Surge Arrestor	Completed	{03DE6AAB-177E-432A-8BF9-B6DC6081F3BC}
417	38.016123	-120.284022	Non-Exempt Surge Arrestor	Completed	{51B0612E-E795-4DA3-B069-B31C7AF323A1}
418	38.017587	-120.283563	Non-Exempt Surge Arrestor	Completed	{647D8A40-A6D0-4AFC-B04B-6E2454637A6C}
419	38.01336	-120.269238	Non-Exempt Surge Arrestor	Completed	{2A3A5D94-91DA-4076-925A-B3BE06D809D3}
420	38.013787	-120.269407	Non-Exempt Surge Arrestor	Completed	{970B59AF-ACAF-4970-8ACB-15908C938EE5}
421	38.01487	-120.272203	Non-Exempt Surge Arrestor	Completed	{626C73E4-675A-44AA-9CF0-BAED63B750EA}
422	38.016122	-120.285697	Non-Exempt Surge Arrestor	Completed	{E62157FB-A2CC-4C31-90CA-B3FC0B89263B}
423	37.99166	-120.329118	Non-Exempt Surge Arrestor	Completed	{690FE814-ED65-4E24-BDE3-2324DFDBB5D2}
424	37.99205	-120.328907	Non-Exempt Surge Arrestor	Completed	{AEEBB79F-EC87-4393-8E89-23FF2F0E8922}
425	37.99514	-120.324432	Non-Exempt Surge Arrestor	Completed	{B1D8573A-CF02-4F4F-ABE0-B0FE49D88018}
426	37.994262	-120.32177	Non-Exempt Surge Arrestor	Completed	{3644436F-EE6A-4AD6-A60F-2A31AD84BE62}
427	37.995313	-120.32035	Non-Exempt Surge Arrestor	Not Accessible	{6F970E69-ADBF-4147-B3DE-111A7EE858B9}
428	37.999945	-120.314468	Non-Exempt Surge Arrestor	Completed	{D50ADD70-CC8E-4C55-83AE-616A9AE06F}
429	38.003702	-120.312142	Non-Exempt Surge Arrestor	Completed	{A3BBD869-DC94-4DF6-A916-CC7AB77B0BE0}
430	38.00179	-120.309033	Non-Exempt Surge Arrestor	Completed	{7CEAD16D-943F-472B-A3B7-DA4D39B0A036}
431	38.008218	-120.266128	Non-Exempt Surge Arrestor	Completed	{C98E919D-DF7A-497F-A1FB-5F6FB9A70DF2}
432	38.007105	-120.268083	Non-Exempt Surge Arrestor	Completed	{D6591F05-1E34-40B2-A142-7E764DC42507}
433	38.014678	-120.279087	Non-Exempt Surge Arrestor	Completed	{80A133F2-834A-4CBE-B5B9-6E187594F5AA}
434	38.013575	-120.27686	Non-Exempt Surge Arrestor	Completed	{76BD7225-C15F-4604-97D2-A41B1178420D}
435	38.01392	-120.274907	Non-Exempt Surge Arrestor	Completed	{9C5D27BC-14F3-484E-8042-260E978790E7}
436	38.01716	-120.27542	Non-Exempt Surge Arrestor	Completed	{8B1FD746-7699-4669-AC92-258B77CA8292}
437	38.016793	-120.275407	Non-Exempt Surge Arrestor	Completed	{D08E33AB-06D3-4244-9270-287BBA34FCE8}
438	38.012952	-120.284223	Non-Exempt Surge Arrestor	Not Accessible	{0809BD8A-0C5C-4EF9-AB52-ECF515EEA7B2}
439	38.01278	-120.28043	Non-Exempt Surge Arrestor	Completed	{C0C4E711-5303-469C-9024-2917EF691E21}
440	38.01286	-120.279587	Non-Exempt Surge Arrestor	Completed	{D838CC04-561D-4EF5-ABF6-8B6C585D142F}
441	38.014552	-120.283155	Non-Exempt Surge Arrestor	Completed	{063A98C3-815B-4D91-940B-AE61CE509845}
442	38.020278	-120.271583	Non-Exempt Surge Arrestor	Completed	{1BBDE7A5-309B-4463-B0B4-D27FFBF80AF1}
443	38.02255	-120.271462	Non-Exempt Surge Arrestor	Completed	{CA0E592C-0C9C-4086-A674-4273336D9C54}
444	38.022282	-120.273163	Non-Exempt Surge Arrestor	Completed	{1388CDD3-5222-4525-B884-92C27AA2B284}
445	38.020277	-120.27357	Non-Exempt Surge Arrestor	Completed	{2F6FE25D-3F2F-4275-81BF-A9A91565CD7D}
446	37.71908	-120.190555	Non-Exempt Surge Arrestor	Completed	{56E85DD2-6680-449A-9C13-E86D66640F48}
447	37.732867	-120.180617	Non-Exempt Surge Arrestor	Not Accessible	{7AF3B193-FFE9-45E7-8EFF-022CA0F7B2C8}
448	37.700125	-120.268845	Non-Exempt Surge Arrestor	Completed	{E007C3F4-F3D1-4E1D-BC24-AAC44D5B0B71}
449	37.733747	-120.213913	Non-Exempt Surge Arrestor	Not Accessible	{2DAB6FC8-7E00-4802-A084-EA2263FEB819}
450	37.724083	-120.29591	Non-Exempt Surge Arrestor	Completed	{5BEA587F-C399-42EE-8E9C-3F765085F004}
451	37.72167	-120.296147	Non-Exempt Surge Arrestor	Completed	{92854326-7AE2-409F-B604-930E02336C1B}
452	37.721227	-120.27783	Non-Exempt Surge Arrestor	Completed	{84590B6B-2D5D-45BE-8DFE-44B50C2CC6DD}
453	37.699248	-120.297207	Non-Exempt Surge Arrestor	Completed	{8AABE060-6E68-49B5-98ED-E20EEFE67DBA}
454	37.72714	-120.187732	Non-Exempt Surge Arrestor	Completed	{A9316F58-5F78-4EE4-AE79-E196639CD6CC}
455	37.733462	-120.176673	Non-Exempt Surge Arrestor	Completed	{BDF8122F-9AFF-4644-83F4-D9D190177C68}
456	37.725892	-120.1863	Non-Exempt Surge Arrestor	Completed	{D3B45E12-B20E-46C6-9A84-8F7FC07E05FD}
457	37.718	-120.190613	Non-Exempt Surge Arrestor	Completed	{2CE9D9A2-417E-43FA-8B8F-C86ED33B2711}
458	37.723805	-120.18177	Non-Exempt Surge Arrestor	Completed	{E678B51F-8E5D-4C60-B1BD-C5FCDB10E33F}
459	37.73642	-120.22732	Non-Exempt Surge Arrestor	Completed	{9637858E-5BEA-4B1A-9CB8-754F407A438D}
460	37.735698	-120.220542	Non-Exempt Surge Arrestor	Not Accessible	{86776314-1B5F-4C44-A035-6D18EC9669C3}

461	37.7337	-120.223973	Non-Exempt Surge Arrestor	Completed	{4210D087-2FF1-4F63-8E7D-6417B7C42597}
462	37.731428	-120.240917	Non-Exempt Surge Arrestor	Completed	{3816EDB7-1EFE-46AA-910E-1008F8754A03}
463	37.723043	-120.269982	Non-Exempt Surge Arrestor	Completed	{FA8852EF-BC0D-40F3-A63C-DF7C0DE84571}
464	37.723013	-120.289862	Non-Exempt Surge Arrestor	Completed	{A1EA7A1D-B6D3-47AB-8330-2E4F6E68D2A5}
465	37.718355	-120.298607	Non-Exempt Surge Arrestor	Completed	{B31419BA-41BE-44F6-A8C2-1CF76BAD0D1C}
466	37.701282	-120.298993	Non-Exempt Surge Arrestor	Completed	{F998C258-6438-426F-B3DA-33A913ED7499}
467	37.700465	-120.293393	Non-Exempt Surge Arrestor	Completed	{A608716D-6C70-4867-B2C5-77EF0010DD0F}
468	37.70056	-120.273282	Non-Exempt Surge Arrestor	Completed	{89F4B2A0-C9EB-497F-9A1A-0247343B175F}
469	37.698237	-120.290597	Non-Exempt Surge Arrestor	Completed	{F04DF8EA-94F1-4448-B603-548D102593C5}
470	37.704898	-120.286037	Non-Exempt Surge Arrestor	Completed	{CECCB087-19B4-4FA6-8B17-08D94BE3F118}
471	37.705998	-120.284628	Non-Exempt Surge Arrestor	Completed	{66961A38-4A56-4EAA-84CE-F9C05CD7959B}
472	37.73144	-120.26168	Non-Exempt Surge Arrestor	Not Accessible	{5F1FD871-7085-41F0-8430-C149875366B9}
473	37.701707	-120.300757	Non-Exempt Surge Arrestor	Completed	{B9034737-7775-4263-A069-DA8BEE3FC1E6}
474	35.699408	-120.712162	Non-Exempt Surge Arrestor	Completed	{ABE75461-C543-4C72-A6C8-637EFFB0C36B}
475	35.492768	-120.662497	Non-Exempt Surge Arrestor	Completed	{C8D9D541-1A74-4ED9-8A22-DE66755958C4}
476	35.45826	-120.659933	Non-Exempt Surge Arrestor	Completed	{61437FE8-213D-42C5-BF7A-2BAA70489130}
477	40.19524	-122.226497	Non-Exempt Surge Arrestor	Completed	{AA392A6B-882D-47EA-B656-2B4D0F8CD921}
478	40.195767	-122.226492	Non-Exempt Surge Arrestor	Completed	{1047EAE2-D43A-4128-9CA6-83B02F5A2322}
479	40.475925	-122.292153	Non-Exempt Surge Arrestor	Completed	{FBB3B0B2-ED36-425F-BC7B-BBB9F0C5B215}
480	39.136075	-120.944632	Non-Exempt Surge Arrestor	Completed	{2EF72653-3350-4289-8C42-CABAF68CCB47}
481	39.137867	-120.942888	Non-Exempt Surge Arrestor	Completed	{BA441DBF-31BC-47AA-A7DB-C7DF95866183}
482	39.1328	-120.972112	Non-Exempt Surge Arrestor	Completed	{A073F65A-259F-46E3-AF1E-808B4D797C57}
483	39.128548	-120.976672	Non-Exempt Surge Arrestor	Completed	{3250FAD4-F65A-4AE8-BECA-C33B4BDA1D15}
484	39.126943	-120.97269	Non-Exempt Surge Arrestor	Completed	{56E15630-6C94-4999-964C-E211BC19CE02}
485	39.135603	-120.959185	Non-Exempt Surge Arrestor	Completed	{47301D94-8659-4B4D-8047-5FC93710F24D}
486	39.138878	-120.970603	Non-Exempt Surge Arrestor	Completed	{12C8C208-ED3B-4E17-8964-96B2CE610D27}
487	39.141878	-120.970238	Non-Exempt Surge Arrestor	Completed	{B9FC5842-BE73-4952-812C-FBC502A1F7FA}
488	39.137378	-120.957562	Non-Exempt Surge Arrestor	Completed	{82BA2C2D-E8A7-405C-8AF8-45277D6F7289}
489	39.140897	-120.955218	Non-Exempt Surge Arrestor	Completed	{5FC81A53-102D-488F-99B2-F53990440985}
490	39.140232	-120.952398	Non-Exempt Surge Arrestor	Completed	{0D391975-B220-47CD-B50B-2FE91BC233EE}
491	39.143475	-120.953793	Non-Exempt Surge Arrestor	Completed	{8B1D5BCC-8EFB-4FE0-87E0-772832D90152}
492	39.146655	-120.955458	Non-Exempt Surge Arrestor	Not Accessible	{C73F886D-AF61-4058-BF0D-804FC5DA50F4}
493	39.146988	-120.954215	Non-Exempt Surge Arrestor	Not Accessible	{C8026CDA-7C3F-4B54-9110-57DB30C63733}
494	39.148612	-120.95785	Non-Exempt Surge Arrestor	Completed	{65D6F1A9-2D26-4906-B473-50F92AFB87B2}
495	39.14778	-120.952573	Non-Exempt Surge Arrestor	Completed	{5879AE2D-0727-42E5-9E95-724079013F93}
496	39.152245	-120.96	Non-Exempt Surge Arrestor	Completed	{D3855CB6-6430-40CB-8D06-F425D4EC1BBF}
497	39.153155	-120.959863	Non-Exempt Surge Arrestor	Completed	{3EB0D77D-E749-4361-BC01-11789CE6F906}
498	39.153172	-120.960732	Non-Exempt Surge Arrestor	Completed	{832AB538-613C-44C5-A67E-A7A18E024D1B}
499	39.154867	-120.960013	Non-Exempt Surge Arrestor	Completed	{52EE7406-7088-4075-881A-4A42B857FAA7}
500	39.155383	-120.960147	Non-Exempt Surge Arrestor	Completed	{0FE4EF32-0727-49A7-9596-C65A4FB63BC6}
501	39.156653	-120.958848	Non-Exempt Surge Arrestor	Completed	{70108324-23FA-4776-A989-A1EEF4F9C539}
502	39.15691	-120.960793	Non-Exempt Surge Arrestor	Completed	{25A4294B-79CE-4C11-B4BA-767DD39E1DFA}
503	39.150308	-120.959943	Non-Exempt Surge Arrestor	Completed	{23E16CE5-A3D0-42EF-9A2E-BD9C3C4DCCD6}
504	39.153202	-120.962005	Non-Exempt Surge Arrestor	Completed	{3507BDAC-E214-483D-B8F5-8F63D068846D}
505	39.150913	-120.961908	Non-Exempt Surge Arrestor	Completed	{22DE090B-0EC8-4374-ACED-ED82DA56569E}
506	39.152333	-120.962893	Non-Exempt Surge Arrestor	Completed	{43CA4D0B-B999-44A3-81B9-AB2B92D5CE36}
507	39.14917	-120.96298	Non-Exempt Surge Arrestor	Completed	{623A0C5C-B684-401A-B8FB-20AB89B3F22F}
508	39.148322	-120.965533	Non-Exempt Surge Arrestor	Completed	{8AC7C3F7-9AAE-4041-89AA-E53743E1F843}
509	39.155043	-120.961935	Non-Exempt Surge Arrestor	Completed	{4ADD2AB3-EC85-4D6F-AE72-C5FC7DC2C686}
510	39.158698	-120.961773	Non-Exempt Surge Arrestor	Completed	{00FB576C-EC73-4701-A7AE-89E35BE52852}
511	39.158808	-120.9584	Non-Exempt Surge Arrestor	Completed	{95821AE9-EFAC-440A-92CA-2AC2CD1324F1}
512	39.130863	-120.97317	Non-Exempt Surge Arrestor	Completed	{1B421D3F-DA47-4316-AC82-8C5EB0CED852}

513	39.144378	-120.953533	Non-Exempt Surge Arrestor	Completed	{C224CA1E-8323-4932-9707-CDB778D5A4B6}
514	39.142923	-120.953892	Non-Exempt Surge Arrestor	Not Accessible	{77CFC10E-B054-4727-9011-40A06539A98B}
515	39.133363	-120.959683	Non-Exempt Surge Arrestor	Completed	{919001B0-3ABF-428C-95AD-6785B9204740}
516	39.13518	-120.967277	Non-Exempt Surge Arrestor	Not Accessible	{9EACBAF1-F18D-4548-9961-43CAA83619B7}
517	39.132615	-120.967435	Non-Exempt Surge Arrestor	Completed	{ADE631BD-C6AB-4713-BF5D-D4DD1CB556DB}
518	39.131702	-120.965393	Non-Exempt Surge Arrestor	Completed	{1A874BB3-44EB-4911-9B95-B031ABBBF6A2}
519	38.847248	-121.107718	Non-Exempt Surge Arrestor	Completed	{CD570363-2742-4860-A8C4-51C8D5A825C7}
520	38.849212	-121.109798	Non-Exempt Surge Arrestor	Completed	{1CDED21A-3F51-4A71-A7C5-8EFD2C4BAB47}
521	38.85796	-121.105677	Non-Exempt Surge Arrestor	Completed	{24DBE975-9313-4F93-B5B3-E2715C243B69}
522	38.853882	-121.091243	Non-Exempt Surge Arrestor	Completed	{8A70523F-CC76-4856-ADE2-0DF4FEBB8BA0}
523	38.845077	-121.113267	Non-Exempt Surge Arrestor	Completed	{2DCB2AA2-C46F-457F-94BB-2B929A515896}
524	38.844615	-121.11505	Non-Exempt Surge Arrestor	Completed	{2AE5CCBB-5EF3-4FCA-B96D-0F87611B9D69}
525	38.848193	-121.105122	Non-Exempt Surge Arrestor	Not Accessible	{1BA02A75-392D-4A6F-AD00-E8AE1ECA0F03}
526	38.85271	-121.094123	Non-Exempt Surge Arrestor	Completed	{F616B98F-FEA8-4058-8A3F-C616C3FE8C96}
527	38.850085	-121.092187	Non-Exempt Surge Arrestor	Completed	{B5C53103-CB1C-436F-AEEA-C599DA339879}
528	38.852947	-121.096387	Non-Exempt Surge Arrestor	Completed	{0043AF9D-A516-4A03-AF08-27B614921515}
529	38.853813	-121.090332	Non-Exempt Surge Arrestor	Completed	{15343614-689C-47FE-8D45-5523C67AA3B6}
530	38.855993	-121.089543	Non-Exempt Surge Arrestor	Completed	{96F1408A-C404-46D4-810D-0EA10968A66E}
531	38.851852	-121.093458	Non-Exempt Surge Arrestor	Completed	{EF397FE5-2127-4234-A341-8069F34F13D7}
532	38.84789	-121.111042	Non-Exempt Surge Arrestor	Completed	{B866AAB0-79E1-41EA-8D41-4E5333538511}
533	38.856753	-121.093472	Non-Exempt Surge Arrestor	Completed	{C185A509-ED2A-4A2A-8B10-3C561673828A}
534	38.857832	-121.091148	Non-Exempt Surge Arrestor	Completed	{53B81C41-6CCD-49CF-B0EC-E58D50257506}
535	38.850793	-121.132773	Non-Exempt Surge Arrestor	Completed	{36FB2BDD-AC4E-4870-9A7A-7CE5A20861CF}
536	38.850483	-121.095193	Non-Exempt Surge Arrestor	Completed	{AA167BDF-482F-4BA1-88DE-3FB7D5B50147}
537	38.851307	-121.094363	Non-Exempt Surge Arrestor	Completed	{E664443F-5A08-41FE-BB61-8F91BBB7A690}
538	38.850977	-121.13426	Non-Exempt Surge Arrestor	Completed	{C56A081E-1FFE-4450-9DBB-B390046C096D}
539	38.8437	-121.147532	Non-Exempt Surge Arrestor	Completed	{C5935DA1-C8E3-4E25-9C1F-96720A087B77}
540	38.845073	-121.147598	Non-Exempt Surge Arrestor	Completed	{4C9B2075-3BF4-4043-8487-E2DD826A863D}
541	38.842398	-121.155353	Non-Exempt Surge Arrestor	Completed	{F3A75266-BC7C-4E84-B50C-D63B4AF97840}
542	38.839445	-121.146735	Non-Exempt Surge Arrestor	Completed	{1272A304-6D1A-4138-BB51-C22CA9F4902E}
543	38.84704	-121.149922	Non-Exempt Surge Arrestor	Completed	{E0169B22-4A4E-4770-B845-92A2BBCB9970}
544	38.842233	-121.156845	Non-Exempt Surge Arrestor	Completed	{C8D245C0-A4C5-47A4-92C9-A43CF8BB529B}
545	38.841873	-121.154138	Non-Exempt Surge Arrestor	Completed	{A5F68988-F3AB-40B4-AD90-05A786425D7F}
546	38.845763	-121.149977	Non-Exempt Surge Arrestor	Completed	{21003D33-5FBE-42FA-AAC1-61CD3EEB96DD}
547	38.846102	-121.150007	Non-Exempt Surge Arrestor	Completed	{C26E9502-648D-4B32-8DF4-1F0275A4BFF0}
548	38.847343	-121.110742	Non-Exempt Surge Arrestor	Completed	{C5DE53CD-7FF6-4CE9-AC27-8755A0814C80}
549	38.855393	-121.083707	Non-Exempt Surge Arrestor	Completed	{9D5BF016-B226-458C-886A-64BA7CC9B8EF}
550	38.865628	-121.126825	Non-Exempt Surge Arrestor	Completed	{79407626-689B-45FC-843F-51E0DF9D090B}
551	38.84463	-121.116837	Non-Exempt Surge Arrestor	Not Accessible	{031ABA2B-B4B8-481D-AB3B-F927F1E36767}
552	38.872148	-121.121267	Non-Exempt Surge Arrestor	Completed	{0B3931BA-3832-4FF8-B148-341709FA9EC4}
553	38.871343	-121.118383	Non-Exempt Surge Arrestor	Completed	{D2F4ED09-D4DB-45DF-8C02-630E16F97832}
554	38.84511	-121.117678	Non-Exempt Surge Arrestor	Completed	{CADA7507-5A44-4C17-941A-E194C82D6F83}
555	38.849405	-121.119397	Non-Exempt Surge Arrestor	Completed	{DFCF655F-25E9-41C9-8FCD-FCF96E7B2A79}
556	38.848577	-121.122318	Non-Exempt Surge Arrestor	Completed	{DBD6C4FB-FA1B-439E-96D0-054A018C117F}
557	38.863005	-121.122172	Non-Exempt Surge Arrestor	Completed	{613FFDC3-39AE-47BE-B0BD-0AD3C26A6E67}
558	38.864913	-121.121928	Non-Exempt Surge Arrestor	Completed	{95DEC809-3E19-4861-8763-39236F950DD2}
559	38.860765	-121.121438	Non-Exempt Surge Arrestor	Completed	{F62D8242-C9B1-4EBA-A4EF-47D01DD433B7}
560	38.859347	-121.12109	Non-Exempt Surge Arrestor	Completed	{6DB96A60-F2AD-4285-9EFD-2B186FA8961F}
561	38.857423	-121.12299	Non-Exempt Surge Arrestor	Completed	{8BE55AB0-5537-44AC-8DBE-085EC267FEDE}
562	38.858178	-121.119967	Non-Exempt Surge Arrestor	Not Accessible	{CEFD65C4-0269-4035-9855-D81CBD72643A}
563	38.849722	-121.12455	Non-Exempt Surge Arrestor	Completed	{25E34557-F731-4B81-BFA1-969436A097FF}
564	38.853078	-121.122605	Non-Exempt Surge Arrestor	Not Accessible	{C8723B31-A2C9-4020-BAD9-6A1C3A5AC61D}

565	38.85297	-121.114727	Non-Exempt Surge Arrestor	Not Accessible	{3354D2A8-290A-465D-9162-22815534ED12}
566	38.854738	-121.114428	Non-Exempt Surge Arrestor	Completed	{74947B41-B21E-4B91-AC80-F06123102EAB}
567	38.854727	-121.11277	Non-Exempt Surge Arrestor	Completed	{242AF5B4-11C8-4387-9F79-7B29FD8E02B5}
568	38.853903	-121.111688	Non-Exempt Surge Arrestor	Completed	{B7E0991F-379E-46A5-A63A-D3BECFB3D624}
569	38.850927	-121.124047	Non-Exempt Surge Arrestor	Completed	{23BC5421-E661-4A51-AF95-0FAB6E864CE0}
570	38.870457	-121.124607	Non-Exempt Surge Arrestor	Completed	{A4E02A2C-94F8-46C1-96D2-0DBA57C4C645}
571	38.87057	-121.122928	Non-Exempt Surge Arrestor	Completed	{EECF4C60-3781-46A2-AF1C-DF1A3E4C654F}
572	38.882103	-121.097037	Non-Exempt Surge Arrestor	Completed	{7541C443-0F96-4CA4-87DF-9AE5C6018EB7}
573	39.282857	-121.049685	Non-Exempt Surge Arrestor	Completed	{3C4D4C65-F485-4DC1-A6D3-1664B5DEE616}
574	39.28438	-121.05114	Non-Exempt Surge Arrestor	Completed	{9E433438-571C-4AD5-B026-FC488A6A631A}
575	39.279672	-121.051188	Non-Exempt Surge Arrestor	Completed	{9A4FD35F-1220-4C35-86F7-6B10FF5CEC8A}
576	39.279873	-121.055342	Non-Exempt Surge Arrestor	Completed	{1629D08A-5399-4807-89AE-3F0B51EDE0EF}
577	39.262707	-121.047515	Non-Exempt Surge Arrestor	Completed	{4EEC6431-9EA2-46CD-9888-A098C9C66619}
578	39.262128	-121.046277	Non-Exempt Surge Arrestor	Completed	{DB296C65-AC9F-4DBD-A133-6B2474BC0316}
579	39.260827	-121.046053	Non-Exempt Surge Arrestor	Completed	{CADA924E-C270-4A88-9BFA-5BEFEDC85A50}
580	39.278088	-121.03775	Non-Exempt Surge Arrestor	Completed	{379F29E0-7B55-467E-9687-E1BF0DEFF30D}
581	39.279473	-121.03871	Non-Exempt Surge Arrestor	Completed	{B987F467-FE25-4E8F-9526-A7EF64AC608B}
582	39.26826	-121.037062	Non-Exempt Surge Arrestor	Completed	{8E7A18D7-6690-4DDD-9E74-F5BAD41318DB}
583	39.26729	-121.038235	Non-Exempt Surge Arrestor	Completed	{9E112B3A-B76D-43E6-A133-E2E85F2A499F}
584	39.26954	-121.038235	Non-Exempt Surge Arrestor	Completed	{B051BCDF-1FDD-4C70-A313-62212686E99B}
585	39.270252	-121.039723	Non-Exempt Surge Arrestor	Completed	{3CBC908E-DC05-42B2-98A3-B9C894DA6545}
586	39.268773	-121.05072	Non-Exempt Surge Arrestor	Completed	{FB61CC06-3DFA-429F-9512-CB9DEE1057A0}
587	39.270122	-121.03412	Non-Exempt Surge Arrestor	Completed	{2AD5E5EB-CCFE-45CC-9F6B-960688692C79}
588	39.270663	-121.056272	Non-Exempt Surge Arrestor	Completed	{5983B2F1-14E3-44E3-A50E-DA3740C322C7}
589	39.27208	-121.055858	Non-Exempt Surge Arrestor	Completed	{6D5EF4B0-3F9A-4C88-8FD9-DC0B43406C0B}
590	39.273158	-121.055245	Non-Exempt Surge Arrestor	Completed	{DE823BAB-967E-4574-8232-B006BABB290}
591	39.27032	-121.051993	Non-Exempt Surge Arrestor	Completed	{FE0FBFEC-88BC-4C63-A4DC-E48393A36CA4}
592	39.269685	-121.054627	Non-Exempt Surge Arrestor	Completed	{C91D0FC3-BFF8-4191-95D0-F9C05DDDF75B}
593	39.268692	-121.05383	Non-Exempt Surge Arrestor	Completed	{3BA848DA-5F6D-45A1-8DCC-A4952808987F}
594	39.270923	-121.022532	Non-Exempt Surge Arrestor	Completed	{7B162A72-67AA-44BD-8AB9-1FCF7046B1C5}
595	39.271593	-121.020535	Non-Exempt Surge Arrestor	Completed	{EDB88666-55C1-4D61-8D20-78FE96C009F2}
596	39.27358	-121.025963	Non-Exempt Surge Arrestor	Completed	{B93687EE-D90E-4415-846F-58F2AAF1DA09}
597	39.276178	-121.026365	Non-Exempt Surge Arrestor	Completed	{1286C33B-A50B-40E0-AC10-00C54CF64258}
598	39.278185	-121.027762	Non-Exempt Surge Arrestor	Completed	{3E467D5C-D9D8-46F0-947D-FE5D66308175}
599	39.281057	-121.033075	Non-Exempt Surge Arrestor	Completed	{7098CF4E-23DC-4373-A721-2C4E6BA200BC}
600	39.27623	-121.021408	Non-Exempt Surge Arrestor	Completed	{0E46D80C-241F-406B-8B5F-C9AFEC977075}
601	38.90456	-121.138133	Non-Exempt Surge Arrestor	Completed	{11D015E8-6699-48D2-B1E7-76F69A2C28E7}
602	38.881925	-121.13366	Non-Exempt Surge Arrestor	Completed	{309A43AE-CBB7-47A3-AA5A-819962186507}
603	38.881952	-121.135882	Non-Exempt Surge Arrestor	Completed	{3F14B75D-D08B-4E3F-B8F3-D0FEC3C6C7C6}
604	38.881642	-121.146787	Non-Exempt Surge Arrestor	Not Accessible	{03CAAB15-1F44-4535-8D3C-C558A0B99EE1}
605	38.835609	-121.22125	Non-Exempt Surge Arrestor	Completed	{539EE87E-5746-4FE2-A190-494C30EB66DD}
606	38.88431	-121.152917	Non-Exempt Surge Arrestor	Completed	{369E604F-2FF5-4AC5-8356-BE8D1A145185}
607	38.88271	-121.156247	Non-Exempt Surge Arrestor	Completed	{367C1A05-16C1-4E67-A893-28D10ED16954}
608	38.880952	-121.156512	Non-Exempt Surge Arrestor	Completed	{B1C3E80E-853B-4E37-ABDE-1C5EEC5716DB}
609	38.882293	-121.144205	Non-Exempt Surge Arrestor	Completed	{00110841-C4DE-44D1-ADF0-E919304E9E20}
610	38.887163	-121.139982	Non-Exempt Surge Arrestor	Completed	{FB66C019-3DEF-4E82-AA96-23008F87D763}
611	38.885018	-121.139772	Non-Exempt Surge Arrestor	Completed	{94ACD60F-7007-428A-97D3-98AD33DCB14C}
612	38.885923	-121.140778	Non-Exempt Surge Arrestor	Completed	{F7EFC2F1-6134-47BC-9BAF-4957A086A206}
613	38.881497	-121.139918	Non-Exempt Surge Arrestor	Completed	{5EADB683-D5C8-4A20-B617-22390ED6038A}
614	38.884928	-121.144107	Non-Exempt Surge Arrestor	Completed	{1B99CD29-EB35-425E-A892-D4B91FE3F4D3}
615	38.887792	-121.142912	Non-Exempt Surge Arrestor	Completed	{D7EEA2F7-17F6-4411-9108-EE442076D867}
616	38.8874	-121.142798	Non-Exempt Surge Arrestor	Completed	{26F68263-AB9F-4D03-8EC6-B3D6E06D934C}

617	38.88212	-121.138265	Non-Exempt Surge Arrestor	Completed	{402C47B8-A39B-4E74-A5E3-A815D650C765}
618	38.88258	-121.136645	Non-Exempt Surge Arrestor	Completed	{DC62ACBD-DFD3-4A1C-BB06-72EB7FADC589}
619	38.881282	-121.138853	Non-Exempt Surge Arrestor	Completed	{E5782AFF-AE0F-4347-A9EA-608B746BB79B}
620	39.227055	-121.096657	Non-Exempt Surge Arrestor	Completed	{3F4A6950-77AD-49B7-BA54-5FBB60A019CF}
621	39.229163	-121.096757	Non-Exempt Surge Arrestor	Completed	{106E8772-35DB-46B9-B58D-8114B068A7A9}
622	39.223528	-121.086473	Non-Exempt Surge Arrestor	Completed	{26BF62D7-4EFC-4152-9051-F295600538C6}
623	39.2241	-121.08825	Non-Exempt Surge Arrestor	Completed	{33EBC14F-ACA9-4196-84EE-DE622787819A}
624	39.220013	-121.088922	Non-Exempt Surge Arrestor	Completed	{F660305D-D504-453F-83EF-206FBCA295CC}
625	39.221152	-121.093073	Non-Exempt Surge Arrestor	Completed	{89A15D87-A077-43CC-88D0-809946C03067}
626	39.221952	-121.09416	Non-Exempt Surge Arrestor	Completed	{4CA61437-1F65-45BC-ABA1-539F662F7CA4}
627	39.211857	-121.084745	Non-Exempt Surge Arrestor	Completed	{A9A7DDAF-6685-4501-9F81-97FB8AF6471A}
628	39.214618	-121.087958	Non-Exempt Surge Arrestor	Completed	{46B2B2E7-8A9F-49E6-A67C-C1677286B00E}
629	39.216073	-121.084895	Non-Exempt Surge Arrestor	Completed	{678C0BB6-9220-48A3-A7E6-2C00D05AF4AB}
630	39.221375	-121.080928	Non-Exempt Surge Arrestor	Completed	{BA98D232-A80D-44C5-856F-7448A2F948B3}
631	39.217088	-121.080035	Non-Exempt Surge Arrestor	Completed	{0C00BDCE-2F3E-416D-A006-79A5EBD9DA54}
632	39.219943	-121.08427	Non-Exempt Surge Arrestor	Completed	{F46D6B87-501F-4962-83EC-E19898AC2143}
633	39.219573	-121.083262	Non-Exempt Surge Arrestor	Completed	{6F69C104-1168-4DD3-8082-0DC369FF986F}
634	39.220733	-121.09987	Non-Exempt Surge Arrestor	Completed	{2FE9C269-8FCA-4813-80A3-872117A725A4}
635	39.214517	-121.104048	Non-Exempt Surge Arrestor	Completed	{19E20D68-1C27-40C7-B68C-5B70CC9615E8}
636	39.210583	-121.102917	Non-Exempt Surge Arrestor	Completed	{46267659-9C53-415C-8F41-A3F094BC84A6}
637	39.209057	-121.103167	Non-Exempt Surge Arrestor	Completed	{34915EF4-A2B4-4B65-B619-BBDD323806BB}
638	39.220653	-121.086253	Non-Exempt Surge Arrestor	Completed	{85BA3FFD-BC86-4A16-A82C-4FC12A6C229F}
639	39.208903	-121.17904	Non-Exempt Surge Arrestor	Completed	{02F16D27-F85D-4485-88B3-04600F627C18}
640	39.208468	-121.181888	Non-Exempt Surge Arrestor	Completed	{9C1B2CD1-0A4B-46DF-9B07-8230E640A973}
641	39.208305	-121.185945	Non-Exempt Surge Arrestor	Completed	{736FCC9B-3B7C-4750-A9DF-001069D04CDB}
642	39.206558	-121.187368	Non-Exempt Surge Arrestor	Completed	{3CE984EF-55F0-460D-ADF4-3BFF6E7D5119}
643	39.220998	-121.098537	Non-Exempt Surge Arrestor	Completed	{AC09EFE8-8E02-462E-B3D6-9887441D21C4}
644	39.222838	-121.1006	Non-Exempt Surge Arrestor	Completed	{2B654C25-82BC-46FF-8D3C-1FB793A9BDD4}
645	39.21997	-121.101183	Non-Exempt Surge Arrestor	Completed	{B7420AFF-499A-467B-9887-E57D30626E30}
646	39.219295	-121.098755	Non-Exempt Surge Arrestor	Completed	{B7AEASD5-62A7-4B77-92A1-5C313D736ED3}
647	39.216917	-121.100143	Non-Exempt Surge Arrestor	Completed	{A7025C0D-22B0-46DB-8090-D2C39D29D398}
648	39.212115	-121.102712	Non-Exempt Surge Arrestor	Completed	{B81A52F6-BBAF-4FAB-B1F4-FF3DE38167C1}
649	39.208825	-121.104115	Non-Exempt Surge Arrestor	Completed	{41A3AC4C-5814-4CF9-856F-E95790F8085B}
650	39.225673	-121.08866	Non-Exempt Surge Arrestor	Completed	{79B0E6C5-F8FD-413A-821E-718C4452D962}
651	39.223752	-121.082142	Non-Exempt Surge Arrestor	Completed	{0C283908-2C46-4177-9B08-05F4DAFABC66}
652	38.88219	-121.166125	Non-Exempt Surge Arrestor	Completed	{9E4BD241-872C-48B7-8BA6-451269F463D7}
653	38.90387	-121.17914	Non-Exempt Surge Arrestor	Completed	{A10E079B-73A4-46B4-8D1A-49A614EF0997}
654	38.861777	-121.12215	Non-Exempt Surge Arrestor	Completed	{3EE0956A-D196-4E2D-BF07-C2BDC3B08D71}
655	39.292577	-121.047978	Non-Exempt Surge Arrestor	Completed	{21407502-F15E-4349-B3EF-A6FCB3BC1FAF}
656	38.898812	-121.196737	Non-Exempt Surge Arrestor	Completed	{F8A8EC90-A395-458F-89F6-7E0AC3C777B3}
657	38.898183	-121.198	Non-Exempt Surge Arrestor	Completed	{1F8FAAC2-578B-4AB0-BCFC-938D7E7DB200}
658	38.898222	-121.194658	Non-Exempt Surge Arrestor	Completed	{56B7A339-9111-4583-8C3B-AE868B3377F9}
659	38.889243	-121.148505	Non-Exempt Surge Arrestor	Completed	{BCD8780F-7CEF-485B-A096-EA2EAF78CF55}
660	38.894455	-121.181765	Non-Exempt Surge Arrestor	Completed	{86411C0D-E333-4DE7-8DE4-E7B0E4B2C879}
661	38.893965	-121.177717	Non-Exempt Surge Arrestor	Completed	{33DF2A95-E903-46C8-B208-D3724C645D88}
662	38.894478	-121.178525	Non-Exempt Surge Arrestor	Completed	{4BC5F35D-53F0-407D-B9EA-3C892F2E65ED}
663	38.895043	-121.174665	Non-Exempt Surge Arrestor	Completed	{1AB76F1E-A462-4BA1-A7D8-58480B031751}
664	38.89482	-121.16932	Non-Exempt Surge Arrestor	Completed	{A522C251-FFEA-42E4-AAB4-F9C9A0B03D75}
665	38.896088	-121.168542	Non-Exempt Surge Arrestor	Completed	{A4AFE73B-8A39-4367-A7A4-8B683798FDBA}
666	38.8958	-121.167202	Non-Exempt Surge Arrestor	Completed	{C7D7E3C1-D29C-4AAF-93B9-5560C1B420C1}
667	38.889278	-121.166705	Non-Exempt Surge Arrestor	Completed	{3F24F067-1AD6-4D8C-BE52-C13322D843F8}
668	38.88811	-121.166163	Non-Exempt Surge Arrestor	Completed	{26E6DA7C-68FE-4F5C-BEA0-19000561C92C}

669	38.888643	-121.169538	Non-Exempt Surge Arrestor	Completed	{56EEBEE8-29FB-4361-BD88-F0164D51A402}
670	38.885593	-121.165	Non-Exempt Surge Arrestor	Not Accessible	{3246D3AF-EBFD-4C13-8F42-32A1F55AFB9C}
671	38.884042	-121.158438	Non-Exempt Surge Arrestor	Not Accessible	{3A3C5D39-0D48-425B-BD37-6512D3DCECDB}
672	38.886302	-121.14994	Non-Exempt Surge Arrestor	Completed	{EF38A5A3-C547-4003-99CD-0121FC3656B6}
673	38.88812	-121.163427	Non-Exempt Surge Arrestor	Completed	{38CF2D54-6BDA-4028-BAB5-F8E065039905}
674	38.882675	-121.162805	Non-Exempt Surge Arrestor	Completed	{AC10A811-59E5-4B97-B18C-173E38A9C3F6}
675	38.856057	-121.121257	Non-Exempt Surge Arrestor	Completed	{EEFC8AFD-D378-4A12-884A-D6E83E5FE24B}
676	38.882347	-121.177372	Non-Exempt Surge Arrestor	Completed	{CA70F7A2-3CF7-4B86-833A-23A1027775E0}
677	38.889297	-121.198405	Non-Exempt Surge Arrestor	Completed	{7193E902-B335-491A-B122-1EE7E81012AA}
678	38.88824	-121.199618	Non-Exempt Surge Arrestor	Not Accessible	{89422BA5-2742-4BF2-99C1-72C4BACF9B41}
679	38.887787	-121.197702	Non-Exempt Surge Arrestor	Completed	{40053E95-2DB3-42B1-B901-18B870C6C5D0}
680	38.889795	-121.195992	Non-Exempt Surge Arrestor	Completed	{8BC73FE8-63CC-4051-9E51-8AB37745A2FC}
681	38.886317	-121.193278	Non-Exempt Surge Arrestor	Completed	{592EAD3F-8EFE-41E6-8340-0DDE6B2B8B38}
682	38.893618	-121.194472	Non-Exempt Surge Arrestor	Not Accessible	{8C15B266-A98C-49D5-95C9-66DE2A0C0546}
683	38.89611	-121.19575	Non-Exempt Surge Arrestor	Completed	{EA52B845-2F32-4439-9B9E-419475B1E934}
684	38.888255	-121.17066	Non-Exempt Surge Arrestor	Completed	{E15A62E3-5A2E-4DD7-B279-856D8D0B0C19}
685	38.89795	-121.19047	Non-Exempt Surge Arrestor	Completed	{994AECEF-8901-4ABF-9A12-E6255E5A0704}
686	38.895883	-121.184238	Non-Exempt Surge Arrestor	Completed	{01CC2EB2-EA6C-4C5E-B18A-E01FB3CA7B33}
687	38.884875	-121.176465	Non-Exempt Surge Arrestor	Completed	{9469680E-F4A0-4BB0-B538-EB87F64445AA}
688	38.885297	-121.168768	Non-Exempt Surge Arrestor	Completed	{D18CCF3B-E3A8-4368-9CC4-AA1A6E1E685B}
689	38.889532	-121.172	Non-Exempt Surge Arrestor	Completed	{3A9F68B3-1181-4EE2-A490-A38E659BD7F8}
690	38.882062	-121.164785	Non-Exempt Surge Arrestor	Completed	{72616613-C28B-4905-A8E7-91F60B21714E}
691	38.851848	-121.11762	Non-Exempt Surge Arrestor	Completed	{AAA75AB3-3232-428A-8E28-6F6FDA5670EA}
692	38.853083	-121.119905	Non-Exempt Surge Arrestor	Completed	{02A26AB3-E92B-4619-9F80-88F3B2977F1F}
693	38.947982	-121.205285	Non-Exempt Surge Arrestor	Completed	{E837F507-5046-4564-86FB-DACA2AA9F6F8}
694	38.95479	-121.208977	Non-Exempt Surge Arrestor	Completed	{6BEC04D4-A79F-4834-8E44-949042059422}
695	38.956483	-121.20598	Non-Exempt Surge Arrestor	Completed	{8F035CBB-DC85-4E04-876F-70717D069F4D}
696	38.958025	-121.208597	Non-Exempt Surge Arrestor	Completed	{9DA88E67-375F-415A-9497-C4D3AAE1EAE5}
697	38.942523	-121.200782	Non-Exempt Surge Arrestor	Completed	{41F3559D-3E56-48D8-98A2-6C60FEDD3CE7}
698	38.943622	-121.20495	Non-Exempt Surge Arrestor	Completed	{3AC886D7-57AB-4B4F-A592-56FE07C469A4}
699	38.944492	-121.200013	Non-Exempt Surge Arrestor	Completed	{182926D1-D1AB-43B3-881F-83571D8D3852}
700	38.951908	-121.204512	Non-Exempt Surge Arrestor	Completed	{17EA5099-370A-4086-9174-AE50CB789ADF}
701	38.94612	-121.201318	Non-Exempt Surge Arrestor	Completed	{2959A7E7-B2B3-4AE5-B4A8-E96C96DC1114}
702	38.960917	-121.20381	Non-Exempt Surge Arrestor	Not Accessible	{CD6BB75B-24B5-40A5-9493-0C13B79A5D3F}
703	38.952277	-121.21351	Non-Exempt Surge Arrestor	Completed	{A9B2146E-DF22-43F1-9A68-83B6DB354F91}
704	38.959835	-121.20876	Non-Exempt Surge Arrestor	Not Accessible	{59B17E0D-A1BF-4908-8449-E55F33CEF5D5}
705	38.939117	-121.188055	Non-Exempt Surge Arrestor	Not Accessible	{629443BB-2A4D-4C30-9D2A-941F95BD13BE}
706	38.945623	-121.194183	Non-Exempt Surge Arrestor	Not Accessible	{878DAFCA-C350-4028-B754-6BB7144B9B8A}
707	38.950593	-121.193487	Non-Exempt Surge Arrestor	Completed	{8977391A-9370-4908-B849-779B27DD8AB0}
708	38.942305	-121.190817	Non-Exempt Surge Arrestor	Completed	{06D14F06-15FC-43FD-9153-2E4CB5851998}
709	38.951	-121.199193	Non-Exempt Surge Arrestor	Completed	{7ADCB05E-6088-4D87-A671-1043E97F2917}
710	38.934932	-121.187795	Non-Exempt Surge Arrestor	Not Accessible	{0CEB3049-5976-4BF6-A4D2-19769D292C0E}
711	38.944098	-121.186647	Non-Exempt Surge Arrestor	Completed	{CC0730CB-82F5-430C-83A7-4930552B0D9C}
712	38.939525	-121.186383	Non-Exempt Surge Arrestor	Completed	{42788CE4-81DD-45CE-8364-2552A1AA1580}
713	38.93388	-121.181332	Non-Exempt Surge Arrestor	Completed	{57397364-2898-4096-B09F-EA44F57F8215}
714	38.936062	-121.181767	Non-Exempt Surge Arrestor	Completed	{80E162D6-325D-4D2A-8FA0-9DFC1C8ED649}
715	38.935055	-121.183662	Non-Exempt Surge Arrestor	Completed	{9570C0F8-BC83-4FE3-A7D7-8F39AC934B62}
716	38.934852	-121.180528	Non-Exempt Surge Arrestor	Completed	{2276F84E-E14A-4411-8D42-AD059895FB89}
717	38.936193	-121.182698	Non-Exempt Surge Arrestor	Not Accessible	{4B5057B0-2506-4E9E-80DD-5343DAD8C291}
718	38.940623	-121.181848	Non-Exempt Surge Arrestor	Completed	{024FDAAD-1C30-4F40-9C9A-D9AC973A282F}
719	38.941473	-121.16239	Non-Exempt Surge Arrestor	Not Accessible	{DFC81162-0552-494E-9A58-DF63A8592DEA}
720	38.937845	-121.173853	Non-Exempt Surge Arrestor	Completed	{9813E6C4-7842-4A45-8DD5-D6ED9B800B6D}

721	38.947275	-121.179388	Non-Exempt Surge Arrestor	Completed	{83956C83-1B01-4EEF-9E5E-40691D43EE1D}
722	38.947503	-121.173745	Non-Exempt Surge Arrestor	Completed	{DFA4FE4C-ED2A-4355-BCCD-5C5AD7855F84}
723	38.944407	-121.168627	Non-Exempt Surge Arrestor	Completed	{EC77EF60-03A7-4A31-B6A7-C6062D001A8C}
724	38.947457	-121.175598	Non-Exempt Surge Arrestor	Completed	{9B1A157F-814B-4510-95A8-EE7318E4E69C}
725	38.941093	-121.17644	Non-Exempt Surge Arrestor	Completed	{B48741AD-0A94-48AA-89E6-5597630D4FE4}
726	38.947435	-121.178962	Non-Exempt Surge Arrestor	Completed	{50DC1E40-29C5-4B35-AE5C-B0295D95F615}
727	38.943767	-121.173667	Non-Exempt Surge Arrestor	Completed	{7DA40902-5473-45FF-834A-2D638F4C1497}
728	38.939868	-121.168423	Non-Exempt Surge Arrestor	Completed	{007E2572-02D6-477E-84A4-46825537B24E}
729	38.945745	-121.17553	Non-Exempt Surge Arrestor	Completed	{DF681D58-6FA4-476B-8D79-2D5A3648AAD1}
730	38.939708	-121.16406	Non-Exempt Surge Arrestor	Not Accessible	{91223D66-4963-4612-958F-D845ACFA72EF}
731	38.920555	-121.164358	Non-Exempt Surge Arrestor	Completed	{5F2C8490-0AF2-43E1-87C7-C50556B179B0}
732	38.920552	-121.164872	Non-Exempt Surge Arrestor	Completed	{0125FB2D-F724-463A-B822-043FD37D78AA}
733	38.922115	-121.160893	Non-Exempt Surge Arrestor	Completed	{0593FF86-AD0C-40FD-A9E1-936BFF5ED97B}
734	38.926793	-121.167967	Non-Exempt Surge Arrestor	Completed	{9DF61F5D-C7A3-4174-9AB9-5C723B3B0558}
735	38.927727	-121.165272	Non-Exempt Surge Arrestor	Completed	{A98DBC5C-FFCB-4152-B3A2-4D4C3B6AE251}
736	38.924748	-121.173292	Non-Exempt Surge Arrestor	Completed	{E8119CB1-290E-470B-8F24-FE44756BB4CF}
737	38.92491	-121.16663	Non-Exempt Surge Arrestor	Completed	{CE263F81-D468-41C6-89FF-C4D05CC2132F}
738	38.920605	-121.161847	Non-Exempt Surge Arrestor	Completed	{FB93EDAC-B767-46E2-9F05-991EC9871FD7}
739	38.919455	-121.154372	Non-Exempt Surge Arrestor	Completed	{01894B4E-BD32-4497-B24F-46367446A503}
740	38.919545	-121.156747	Non-Exempt Surge Arrestor	Completed	{62D6C525-869A-4D72-8DBA-B4216195A796}
741	38.921372	-121.157682	Non-Exempt Surge Arrestor	Completed	{0C8410AF-E694-4554-B250-5FB6FD9491E8}
742	38.923232	-121.143382	Non-Exempt Surge Arrestor	Completed	{912EC535-9987-49A0-B386-17A1B1B2488F}
743	38.91588	-121.142395	Non-Exempt Surge Arrestor	Completed	{AC61F1F6-76DB-4E33-80B4-9633DA8C4D94}
744	38.920718	-121.141718	Non-Exempt Surge Arrestor	Completed	{16D82DC4-4022-4953-B6E1-87B700DA33FC}
745	38.91445	-121.136713	Non-Exempt Surge Arrestor	Completed	{7BB66B4D-0641-4B3B-A588-ECD0FD783986}
746	38.910482	-121.135518	Non-Exempt Surge Arrestor	Completed	{F06B5003-21C8-4AE7-9FD3-0CD9B0DE3E41}
747	38.924833	-121.17108	Non-Exempt Surge Arrestor	Completed	{61CCFF14-8117-4921-A839-374703B6F836}
748	38.915118	-121.140002	Non-Exempt Surge Arrestor	Completed	{80D0C60B-A91E-4C6C-85D6-15D0E45C0A8D}
749	38.913798	-121.131952	Non-Exempt Surge Arrestor	Completed	{F01602BD-3627-411F-A233-027547B0FECE}
750	38.907715	-121.134953	Non-Exempt Surge Arrestor	Not Accessible	{7E8BB4EB-DC5F-4EEA-8808-139B61008F5E}
751	38.905585	-121.136728	Non-Exempt Surge Arrestor	Not Accessible	{12049770-9406-45E4-B248-2E3E7940D0D5}
752	38.95324	-121.202647	Non-Exempt Surge Arrestor	Completed	{5A62A611-CBD4-4332-82CE-A492126EE050}
753	38.95322	-121.197603	Non-Exempt Surge Arrestor	Completed	{8082E007-784E-4595-8F85-C2B9CD583CC4}
754	38.957827	-121.207658	Non-Exempt Surge Arrestor	Completed	{879AFD2C-65C9-44C1-8753-5B2D8D1F5978}
755	38.938933	-121.170267	Non-Exempt Surge Arrestor	Completed	{F7BCE4FD-902F-4E25-B8F5-DD59AC93D81B}
756	38.943167	-121.162473	Non-Exempt Surge Arrestor	Completed	{6E6B0D4B-1724-4862-9CA4-A639A90092DB}
757	38.938828	-121.156168	Non-Exempt Surge Arrestor	Completed	{60D471C2-D3B5-47CD-96AE-DFAF94AAFE6D}
758	38.922517	-121.176845	Non-Exempt Surge Arrestor	Not Accessible	{3823C0AE-E216-4763-9CFF-5CC2B92538A9}
759	38.915198	-121.155563	Non-Exempt Surge Arrestor	Completed	{0687E343-807F-4811-9781-2251E4915760}
760	38.945873	-121.20516	Non-Exempt Surge Arrestor	Completed	{FAC37FB5-8E47-417B-85C0-9645DCCAB104}
761	38.94673	-121.206697	Non-Exempt Surge Arrestor	Not Accessible	{865B7FFD-3293-431B-81C1-8ED463DFE8DF}
762	38.904168	-121.131683	Non-Exempt Surge Arrestor	Completed	{99280483-77D3-45E7-A13C-BBC1E80D1F04}
763	38.904272	-121.13504	Non-Exempt Surge Arrestor	Completed	{E2D2FC72-AF55-4267-AF9E-378D62134D46}
764	38.90456	-121.138133	Non-Exempt Surge Arrestor	Completed	{AA51F544-7AF9-48DE-99DC-86DFC1194021}
765	38.905387	-121.171062	Non-Exempt Surge Arrestor	Completed	{C62CCFDD-2F62-458A-9248-CA691ACCB72}
766	38.935015	-121.186325	Non-Exempt Surge Arrestor	Completed	{79048518-5C17-4D9C-AF53-43EA091D8E80}
767	38.899068	-121.176838	Non-Exempt Surge Arrestor	Completed	{148F484E-C944-4519-89E1-FD56F8E60852}
768	38.91445	-121.149393	Non-Exempt Surge Arrestor	Completed	{C4207C09-4525-413D-A388-1B58981D9BDA}
769	38.91544	-121.14938	Non-Exempt Surge Arrestor	Completed	{0F462A72-7319-4F01-9444-FBF2FA1E614C}
770	38.916723	-121.143015	Non-Exempt Surge Arrestor	Completed	{03EDBCFB-5448-41C3-8902-ED4C477BEAAD}
771	38.92417	-121.144462	Non-Exempt Surge Arrestor	Completed	{0CF86106-FBDA-47E8-81AD-06A1E85F0BCA}
772	38.913542	-121.144653	Non-Exempt Surge Arrestor	Completed	{932AC1CC-D635-423C-8F08-E8BF9443C9A4}

773	38.920465	-121.151455	Non-Exempt Surge Arrestor	Completed	{EB570064-0BF6-40BD-8EB0-88F7D6794944}
774	38.913672	-121.147297	Non-Exempt Surge Arrestor	Completed	{388125A3-FA4E-43BD-BB81-B7C2642277F9}
775	38.911453	-121.14008	Non-Exempt Surge Arrestor	Completed	{2E9DE2D2-580C-4A45-B7D8-66FE1F5CCF84}
776	38.910477	-121.138545	Non-Exempt Surge Arrestor	Completed	{488570DA-2D0F-4653-B56D-E675DB0A53DC}
777	38.916355	-121.144407	Non-Exempt Surge Arrestor	Completed	{1B6BB9EA-FED4-47A9-BC1D-83F8F7F2B645}
778	38.893965	-121.177717	Non-Exempt Surge Arrestor	Completed	{9A00293C-2676-4457-8453-25FF54101704}
779	38.882347	-121.177372	Non-Exempt Surge Arrestor	Completed	{7231D398-C330-492E-AC05-A15A7931F0AE}
780	38.905398	-121.143975	Non-Exempt Surge Arrestor	Completed	{5BEAFCE8-F9FF-4EF8-9C96-EEC8E782499F}
781	38.907033	-121.142667	Non-Exempt Surge Arrestor	Completed	{3DECBA03-1BD4-4A14-B4EA-6156041C9FDB}
782	38.904097	-121.142895	Non-Exempt Surge Arrestor	Completed	{FA542C18-C46A-4B6D-9588-74E67478710E}
783	38.906978	-121.146147	Non-Exempt Surge Arrestor	Completed	{1AE619A1-C185-4B19-B2C2-88EAD7C73F47}
784	38.906463	-121.153503	Non-Exempt Surge Arrestor	Completed	{6F418E6A-69A0-4035-AB1F-C35522449D15}
785	38.904218	-121.154308	Non-Exempt Surge Arrestor	Completed	{3813EA68-D539-46CF-8F13-F5EDFD659D18}
786	39.165635	-121.003642	Non-Exempt Surge Arrestor	Completed	{9064739D-4EC9-4BEA-A980-988A479D93C5}
787	38.875562	-121.160563	Non-Exempt Surge Arrestor	Completed	{ADFA52FA-589C-47C8-8A2B-42087D8F0AF1}
788	38.910338	-121.186185	Non-Exempt Surge Arrestor	Completed	{407F2237-52C9-4F18-B37C-1E4B0433C160}
789	38.907692	-121.158972	Non-Exempt Surge Arrestor	Not Accessible	{EA7A6ED7-8A13-4D29-9E33-029DE3C85E7E}
790	38.87431	-121.161485	Non-Exempt Surge Arrestor	Completed	{00677E38-457A-4845-9080-C5C2F877C933}
791	38.904432	-121.182648	Non-Exempt Surge Arrestor	Completed	{D9AC3BB2-D556-425B-9DDC-46DA5133ED9A}
792	38.884875	-121.176465	Non-Exempt Surge Arrestor	Completed	{4FA73965-00E9-4FB4-B5DE-C6A01A6D3725}
793	38.885297	-121.168768	Non-Exempt Surge Arrestor	Completed	{EBDAD450-ADC4-41AC-B85B-CD872E3204DE}
794	38.889532	-121.172	Non-Exempt Surge Arrestor	Completed	{B892893D-D995-4314-83B7-BA3D5E6653B1}
795	38.908352	-121.185465	Non-Exempt Surge Arrestor	Completed	{9603749E-F646-465D-9247-CEFAFA87E85C}
796	38.877562	-121.168405	Non-Exempt Surge Arrestor	Completed	{4CA571EF-772A-4C00-865B-3A7FFF0F3A17}
797	38.901632	-121.134273	Non-Exempt Surge Arrestor	Completed	{5403ADD9-7611-45E2-8980-862A832770AB}
798	38.911288	-121.168403	Non-Exempt Surge Arrestor	Not Accessible	{44FAB299-9099-4799-8A45-D3051BFAFAE2}
799	38.90998	-121.171465	Non-Exempt Surge Arrestor	Completed	{26AEA4FB-F2D9-4073-855D-E1570D24B3E8}
800	40.19524	-122.226497	Non-Exempt Surge Arrestor	Completed	{6991C482-2318-487D-98A8-0841B03A180E}
801	40.195767	-122.226492	Non-Exempt Surge Arrestor	Completed	{F7C68B09-85EE-4795-BA4F-5E55AF8D796E}
802	40.475925	-122.292153	Non-Exempt Surge Arrestor	Completed	{1A196C9D-3BC0-4023-9283-69C39A7461EC}
803	39.20224	-121.08549	Non-Exempt Surge Arrestor	Completed	{6C7EE0E6-887B-40DB-9B01-F62FFDBE3193}
804	39.203048	-121.085997	Non-Exempt Surge Arrestor	Completed	{767A744A-D22E-4157-B0B5-8C03A94BB113}
805	39.194468	-121.091185	Non-Exempt Surge Arrestor	Completed	{ED36D889-988A-4817-8F3C-23BED6CA9C34}
806	39.178117	-121.100973	Non-Exempt Surge Arrestor	Completed	{8BC43F19-8AAD-4C39-9930-18A37F0A58E9}
807	39.214885	-121.097612	Non-Exempt Surge Arrestor	Completed	{8FBD8897-A19D-4A7B-9B76-2DC119889F5C}
808	39.20461	-121.083087	Non-Exempt Surge Arrestor	Completed	{0C3F341D-5149-4366-A060-FE96D8AEF9B9}
809	39.201818	-121.089343	Non-Exempt Surge Arrestor	Completed	{661D4321-D624-47B1-925F-EB30DEAE1EFD}
810	39.201775	-121.089972	Non-Exempt Surge Arrestor	Completed	{F1D9BB55-C7FA-44F5-99BF-7B47209E5496}
811	39.19978	-121.09544	Non-Exempt Surge Arrestor	Completed	{452B9784-7E8A-4E5C-9CE9-6CB2283D3454}
812	39.202987	-121.094592	Non-Exempt Surge Arrestor	Completed	{A3DEB606-3574-40FA-92D5-CDDF5BE4E11F}
813	39.204203	-121.09512	Non-Exempt Surge Arrestor	Completed	{BCB2BF7D-F378-4E80-A90B-6A4FCBE9D9C0}
814	39.190182	-121.110145	Non-Exempt Surge Arrestor	Completed	{9A0FB414-128A-4DC7-9DBB-5722CC8C0D33}
815	39.194802	-121.109608	Non-Exempt Surge Arrestor	Completed	{E1507CE4-692C-4198-960B-3FD9A19A414E}
816	39.177538	-121.103327	Non-Exempt Surge Arrestor	Completed	{DDB7009B-72AC-4E6B-A191-8811813C4019}
817	39.179915	-121.110788	Non-Exempt Surge Arrestor	Completed	{EA825E1A-2C00-47B3-84AD-C2F548102FE9}
818	39.212115	-121.102712	Non-Exempt Surge Arrestor	Completed	{717F3005-C756-4EFF-ADD6-C2C056FA6679}
819	39.224355	-121.033893	Non-Exempt Surge Arrestor	Completed	{A3F0E5E3-7CCB-48C6-A003-9179EFBA9EE8}
820	39.232568	-121.024848	Non-Exempt Surge Arrestor	Completed	{7972BA3A-FF7B-4C92-A48B-A589491A197F}
821	39.202935	-121.009518	Non-Exempt Surge Arrestor	Not Accessible	{A0663D30-9A6C-4566-BDFB-C37875134A92}
822	39.201745	-121.01215	Non-Exempt Surge Arrestor	Completed	{7FD80EE9-56D5-47AA-AE7D-A53BF53137E3}
823	39.202208	-121.014792	Non-Exempt Surge Arrestor	Completed	{0F649CBD-10E3-4C15-A0EA-0441561F3A64}
824	39.203052	-121.017643	Non-Exempt Surge Arrestor	Completed	{FBD6E79E-F6FC-4B1E-B157-36FF41B62E57}

825	39.198907	-121.007067	Non-Exempt Surge Arrestor	Completed	{C29E16A6-C4A4-42BA-951C-12F486370B72}
826	39.199205	-121.005867	Non-Exempt Surge Arrestor	Not Accessible	{A1D7EC23-F549-4B2A-8503-3ACBFD4283E9}
827	39.290743	-121.058663	Non-Exempt Surge Arrestor	Completed	{3F5E0521-16D6-4DD9-82EC-3FEBF620C5E2}
828	39.213118	-121.02244	Non-Exempt Surge Arrestor	Completed	{7D708DFB-43F8-4143-BAC7-06194DB75A9B}
829	39.212972	-121.022758	Non-Exempt Surge Arrestor	Completed	{591EA84C-20FC-4AEC-9556-CED23D6E567E}
830	39.226712	-121.02545	Non-Exempt Surge Arrestor	Not Accessible	{763B15BA-91F1-4ED8-AF28-93F1C06EFF3A}
831	39.21267	-121.013863	Non-Exempt Surge Arrestor	Completed	{AED2A2F8-5165-4895-A07D-1E142C8468CC}
832	39.210823	-121.013553	Non-Exempt Surge Arrestor	Completed	{38A68347-E21F-4EE4-84CC-56F97501352D}
833	39.21407	-121.012413	Non-Exempt Surge Arrestor	Completed	{FF6D94A9-4A2D-44AC-AAB2-2C29B502FA21}
834	39.213397	-121.008797	Non-Exempt Surge Arrestor	Completed	{2443C879-2513-42E5-A4C8-F054A022ABD0}
835	39.233232	-121.027413	Non-Exempt Surge Arrestor	Completed	{78ACBB5A-9AC8-49B7-AB3A-84F5BB0BCB17}
836	39.212942	-121.024785	Non-Exempt Surge Arrestor	Completed	{D05AB725-DADF-4675-B057-94A7F93F5B0D}
837	39.216788	-121.033597	Non-Exempt Surge Arrestor	Completed	{DE40F749-DBBF-4836-9DAD-10DAF812B5C5}
838	39.200638	-121.0099	Non-Exempt Surge Arrestor	Completed	{30483D49-B1DC-4D2E-AB2E-2720BCF9D3A4}
839	39.198697	-121.009485	Non-Exempt Surge Arrestor	Completed	{2A348C9F-5336-42F2-8270-11504AABC9F1}
840	39.198453	-121.004358	Non-Exempt Surge Arrestor	Completed	{2BEDFBAA-4037-438F-BFB3-5BE0C6BA3A73}
841	39.198237	-121.010545	Non-Exempt Surge Arrestor	Completed	{5D3A8604-EFA7-4BF1-842A-1E662344D7FA}
842	39.228925	-121.026212	Non-Exempt Surge Arrestor	Completed	{8A39860C-6D38-4125-9764-B18D8FDCA126}
843	39.215318	-121.007093	Non-Exempt Surge Arrestor	Completed	{DAC6B327-C18A-427D-9D47-8FEAAC26D48E}
844	39.215738	-121.007215	Non-Exempt Surge Arrestor	Completed	{D9013247-F220-4D08-BC6D-A3B5B7798EED}
845	39.206812	-121.012263	Non-Exempt Surge Arrestor	Completed	{9B178682-6B0A-4085-A071-3A4DE6CDFAA2}
846	39.216065	-121.027125	Non-Exempt Surge Arrestor	Completed	{1B01E421-52E4-4A20-BBE8-3928D14F9A1C}



Appendix J - DCD Reclosers

OBJECTID	Latitude	Longitude	Field_Verifiable_Item	Field_Status	GlobalID
1	38.101206	-120.869627	System Protection Protection Deploy DCD Reclosers	Completed	{769B8A8A-B100-4334-B616-9C0C4D46197D}
2	38.075515	-120.539794	System Protection Protection Deploy DCD Reclosers	Completed	{BFD75783-A1B4-4DC7-BADE-11C43A2DD409}
3	38.486472	-120.846584	System Protection Protection Deploy DCD Reclosers	Completed	{1E65C780-E76D-4C03-88CD-0CFBC248A3CC}
4	37.946317	-122.107901	System Protection Deploy DCD Reclosers	Completed	{D5FB777F-0ECD-4903-876F-D922EDCE099E}
5	37.910422	-122.038501	System Protection Deploy DCD Reclosers	Completed	{D32935FD-5FDC-4FF3-9E57-FB5985C3D22B}
6	38.235989	-122.152924	System Protection Deploy DCD Reclosers	Completed	{02EA60B0-8029-4681-83B0-1AF1D6DC3DB6}
7	38.505665	-122.484499	System Protection Deploy DCD Reclosers	Completed	{5A90A825-18AD-4B11-A128-607B4ABF4499}
8	38.05939	-122.532181	System Protection Deploy DCD Reclosers	Completed	{B27E42A5-2821-4BD1-8C37-6A263936811C}
9	38.085479	-122.57148	System Protection Deploy DCD Reclosers	Completed	{A17A9A9F-E185-4DC2-8096-6D1AC9A9A23B}
10	38.423475	-122.674159	System Protection Deploy DCD Reclosers	Completed	{11BEC437-0941-4BB4-9F37-7D2AF79C5FE7}
11	38.488625	-122.855117	System Protection Deploy DCD Reclosers	Completed	{15988A77-F90B-4DE2-BC19-E130B19B158C}
12	38.808431	-123.023459	System Protection Deploy DCD Reclosers	Completed	{3499054B-8A33-4C6F-A064-2F0CA18C416E}
13	39.117208	-123.200363	System Protection Deploy DCD Reclosers	Completed	{0B73B001-726D-4167-8C5F-A2FEB298C01D}
14	37.30049	-121.754172	System Protection Deploy DCD Reclosers	Completed	{D987526D-2516-4F0E-93E5-F48CE86C5376}
15	36.882696	-121.327417	System Protection Deploy DCD Reclosers	Completed	{D617B9B2-0030-4168-BCCF-12D061747208}
16	36.633178	-121.698162	System Protection Deploy DCD Reclosers	Completed	{E9DE056A-2D61-40EA-A08F-EC3DA5AE27DF}
17	36.984476	-122.026767	System Protection Deploy DCD Reclosers	Completed	{0F549AF6-E844-402B-8021-0498DF304E2D}
18	37.222637	-121.970975	System Protection Deploy DCD Reclosers	Completed	{55639562-E926-40D8-B22A-4CFCB5F8CF53}
19	35.706676	-120.706726	System Protection Deploy DCD Reclosers	Completed	{988D62D1-AB34-498A-92D3-F1BD37F46FF9}
20	35.264044	-120.653683	System Protection Deploy DCD Reclosers	Completed	{9048618B-2A6A-40BE-A13C-16B887291028}
21	34.599349	-120.097888	System Protection Deploy DCD Reclosers	Completed	{B22BFA97-BFFA-4BD1-9591-861B8209F31A}
22	40.194343	-122.240909	System Protection Deploy DCD Reclosers	Completed	{3ECEDD73-4D4D-4D31-8121-67E71D9B9410}
23	40.44004	-122.29909	System Protection Deploy DCD Reclosers	Completed	{F4FB260D-F89D-4B47-9AF3-7F3293CEC357}
24	40.470007	-122.295108	System Protection Deploy DCD Reclosers	Completed	{3DEE239C-42DE-489D-8A43-4E771D180F06}
25	40.194343	-122.240909	System Protection Deploy DCD Reclosers	Completed	{E0632EC0-3EC0-4B9C-A6CD-59E7A8CC0979}
26	40.44004	-122.29909	System Protection Deploy DCD Reclosers	Completed	{A6400BF2-7748-40E2-8B66-6E57B837CACD}
27	40.470007	-122.295108	System Protection Deploy DCD Reclosers	Completed	{E4BB26D4-64FD-48C5-B104-548D7994346B}
28	37.059324	-119.388124	System Protection Deploy DCD Reclosers	Completed	{C481CBA5-309E-409C-BA20-30CE514208B4}
29	37.06209	-119.360123	System Protection Deploy DCD Reclosers	Completed	{7816713E-91DA-4622-AD94-DC9F9248F4E2}
30	37.066009	-119.357949	System Protection Deploy DCD Reclosers	Completed	{7421F45F-AD0F-4B6F-B60B-36D64F5EBFCA}



Appendix J - HD Cameras

OBJECTID	Latitude	Longitude	Field_Verifiable_Item	Status	Region	Asset_ID
1	41.224876	-122.242109	HD Cameras	Completed	1	Soda Ridge 2
2	40.629167	-123.08455	HD Cameras	Completed	1	Hayfork Divide 2
3	40.055409	-121.9856	HD Cameras	Completed	1	East Los Molinos
4	39.28789	-122.33474	HD Cameras	Completed	2	Sites 1
5	38.517394	-123.172325	HD Cameras	Completed	2	Smith Ridge
6	38.577747	-123.159647	HD Cameras	Completed	2	Mohrhardt Ridge 2
7	39.124762	-123.516772	HD Cameras	Completed	2	Lula Vineyard
8	37.8145	-121.80833	HD Cameras	Completed	3	Highland Peak
9	37.86779	-122.08324	HD Cameras	Completed	3	Lafayette Lucas Dr
10	36.406389	-121.491389	HD Cameras	Completed	3	Palo Escrito 2
11	36.9034	-121.2301	HD Cameras	Completed	3	Henrietta Peak 2
12	37.008168	-121.287603	HD Cameras	Completed	3	Pacheco Peak 1
13	37.88351	-122.22188	HD Cameras	Completed	3	Vollmer Tower Top
14	37.8038	-122.2723	HD Cameras	Completed	3	Oakland Clorox
15	35.646	-120.739	HD Cameras	Completed	4	Portnoff Hill 2
16	35.759774	-118.759622	HD Cameras	Completed	4	BlueMtnKern 2
17	35.164126	-118.580572	HD Cameras	Completed	4	El Rancho 2
18	34.833597	-118.996474	HD Cameras	Completed	4	Tecuya Mtn 2
19	34.526943	-119.979265	HD Cameras	Data Issue	4	Santa Ynez Peak West 2
20	35.2068	-119.485	HD Cameras	Completed	4	Buena Vista Kern 2
21	34.829086	-119.203979	HD Cameras	Completed	4	Mt. Abel 2
22	34.803823	-118.815796	HD Cameras	Completed	4	Gorman 1
23	38.65442	-120.70524	HD Cameras	Completed	5	Somerset
24	39.329579	-121.328995	HD Cameras	Completed	5	Jacobs Ladder
25	39.6787	-121.0094	HD Cameras	Completed	5	Lexington Hill 2
26	38.9638	-121.239633	HD Cameras	Completed	5	Garden Bar
27	39.768834	-120.436727	HD Cameras	Completed	5	Beckworth Peak 2
28	39.332739	-121.234256	HD Cameras	Completed	5	Oregon House
29	38.573867	-120.7269815	HD Cameras	Completed	5	Mt Aukum 1
30	37.218222	-119.238583	HD Cameras	Completed	6	Huntington Lake 1
31	36.746306	-119.280028	HD Cameras	Completed	6	Bear Mtn Fresno 1
32	37.8052	-120.3281	HD Cameras	Completed	6	Moccasin Peak 2



Appendix J - Distribution Sectionalizing

OBJECTID	Latitude	Longitude	Field_Verifiable_Item	Field_Status	GlobalID
1	38.108249	-120.86721	Distribution Sectionalizing	Completed	{E9CB8312-3FEA-4151-8BEB-C06D4C4958A9}
2	38.094032	-120.866085	Distribution Sectionalizing	Completed	{40586BF6-3267-4485-91A0-84BC1084F2AF}
3	38.110205	-120.866703	Distribution Sectionalizing	Completed	{D536F7D1-EAB7-45DB-8751-5754C5266DC8}
4	38.111554	-120.508292	Distribution Sectionalizing	Completed	{0648A88B-5291-4F4E-87DC-78C7C2C83263}
5	38.28461	-120.504716	Distribution Sectionalizing	Completed	{16A36F53-B7EE-47A7-81F3-1E7BFCEEE427}
6	38.284895	-120.511708	Distribution Sectionalizing	Completed	{DBC2C9FB-5321-43E8-9C74-B9DEB785824E}
7	38.284914	-120.504246	Distribution Sectionalizing	Completed	{7F4E5EE2-362D-452C-BB18-ECEC82AE2464}
8	38.285516	-120.503544	Distribution Sectionalizing	Completed	{7FD7CDB5-2752-489A-8AD9-435077F5491E}
9	38.29789	-120.504514	Distribution Sectionalizing	Completed	{96BA06E0-0DB4-4910-94C3-AF3292DA3EA1}
10	38.4692	-120.8536	Distribution Sectionalizing	Completed	{B6162E85-43E9-478B-9D43-7A8F05FFD4E1}
11	38.082531	-120.546916	Distribution Sectionalizing	Completed	{F8F7BD0C-9294-4719-A84B-2D0636235807}
12	38.085314	-120.563604	Distribution Sectionalizing	Completed	{28FAF6B3-D588-401F-8A28-9A0437815577}
13	38.087243	-120.556237	Distribution Sectionalizing	Completed	{2FBD4209-F537-4490-BECA-5CA42D8056C9}
14	38.076164	-120.542735	Distribution Sectionalizing	Completed	{2033C12A-8522-47CC-9826-1545D9AB3D90}
15	38.101303	-120.869688	Distribution Sectionalizing	Completed	{00DE0362-CDD5-4FD0-B044-1E2C99B9CA86}
16	38.065801	-120.540406	Distribution Sectionalizing	Completed	{6B216AE5-6DE7-403B-A4B9-D36C90D68E57}
17	38.069017	-120.544583	Distribution Sectionalizing	Completed	{EB7879D5-9980-49D3-A6AB-9D6962DE912F}
18	38.060819	-120.539034	Distribution Sectionalizing	Completed	{0371552F-4B17-4B7C-B519-2732DD19D27B}
19	38.086806	-120.567046	Distribution Sectionalizing	Completed	{6DC29B3A-C934-474C-B990-05C6C1AC1C9D}
20	38.085694	-120.567206	Distribution Sectionalizing	Completed	{6AEDFE32-C820-4F5D-A2C8-C8669F22D367}
21	38.075306	-120.539869	Distribution Sectionalizing	Completed	{6DA373C0-3679-4C43-A45A-68CBD890EB19}
22	38.291131	-120.504795	Distribution Sectionalizing	Completed	{68341F89-65E9-459C-9399-C941F0F0EB2E}
23	38.087445	-120.570236	Distribution Sectionalizing	Completed	{BFD5F30D-A7D0-461A-A956-DC62C293F115}
24	38.285004	-120.51495	Distribution Sectionalizing	Completed	{4F26FFDC-33AB-414A-9234-BC6A6A7C4AA2}
25	38.060684	-120.536785	Distribution Sectionalizing	Completed	{F53A1709-4442-46C9-83DC-17380DF4BE7C}
26	37.934761	-122.096498	Distribution Sectionalizing	Completed	{208F59A3-D42D-4314-B228-8A87064FDE9D}
27	37.919744	-122.098859	Distribution Sectionalizing	Completed	{1EB8D76B-B61A-4B7A-8422-6455F98BEE19}
28	37.838531	-121.953516	Distribution Sectionalizing	Completed	{231DF5FC-C749-4B80-A27C-BBB9A85064B8}
29	38.2842	-122.1249	Distribution Sectionalizing	Completed	{B2B36E3F-7F3B-4045-8BFC-286CB6AC0047}
30	38.48159	-122.457707	Distribution Sectionalizing	Completed	{2461838D-615E-4057-A5DD-AAC926B5ACE8}
31	38.487561	-122.449799	Distribution Sectionalizing	Completed	{CFBCD3D7-5AB5-4EED-B9AB-F188B59364C5}
32	38.493134	-122.456782	Distribution Sectionalizing	Completed	{2EEB2C12-5499-4873-9FFE-6BC1CE0886C2}
33	38.50482	-122.477083	Distribution Sectionalizing	Not Found	{27A95672-5E9E-4868-AD95-429D2CF34517}
34	38.50556	-122.48459	Distribution Sectionalizing	Completed	{68772118-E935-4DE3-AE03-64F2342C9712}
35	37.976928	-122.51631	Distribution Sectionalizing	Completed	{4CCC926C-1E05-4BC6-A3CB-4C62350A6C49}
36	37.980772	-122.515377	Distribution Sectionalizing	Completed	{1E725097-1BCA-4E11-BFC5-D4D53B9023EB}
37	37.982717	-122.520818	Distribution Sectionalizing	Completed	{09D7EB81-66EE-4A98-9C10-A87EC341D11B}
38	37.9874	-122.5256	Distribution Sectionalizing	Completed	{3BB03D26-43CF-46AC-A958-2F5F32A15651}
39	38.05348	-122.53136	Distribution Sectionalizing	Completed	{23967269-8CD0-404D-AE40-1BB08AFDA93C}
40	38.0625	-122.5361	Distribution Sectionalizing	Completed	{09DD5F32-089E-43B0-9685-D56FFDE6DD19}
41	38.090025	-122.576655	Distribution Sectionalizing	Completed	{35E916AC-CB19-432F-910E-06440ADA1A04}
42	38.09313	-122.57435	Distribution Sectionalizing	Completed	{A93404C7-E11E-4CDC-8D99-ED430177A89D}
43	38.0982	-122.5809	Distribution Sectionalizing	Completed	{2A73BCDC-8326-4C06-A40E-740617650B10}
44	38.2502	-122.5587	Distribution Sectionalizing	Completed	{C81780BA-8E72-46F1-94E5-F0D2762A173E}
45	38.269	-122.6084	Distribution Sectionalizing	Completed	{AE57CF65-C43D-4E01-B6FB-3B64F2582783}
46	38.2849	-122.6687	Distribution Sectionalizing	Completed	{0077B2D4-42D0-4CF8-836B-C32AC211B658}
47	38.2834	-122.6695	Distribution Sectionalizing	Completed	{3451581B-0079-4084-A71D-02D90765A37F}
48	38.2997	-122.6805	Distribution Sectionalizing	Completed	{1E9B419F-BF58-4AAC-AD20-9F7F6111EF9E}
49	38.39678	-122.71353	Distribution Sectionalizing	Completed	{0316D564-5203-4206-8E77-CB658109559D}

50	38.41655	-122.6986	Distribution Sectionalizing	Completed	{10EEFC52-BECD-4E2A-BC34-FA3ADD509199}
51	38.4218	-122.6919	Distribution Sectionalizing	Completed	{1CD5075B-68AE-4037-B0E6-FEEF9A472654}
52	38.4533	-122.6898	Distribution Sectionalizing	Completed	{6B99C89A-45B0-40FC-8D91-C2F5180EC655}
53	38.458012	-122.707848	Distribution Sectionalizing	Completed	{DAC69DD4-B92A-4227-8FDF-872CF7118C0F}
54	38.4836	-122.8479	Distribution Sectionalizing	Completed	{2A78FFC3-5B9B-4D50-91A9-B4AEE92FC1A2}
55	38.4735	-122.897	Distribution Sectionalizing	Completed	{08880902-0CF8-43FD-A985-40BEF637FEA7}
56	38.4781	-122.8948	Distribution Sectionalizing	Completed	{0F6B103D-8694-4794-8F16-FBB2204997BF}
57	38.48325	-122.8953	Distribution Sectionalizing	Completed	{1F19910D-0390-4EE2-8DC4-2E79F1227A80}
58	38.55646	-122.78593	Distribution Sectionalizing	Completed	{AA82C9A8-D029-4F48-BB69-271A47D9478B}
59	38.5809	-122.8316	Distribution Sectionalizing	Completed	{D5E947A9-D1BF-4105-AAFE-C68559C9F5DA}
60	38.6496	-122.868847	Distribution Sectionalizing	Completed	{C4097FBC-A5B4-442E-9E99-7E611D9CED8E}
61	38.6958	-122.8855	Distribution Sectionalizing	Completed	{FB160672-C701-4B56-B015-612EEEEAAE4B7}
62	38.70765	-122.90844	Distribution Sectionalizing	Completed	{5437057F-8082-40B2-88D2-198E3D91D207}
63	39.0985	-123.1914	Distribution Sectionalizing	Completed	{58CF3A7C-388F-4965-9E0B-8C28B66AA948}
64	39.12112	-123.206738	Distribution Sectionalizing	Completed	{8FF59FFC-D434-4CFE-BB5E-4B57D6A9F830}
65	39.2078	-123.2034	Distribution Sectionalizing	Completed	{E25600EF-48FF-4CF4-ACE2-5B636753B129}
66	39.2147	-123.2045	Distribution Sectionalizing	Completed	{4A65959A-0982-4FD8-BBC3-F571C28A50AE}
67	39.2253	-123.20387	Distribution Sectionalizing	Completed	{47FB4812-0EDF-465D-B209-43EC9D53F389}
68	37.339157	-121.77968	Distribution Sectionalizing	Completed	{798DC072-0211-443E-926E-758F494A793D}
69	37.246101	-121.760096	Distribution Sectionalizing	Completed	{18799A71-1700-40FD-9844-81D6EF5E7E33}
70	37.133679	-121.67427	Distribution Sectionalizing	Completed	{BD731D36-4CFE-4DFE-AB56-92FC8488CDC8}
71	37.1223	-121.6643	Distribution Sectionalizing	Completed	{86D8C65C-C0AF-46A2-BE2E-60C95FACCD6D}
72	37.0529	-121.5276	Distribution Sectionalizing	Completed	{C87E641D-33E5-4BE6-B465-FF956476E134}
73	36.9864	-121.5774	Distribution Sectionalizing	Not Found	{F8B23DFE-EEB0-4F88-B1D3-3357E1858A3F}
74	36.9653	-121.5649	Distribution Sectionalizing	Completed	{EFBAD3D7-2087-433E-BB29-FDDE5C83C844}
75	36.833521	-121.533851	Distribution Sectionalizing	Completed	{7DABBD A9-5CC0-4970-AC70-2A797371E4F9}
76	36.8681	-121.5544	Distribution Sectionalizing	Completed	{7FE093CA-7CCA-467C-921E-863460EE3B03}
77	36.600373	-121.631609	Distribution Sectionalizing	Completed	{FEAC06B9-C005-4095-B17E-2F678422D8F4}
78	36.59886	-121.64179	Distribution Sectionalizing	Completed	{D08F16E6-33E6-4E01-BC8C-EE1438113224}
79	36.815711	-121.697102	Distribution Sectionalizing	Completed	{FCAE0394-5A54-4875-B474-89A55E301905}
80	36.983713	-121.913038	Distribution Sectionalizing	Completed	{177A39DB-F578-417E-B5B0-3D100D9420DA}
81	36.9873	-121.9199	Distribution Sectionalizing	Completed	{DA85A01A-988F-483C-8A1D-10884787D879}
82	36.9913	-121.9845	Distribution Sectionalizing	Completed	{0775BB44-D854-4FF6-8EAC-D8C6F457438B}
83	37.057038	-122.012395	Distribution Sectionalizing	Completed	{5EFAECD6-A7BE-4F70-BD1E-823B49A71A6E}
84	37.038435	-122.028461	Distribution Sectionalizing	Completed	{815BC633-CE68-43A4-9E5E-04A5FD822D99}
85	37.058436	-122.011629	Distribution Sectionalizing	Completed	{041E649D-B785-40F0-9D68-A699F4B0AD62}
86	37.22426	-121.969875	Distribution Sectionalizing	Completed	{47097513-0D83-4745-BBE2-275285E65415}
87	37.229015	-121.984813	Distribution Sectionalizing	Completed	{55795149-01E1-4FD8-85C5-1301E9C137C8}
88	37.583216	-122.498032	Distribution Sectionalizing	Completed	{DD667880-D5DD-4F62-985A-84A9AE5FC14C}
89	37.588552	-122.499248	Distribution Sectionalizing	Completed	{C4D00F10-B72C-4E48-948C-D975348C2B1E}
90	35.457707	-120.659792	Distribution Sectionalizing	Completed	{669E8F5B-DC06-4FC9-9C81-88CC8B054A33}
91	35.245175	-120.641215	Distribution Sectionalizing	Completed	{16B36631-30C2-4880-87A8-8EDF06F0EBE8}
92	34.6411	-120.1154	Distribution Sectionalizing	Completed	{5B744BD3-10F1-4CDF-9B0C-624DECD424B2}
93	40.193722	-122.162135	Distribution Sectionalizing	Completed	{7AEA158E-CDE0-4BFC-9A34-F3BE039F9F81}
94	40.4454	-122.3053	Distribution Sectionalizing	Completed	{4BE22563-D200-4519-AC47-9A671F087827}
95	40.4474	-122.3104	Distribution Sectionalizing	Completed	{7EB2744E-FEF3-4CFD-9355-C850FD081EBC}
96	40.4913	-122.2757	Distribution Sectionalizing	Completed	{EB3870B4-B63E-478B-A95F-7976B9374143}
97	40.193722	-122.162135	Distribution Sectionalizing	Completed	{BA41E357-FOCA-4E6E-8D31-C01D8981AA9A}
98	40.4454	-122.3053	Distribution Sectionalizing	Completed	{960E8483-1AB0-417C-AF14-5F68C3F51848}
99	40.4474	-122.3104	Distribution Sectionalizing	Completed	{C936A6FF-184A-4F03-9151-86703DEB45A8}
100	40.4913	-122.2757	Distribution Sectionalizing	Completed	{A50BB4A2-DC74-4673-A681-1ABA01529ED3}



Appendix J - Weather Stations

OBJECTID	Latitude	Longitude	Field_Verifiable_Item	Field_Status	GlobalID
1	38.067623	-120.740607	Weather Stations	Completed	{4B6DE56B-029B-45A1-90C7-58BA3DE72568}
2	38.44279	-120.733191	Weather Stations	Completed	{1EC1EEC6-30BA-4B06-839E-B4159E382284}
3	38.210132	-120.456887	Weather Stations	Completed	{B1A4B565-8328-4EE5-B417-4A9ED404A293}
4	38.23189	-120.799506	Weather Stations	Completed	{93D69D0A-A052-47DC-9628-9D7C7D2F9EAB}
5	38.2123	-120.7563	Weather Stations	Completed	{49EE8221-9FD4-4201-BAE9-0FD03E82B350}
6	37.871911	-120.688028	Weather Stations	Completed	{6C779690-D46B-40F4-A977-71EFAC2F8DB4}
7	38.154839	-120.530738	Weather Stations	Completed	{367141DA-5163-45FD-B625-11BC70EB03BE}
8	38.299439	-120.568445	Weather Stations	Completed	{2E132A5C-B6D6-489A-A5D1-1D28A823E0B2}
9	38.195335	-120.930098	Weather Stations	Completed	{DC064753-69EA-42CF-B8EA-C38ADDF74DC}
10	38.058925	-120.534551	Weather Stations	Completed	{70FBFB2D-B92C-49B8-AE1D-D466FE3DE9FB}
11	38.327489	-120.630394	Weather Stations	Completed	{E15FC735-91BC-4819-9071-13115C460CEE}
12	38.106025	-120.494489	Weather Stations	Completed	{A7AC879C-90C0-40DC-9959-F280F38F7E03}
13	37.842594	-121.954173	Weather Stations	Completed	{020EFAC6-F71A-4307-9B4E-4C8FA58A1D88}
14	38.264057	-122.113484	Weather Stations	Completed	{84A46CDB-AE42-4078-A208-37EC20AC0290}
15	38.488002	-122.459484	Weather Stations	Completed	{047E8010-5FCB-426D-BB32-E08E27755A23}
16	38.494178	-122.469202	Weather Stations	Completed	{1B4FBA13-1518-47CD-903D-D23AD7F3A1F5}
17	37.98096	-122.515202	Weather Stations	Completed	{BBE1407A-08C4-4F5F-9C8E-0635771A86C7}
18	38.292142	-122.633813	Weather Stations	Completed	{313DE315-1C23-47D0-9EC8-4811E3CEA411}
19	38.284103	-122.732201	Weather Stations	Completed	{746B466B-60D7-4182-8AD0-68998F4B21E1}
20	38.394633	-122.713408	Weather Stations	Completed	{53866636-BC1D-41EE-A834-D61C316B3B12}
21	38.483331	-122.852149	Weather Stations	Completed	{1FBCAD70-8679-4E44-B1B8-B28DA6878D1F}
22	38.456501	-122.906414	Weather Stations	Completed	{2CC2366A-4B9C-4A1D-9AC0-77E7BBC84662}
23	38.760189	-123.00063	Weather Stations	Completed	{9DF045CC-CBE8-4658-A4A2-9EE99ACD51E2}
24	38.9779	-123.112862	Weather Stations	Completed	{8E0E835D-6405-46F4-975A-4D85A5DFE277}
25	39.242475	-123.16925	Weather Stations	Completed	{CD78BA5F-A7C0-4EB6-824C-9520E5D5C378}
26	37.339273	-121.780214	Weather Stations	Completed	{8FC618C4-37B1-438F-9C08-EB4FEA800312}
27	37.049632	-121.530006	Weather Stations	Completed	{B006E649-1FA3-4B78-ABAB-55B0E0E94ED4}
28	36.789146	-121.349898	Weather Stations	Completed	{B16AFF8D-CE0B-4D0F-95E5-7235AF976260}
29	36.865707	-121.55436	Weather Stations	Completed	{19FA4FB2-C059-4EFB-9D1A-672884393CC2}
30	36.633502	-121.697184	Weather Stations	Completed	{DF445B7C-5F28-4C1B-8C59-5FC983E4704B}
31	36.947681	-121.815124	Weather Stations	Completed	{636FE4F6-4643-41F8-A397-0ADE08D6BA20}
32	38.13141	-120.11951	Weather Stations	Not Accessible	{EDE6CE82-CAF1-4CBA-8E09-1A8C9C4A7C5F}
33	37.82978	-120.476072	Weather Stations	Completed	{9A74E08F-A59C-44DC-B74E-1E91196148FA}
34	37.586731	-122.49568	Weather Stations	Completed	{BC8E9E99-EA5F-4527-B0BE-6E4C4800D182}
35	37.793613	-122.127977	Weather Stations	Not Accessible	{1860D7B9-3A1F-4180-99E6-53E0E0EFBBD9}
36	37.680264	-122.036425	Weather Stations	Completed	{AFE5716E-3DAE-43BB-8737-1AF70C0558D5}
37	35.7398	-120.72028	Weather Stations	Completed	{8D45FC9B-C2DB-4777-9AF3-9CA929A7DEE4}
38	35.465061	-120.671716	Weather Stations	Completed	{9EC2F8F4-F3B1-40CB-AEBB-5C4F00AEE872}
39	34.968776	-120.405874	Weather Stations	Completed	{FB0CFF65-101A-43BC-A0EC-AC826018EDE8}
40	34.853856	-120.259654	Weather Stations	Completed	{B001E854-785B-4B00-8561-978FF5658B89}
41	40.159716	-122.230005	Weather Stations	Completed	{0556CD4D-4A0F-4CF5-9E6C-AA8EF6E82327}
42	40.447354	-122.300989	Weather Stations	Completed	{0CB840D3-66DC-45B4-B849-387AEFE48E09}
43	40.50665	-122.25753	Weather Stations	Completed	{5B8589D5-3F74-4D3D-BB6B-616F3DD57E58}
44	40.487824	-122.124183	Weather Stations	Completed	{AA520258-497D-4D13-BB85-8EFCDD534AC64}
45	40.159716	-122.230005	Weather Stations	Completed	{53023509-EB7B-438E-ADC5-9844DE17C287}

46	40.447354	-122.300989	Weather Stations	Completed	{B368F556-C59E-4B82-B3D9-DDFF3A44AA2C}
47	40.50665	-122.25753	Weather Stations	Completed	{D8E17628-5B90-4581-BBA3-76E6C56A1763}
48	40.487824	-122.124183	Weather Stations	Completed	{8A355281-8A8B-416E-BAB8-41B608D5B172}
49	37.011657	-119.575215	Weather Stations	Completed	{B788CEE3-CC83-4544-8ADD-E6440B8934EC}
50	36.983689	-119.376563	Weather Stations	Completed	{58A36BB1-CF0B-4767-B240-5A477D4B64C4}
51	36.949295	-119.448982	Weather Stations	Completed	{9E34E300-3825-42BF-842F-432CC513530D}



Appendix J - System Hardening

OBJECTID	F2020_Completed_Miles	Lat	Long	Hardening_Identified	Column1_X	Line Miles
1	5.9	37.83589	-121.9505	Y	-121.95054	5.9
2	0.97	38.4989	-122.4616	Y	-122.46163	0.54
3	27.29	38.52679	-122.2221	Y	-122.2220508	25.47
4	13.07	38.41368	-122.1166	Y	-122.1166249	9.08
5	5.65	38.53785	-122.4727	Y	-122.472695	2.27