

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Implement  
Electric Utility Wildfire Mitigation Plans  
Pursuant to Senate Bill 901 (2018).

Rulemaking 18-10-007  
(Issued October 25, 2018)

**UPDATED PROGRESS REPORT OF  
PACIFIC GAS AND ELECTRIC COMPANY (U 39 E)  
WILDFIRE MITIGATION PLAN**

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Dated: January 15, 2020

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# 2019 Wildfire Safety Plan Initiative Performance

## 1. Wildfire Safety Inspections Program (WSIP) Transmission

- 1.1 Inspections: 100%
- 1.2 Corrective Actions: 93%
- 1.3 Quality: 98.1%
- 1.4 Drone Inspections: 100%
- 1.5 Helicopter Inspections: 100%

### Distribution

- 1.6 Inspections: 100%
- 1.7 Corrective Actions: 96%
- 1.8 Quality: Below Target

### Substation

- 1.9 Inspections: 100%
- 1.10 Corrective Actions: 100%

## 2. System Hardening

- 2.1 45 Miles – Q2: 106%
- 2.2 150 Miles – EOY: 114%
- 2.3 Quality: 100%
- 2.4 Non-exempt fuses: 109%
- 2.5 System Protection
- 2.6 Sectionalization

## 3. Vegetation Management

- 3.1 EVM 1,000 miles - Q2
- 3.2 EVM 2,450 miles – EOY: 103%
- 3.6 EVM Quality: Below Target
- 3.3 CEMA inspections: 81%
- 3.4 CEMA Corrective Actions: 100%
- 3.5 Strike Potential: 81%

## 4. Public Safety Power Shut-Off

- 4.1 Recloser Operations: 100%
- 4.2 Customer Services
- 4.3 PSPS Impact Mitigation
- 4.4 Re-energization Strategy
- 4.5 Customer Notifications
- 4.6 First Responders and Critical Services: Advanced notification
- 4.7 Medical Baseline Notifications
- 4.8 Customer and Community Outreach
- 4.9 Mitigate impact on Telecom / Water Utilities
- 4.10 Mapping and Communication Protocols

## 5. Resilience Zones

- 5.1 Pilot: Completed
- 5.2 Additional Resilience Zones

## 6. Operations and Technology

- 6.1 Response, Recovery and Restoration
- 6.2 Personnel Work Procedures
- 6.3 Situational Awareness
- 6.4 Rapid Earth Fault Current Limiter
- 6.5 Enhanced Wires Down Detection
- 6.6 Disable Manual Reclosers
- 6.7 Recloser Daily Operations

## 7. SIPT & WSOC

- 7.1 Aviation Resources
- 7.2 SIPT
- 7.3 SIPT support WSOC
- 7.12 WSOC Technology

### WSOC Tools

- 7.4 Camera Deployment Q2: 103%
- 7.5 Camera Deployment EOY: 187%
- 7.7 Fire Spread Model
- 7.8 Fire Detection System

### and Meteorology

- 7.6 Meteorological Operations (POMMS)
- 7.9 Storm Outage Prediction Model (SOPP)
- 7.10 Weather Stations - Q2: 125%
- 7.11 Weather Stations – 9/1: 107%

All information provided in this update reflects preliminary full-year 2019 data as of 1/10/2020, further validation & quality reviews may result in data changes

Color Legend: Completed on Time Completed Late On Track At Risk or Substantially Complete Not Completed



# Wildfire Safety Inspections Program (WSIP)

## 1. Wildfire Safety Inspections Program (WSIP) - Transmission

1.1 Transmission Inspections  
100%  
Completed Late

### Complete a WSIP enhanced inspection of all ~50,000 structures

**2019 WSP Commitment:** Complete all enhanced visual inspections by 05/01/19.

**2019 Performance:** All inspections completed, however final aerial inspections not completed until December.

1.2 Transmission Corrective Actions  
93%  
Partially Complete

### Complete all high priority corrective actions (A and B tags) identified during these inspections

**2019 WSP Commitment:** Complete all A tag and B tag (>5,000) repairs identified from WSIP enhanced inspections by 5/31; excluding tags on deenergized or 3<sup>rd</sup> party-owned lines.

**2019 Performance:** Completed all priority A and over 90% of priority B corrective actions in 2019 (excluding open tags on de-energized lines where no hazard exists). Some B tags (<500) will be completed in 2020, due to a combination of factors, including when PG&E was permitted to take lines out of service and the diversion of resources to PSPS events.

1.3 Transmission Quality  
98.1% "Passed"  
Completed

### Achieve a 98 percent "meets expectations" performance during internal audits

**2019 WSP Commitment:** Quality performance measured by Internal Audit nonconformance report of findings that represents a violation of a policy, procedure, standard or other applicable legal or regulatory requirement.

**2019 Performance:** Electric Quality Control identified 2 priority 'B' and 27 priority 'E' record nonconformance out of 244 transmission records that contained 1,550 attributes, no high risk nonconformances were found. Overall compliance score of 98.1% met the target of 98%.

1.4 Drone or Helicopter Aerial Inspections  
100%  
Completed Late

### Drone inspections will be conducted on every structure in the WSIP scope, subject to any FAA restrictions that cannot be resolved

**2019 WSP Commitment:** Complete all WSIP aerial enhanced inspections of in-scope structures by 05/01/19.

**2019 Performance:** All Transmission aerial inspections of 49,760 structures were completed, but some after the deadline. Final inspections completed in December as helicopters were utilized at Air Force bases and municipal airports, after extensive discussions, as an alternative inspection method due to restricted drone access.

1.5 Helicopter Inspections  
Completed

### Helicopters will be used for additional aerial inspections for collecting infrared data to determine hot spots on conductors, insulators, and connectors requiring repair

**2019 WSP Commitment:** High resolution infrared cameras mounted on helicopters utilized to assess for hot spots (e.g. loose/poor connections) on both summer and winter peaking lines. Scope of work is ~20% of all overhead assets (assets are reviewed on a 5-year cycle).

**2019 Performance:** All 2019 transmission helicopter inspection were completed. Further, as part of the winter and summer readiness scope, operational engineers review circuits' potential for overload conditions.



# Wildfire Safety Inspections Program (WSIP)

## 1. Wildfire Safety Inspections Program (WSIP) – Distribution and Substation

### 1.6 Distribution Inspections

100%

Completed Late

#### **Complete a WSIP enhanced inspection of all ~685,000 poles in the HFTD areas by 05/31/19**

**2019 WSP Commitment:** Complete all enhanced visual inspections by 05/01/19.

**2019 Performance:** Inspections of all 694,250 poles completed, final inspections completed in August.

#### **Complete high priority corrective actions (A and B tags) created from deficiencies identified resulting from these enhanced inspections by June 30, 2019**

**2019 WSP Commitment:** Complete all A and B tag (~5,000) corrective actions as defined by the Centralized Inspection Review Team (CIRT) review (excludes B tags created to track locations where initial inspection could not access assets).

**2019 Performance:** Completed all ~1,000 high priority “A” tags and majority of ~4,000 “B” Tags in 2019. A small volume of “B” Tags (approximately 190) will be completed in 2020, due to a combination of factors, including inclement weather; the availability of equipment, materials, and qualified personnel; objections from property owners or governmental agencies; and environmental permitting requirements.

#### **Achieve a 98 percent “meets expectations” performance during internal audits**

**2019 WSP Commitment:** The quality of Distribution WSIP inspections will be validated through Work Validation Reviews of WSIP inspection work and will report on findings that represents a policy, procedure, or standard violation.

**2019 Performance:** There were 3 high significance findings and 45 medium significance findings identified through 1,451 reviews (1,067 field reviews and 384 records reviews) resulting in a total 96.7% quality score, below the 98% target. As a result of missing this target, PG&E commissioned an independent third-party evaluation of its WSIP inspections and is engaged in a quality assessment effort that includes thousands of re-inspections.

#### **Complete WSIP enhanced inspections for all (~200) substations located in HFTD areas, by 05/01/19**

**2019 WSP Commitment:** Complete all substation enhanced visual inspections by 05/01/19

**2019 Performance:** All Substation (222 locations) inspections were completed on time (04/29/19) with a specific focus on the failure mechanisms for transformers, conductors, connectors, insulators, switches, poles, and other equipment that could result in fire ignitions.

#### **Complete all high priority corrective actions (A and B tags) created from deficiencies identified resulting from these enhanced inspections by 05/31/19**

**2019 WSP Commitment:** Complete all A and B tag (~700) repairs as defined by the Centralized Inspection Review Team (CIRT) review.

**2019 Performance:** As of 05/31/19 had completed all high priority A tags (101) and B Tags (644) identified to date. Further reviews resulted in additional B tags that are being worked on standard completion schedules.

### 1.7 Distribution Corrective Actions

96%

Substantially Completed

### 1.8 Distribution Quality

96.7%

Below Target

### 1.9 Substation Inspections

100%

Completed on Time

### 1.10 Substation Corrective Actions

100%

Completed on Time



# System Hardening

## 2. System Hardening

2.1 SH – Q2 Target

106%

Completed on Time

### Complete 45 miles in HFTD areas by 6/30/19

**2019 WSP Commitment:** Implement System Hardening standard by (1) replacing overhead (OH) circuits with insulated conductors, appropriately sized poles and covered secondary, (2) converting OH circuits to underground (UG), or (3) retiring/removing OH assets where customers can be served by other means (e.g. distributed generation, microgrid).

**2019 Performance:** While this commitment was noted as unlikely to achieve in PG&E’s 5/31 Notice to the CPUC, potential execution risks were mitigated and 47.7 miles were completed and quality validated by 06/30/19.

2.2 SH – Q4 Target

114%

Completed on Time

### Complete an additional 105 miles for a total of 150 miles in HFTD areas by 12/31/19

**2019 WSP Commitment:** Same criteria as 2.1 to achieve total of 150 miles by end of year.

**2019 Performance:** Completed 171 miles and passed quality validation by 12/31/19.

2.3 Quality Expectations

Passed

Completed

### Achieve a 100 percent “meets expectations” performance during internal audits

**2019 WSP Commitment:** Both QC and Internal Audit reviews will take place for all System Hardening miles. Any identified quality concerns are reworked before the mileage is counted towards the reported System Hardening miles.

**2019 Performance:** QC and Internal Audit reviews successfully completed for all 171 miles completed by 12/31/19.

2.4 SH - Equipment

113%

Completed

### Replace approximately 625 non-exempt fuses/cutouts in HFTD areas (each year for 7 years)

**2019 WSP Commitment:** Replace a minimum of 625 non-exempt fuses/cutouts in HFTD areas by 12/31/19.

**2019 Performance:** 706 non-exempt fuses were replaced in HFTD areas by EOY, surpassing 625 target.

2.5 System Protection

On Track

### Automate the remaining non-SCADA TripSavers serving the Tier 2 and Tier 3 HFTD areas, in 2020

**2019 WSP Commitment:** Prepare to complete this work in 2020

**2019 Performance:** During 2019 engineering analysis determined that instead of SCADA-enabling these TripSavers they will be reprogrammed in 2020. By EOY, engineering completed creation of new electronic settings files for remaining 278 locations. By start of 2020 fire season (June 1, 2020) forecast to have uploaded all electronic settings files via Bluetooth, thereby completely removing their reclosing functionality and converting them into electronic fuses.

2.6 Sectionalization  
(Distribution)

228 devices

On Track

### Installation of additional line reclosers at Tier 2 and Tier 3 HFTD boundaries

**2019 WSP Commitment:** Install additional sectionalizing devices. No specific target was set for the number of devices in the WSP. These new SCADA-enabled devices will be a combination of Line Reclosers, FuseSavers, and Motorized Switch Operators (MSO).

**2019 Performance:** PG&E operationalized 228 new SCADA-Enabled sectionalizing devices (91% of the internal target of 250). An additional 65 devices were installed in the field but not SCADA Enabled or released to operations as of EOY.



# Vegetation Management

## 3. Vegetation Management – Enhanced Vegetation Management (EVM)

3.1 EVM 1,000 Miles  
– Q2  
100%  
Completed Late

**Perform enhanced vegetation management (EVM) work on approximately 1,000 circuit miles in HFTD areas, by 6/30/19**

**2019 WSP Commitment:** Complete 1,000 circuit miles of enhanced vegetation cleared consistent with the EVM program scope, within high-fire risk areas to reduce wildfire risk through (1) overhang clearing within 4ft from conductor to sky, (2) 12 ft radial clearing around the conductor, and (3) hazard tree mitigation.

**2019 Performance:** Completed late. As of June 30<sup>th</sup> ~484 miles were validated as completed. In October the 1,000 mile threshold was crossed.

3.2 EVM – 2,450  
Miles by EOY  
103%  
Completed on Time

**Perform enhanced vegetation management (EVM) work on a total of 2,450 circuit miles in HFTD areas, by 12/31/19**

**2019 WSP Commitment:** Same criteria as 3.1 to complete EVM work on 2,450 circuit miles by 12/31/19.

**2019 Performance:** PG&E completed and validated 2,533 circuit miles as cleared to EVM scope.

3.6 EVM Quality  
63%  
Below Target

**Achieve a 92 percent “meets expectations” performance in EVM QA audits**

**2019 WSP Commitment:** QA review performed on 100 percent of EVM work. Any trees found to have been missed or incorrectly worked through the QA reviews will be reworked to meet the relevant program scope.

**2019 Performance:** Throughout 2019 PG&E performed work verification on every mile of EVM work completed in the field. The “first pass” quality results of this work verification process were ~60% for the year. Any miles that did not pass the initial work verification were reworked and re-work verified before they were considered complete. Based on this 60% “first pass” quality score this commitment is being considered “below target”.

To mitigate for identified quality challenges, in Q4 an additional Quality Assurance (QA) review process was implemented and assessed approximately 230 miles (~9% of work completed in 2019) of work that had passed work verification and were being counted as complete. These QA assessments identified that 98% of miles had been properly assessed and worked according to company standard.



# Vegetation Management

## 3. Vegetation Management – continued

### 3.3 CEMA Inspections

81%

Substantially  
Completed

#### Complete 100 percent of VM CEMA patrols (inspections) for dead or dying trees “CEMA Trees”

**2019 WSP Commitment:** Complete CEMA Inspections within targeted areas.

**2019 Performance:** VM completed ~81% of originally planned CEMA inspections (the 2<sup>nd</sup> inspection of the year for each applicable circuit) on a mileage basis and identified ~50,000 tree units requiring work. All circuits and trees tall enough to strike lines were inspected at least once in 2019. However, CEMA inspections are targeted to occur 6 months after routine 1<sup>st</sup> patrol of a circuit. Risk-informed changes to the 2019 Routine (i.e. 1<sup>st</sup>) inspection schedule during Q1, and delays in executing the routine schedule during Q1 and Q2, resulted in associated rescheduling of some CEMA (i.e. 2<sup>nd</sup>) inspections from the second half of 2019 into early 2020. All circuits and trees in HFTD remain on a generally twice per year inspection cycle, although a small volume was only inspected once in the 2019 calendar year.

### 3.4 CEMA Corrective Action

100%

Completed on Time

#### Removing or working all dead or dying trees (“CEMA trees”) identified by 10/01/19

**2019 WSP Commitment:** For all tree work identified by CEMA inspections as of 10/01/19, complete work by 12/31/2019. Excludes trees where tree work is delayed by third party delays, including environmental permitting requirements, owner refusals, and agency approval or review.

**2019 Performance:** Completed ~48,000 CEMA tree work units, including all tree work identified by CEMA inspections before 10/1, with the exception of approximately 1,839 trees where work completion has been delayed due to 3rd party constraints.

### 3.5 Assess Trees with Strike Potential

81%

Substantially  
Completed

#### Inspect all Trees with a Potential Strike Path to Power Lines

**2019 WSP Commitment:** Assess the more than 100 million trees with potential strike path through completion of on all CEMA inspection within targeted areas.

**2019 Performance:** See notes above for 3.3, completed ~81% of planned CEMA inspections, on a mileage basis. As noted: all circuits and trees in HFTD remain on a generally twice per year inspection cycle, although a small volume was only inspected once in the 2019 calendar year.





# Public Safety Power Shutoff (PSPS)

## 4. Public Safety Power Shutoff (PSPS)

4.1 Recloser Operations

100%

Completed on Time

**SCADA-enabling all remaining, active/operational line reclosers (~285) in Tier 2 and Tier 3 HFTD areas, by 06/01/19**  
**2019 WSP Commitment:** Install SCADA (Supervisory Control and Data Acquisition) functionality on all line reclosing devices in Tiers 2 and 3 which are not currently SCADA-enabled.  
**2019 Performance:** Completed SCADA enabling on all 287 remaining manual reclosers by 5/30.

4.2 Customer Services

Completed

**Continuously refine and further develop strategies that minimize the extent of disruption of grid power**  
**2019 WSP Commitment:** Define and document the following six new program workstreams in the 2019 Customer Program Playbook and implement during PSPS events: 1) Back Up Generation (OEM, Retail and Technology Partnerships), 2) Back Up Generation (Continuous Power Programs), 3) Collaborative Community Support (Community Resource Centers), 4) Support programs (Access & Functional Needs community), 5) Partnership with Critical Services providers and 6) Coordination with 3rd-Party Commodity Suppliers (CCAs).  
**2019 Performance:** Implemented improved strategies across workstreams during September, October & November PSPS events.

4.3 PSPS Impact Mitigation

On Track

**Identify and prioritize mitigation of PSPS impacts to customers where de-energizing the line will not result in a realized wildfire risk reduction**  
**2019 WSP Commitment:** All sectionalizing devices being installed as part of initiative 2.6 within System Hardening are designed to isolate Tier 2 and Tier 3 HFTD areas.  
**2019 Performance:** Aligns with initiative 2.6 within “System Hardening”. This effort is prioritized based on total number of customers who would otherwise be impacted by PSPS that can benefit from sectionalizing devices. Note that prioritization analysis for sectionalizing devices will continue to be refined each year based on improved analysis and information.

4.4 Re-energization Strategy

Not Completed

**Re-energize only when confirmed safe to do so and only after protection zones are patrolled and clear of defects or damage. Prioritize as directed to maximize public safety and minimize outage impacts and duration.**  
**2019 WSP Commitment:** Confirm it is safe to re-energize circuit by conducting a patrol, which is a visual assessment of the lines to ensure segments are clear of defects and/or damage.  
**2019 Performance:** This issue was fully described in PG&E’s second amendment filed on April 25th, with the key proposed amendment being that instead of positively inspecting every circuit that is de-energized during PSPS events, “PG&E will exercise operational judgment to determine whether distribution lines in areas that did not experience the PSPS triggering conditions but were only interrupted because of the de-energization of other lines should be patrolled.”



# Public Safety Power Shutoff (PSPS)

## 4. Public Safety Power Shutoff (PSPS) – continued

4.5 Customer Notifications

On Track

### Attempt to send notifications to all potentially impacted customers

**2019 WSP Commitment:** Attempt to send notifications to all customers identified as being in scope of a PSPS event

**2019 Performance:** PG&E attempted to send notifications to all customers impacted by PSPS events in 2019. During the largest, October 2019, PSPS events ~ 3% of total impacted customers were not contacted. PG&E is working to improve data accuracy and resolve abnormal circuit configuration issues and reaching out to customers without contact information to request they update their information.

4.6 First Responders and Critical Services

On Track

### Attempt to notify First Responders, Healthcare Facilities, Telecommunication Providers and Water Utilities in advance of residential notifications prior to a PSPS event

**2019 WSP Commitment:** For each PSPS event in 2019, attempt to notify critical service providers.

**2019 Performance:** PG&E was generally successful at sending notifications to all impacted critical service providers during 2019 PSPS events but identified several lessons learned and areas for improvement for 2020 and beyond.

4.7 Medical Baseline Notifications

Completed

### Attempt to provide additional notifications to life support/medical baseline (MBL) customers prior to a PSPS event if general notifications are unsuccessful

**2019 WSP Commitment:** Maintain up to date contact information and provide the necessary tools and processes to support the additional notification / outreach to MBL customers expected to be impacted by a PSPS event, including rolling trucks to knock on doors of MBL customers if they do not confirm receipt of prior notice attempts via phone, text or email.

**2019 Performance:** PG&E had documented and implemented processes in place to provide additional notifications to life support and MBL customers throughout 2019 PSPS events.

4.8 Notification Tools

Completed

### Refine customer notification tools and educate customers and communities to prepare for PSPS execution

**2019 WSP Commitment:** Deploy pre-wildfire season outreach efforts, including open houses, webinars, and direct mail/email campaigns to prepare customers and communities for PSPS events. Document processes, testing, functionality and use of notification tools for PSPS events.

**2019 Performance:** PG&E successfully executed a pre-wildfire season outreach and engagement plan and then implemented improved notification functionality throughout the 2019 PSPS events. Improvements during 2019 included streamlining the notifications, providing a multi-premise view of impacted addresses, and providing updated scripts with links to PSPS event maps for public safety partners.



# Public Safety Power Shutoff (PSPS)

## 4. Public Safety Power Shutoff (PSPS) – continued

4.9 Mitigate Impact on Telecom / Water Utilities

On Track

**Proactively identify PSPS impacts to critical customers and services that support emergency response and preparedness**

**2019 WSP Commitment:** Ensure accurate contact information is on file for notification purposes and provide resources (advanced notification expectations, GIS planning maps, fact sheets, websites) for emergency preparedness planning that clarifies the process for engagement and the information received during a PSPS event.

**2019 Performance:** During 2019 PSPS events, PG&E implemented the advanced notices with Public Safety Partners (PSPs) and Critical Facilities, including engagement with CCAs, telecommunication service providers and transmission customers. Further improvements for critical service provider engagement were identified through the October events, such as granting access to the PSPS data portal for Telecommunication providers

4.10 Mapping and Communication Protocols

On Track

**Ensure sufficient mapping, planning and communication protocols are developed prior to potential PSPS initiation**

**2019 WSP Commitment:** Develop protocols to provide event-specific maps, depicting areas under consideration for potential de-energization, to state and local officials as well as the public. Provide planning maps in advance of events for use by local officials and public safety partners for planning purposes. Develop robust communications protocols and procedures to support timely notification and communication to all stakeholders, from public safety partners to residential customers, in advance of a given PSPS event. Communications media include a combination of automated calls, emails, texts, and where applicable and appropriate live calls to public safety partners.

**2019 Performance:** In 2019 PG&E provided impact maps in the PSPS data portal first with availability to the public as PSPS event notifications expanded. PG&E is currently working towards adding additional circuit-level information to the online PSPS portal site for advanced notification to public safety partners, and to the public through the pge.com website.

## 5. Resilience Zones

5.1 Resilience Zone  
- Pilot

Completed Late

**Operationalize one resilience zone by June 1, 2019. Evaluate performance and effectiveness through post event review. Incorporate learnings into future Resilience Zone establishment.**

**2019 WSP Commitment:** The operationalization target is met when the first resilience zone becomes ready to use during PSPS. To reach readiness, the following needs to be complete:

1) installation of sectionalizing devices to enable isolation of the intended area from the rest of the distribution grid during PSPS, 2) installation of a pre-installed interconnection hub to enable the rapid connection of mobile generation during PSPS and 3) completion of any necessary hardening treatment(s) to enable safe energization of the intended area during PSPS weather conditions.

**2019 Performance:** As of 09/24/2019, PG&E's first resilience zone pilot project (in Angwin, Napa County) was completed and ready to be operated during relevant PSPS events. This pilot Resilience Zone in Angwin was operated during the three PSPS Events in October 2019 in which the adjacent area was in-scope for de-energization (Oct 05, Oct 23, and Oct 26-29).

5.2 Additional  
Resilience Zones

On Track

**Continue efforts to develop Resilience Zones in other towns in alignment with system hardening and targeted sectionalizing efforts**

**2019 WSP Commitment:** PG&E is continuing efforts to develop additional Resilience Zones.

**2019 Performance:** PG&E has four additional resilience zone sites currently in the implementation phase with an operationally-ready target date in 2020. Additionally, during 2019 PSPS events PG&E was able to safely operate three additional temporary microgrids in communities that do not yet have pre-installed interconnection hubs (PIHs). While these sites were not considered Resilience Zones (because they did not leverage fully pre-engineered infrastructure), they achieved the same purpose, which is to energize islanded zones within communities impacted by PSPS events and thereby enable some community resources (e.g. commercial corridors and critical facilities) to continue serving the nearby population.



## 6. Operations

### 6.1 Response, Recovery and Restoration

Completed on Time

**To respond more quickly and effectively to major wildfires, regardless of the source of ignition (e.g., third party, lightning, etc.), and to prepare to rebuild and recover from a disaster safely, efficiently, effectively, and consistently. PG&E's plan is to be ready to meet this objective by June 1, 2019 by developing the wildfire response and post-incident recovery capabilities described in this Plan**

**2019 WSP Commitment:** Have plans in place and ready to deploy to support rapid, well-coordinated response and recovery activities for wildfire impacted communities.

**2019 Performance:** As of 06/01/19, PG&E had developed wildfire response and post-incident recovery capabilities, documented in the Company Emergency Response Plan (CERP), prior to the start of the wildfire season. PG&E has enhanced and documented its commitment to support timely, well-coordinated activities between Service Planning & Design, Gas and Electric Construction, and External Engagement, as documented in PG&E's Disaster Rebuild Annex.

### 6.2 Personnel Work Procedures

Completed

**Update guidance in TD 1464S and verify annual refresher training is completed for all field employees in advance of exposure to elevated wildfire risk conditions.**

**2019 WSP Commitment:** Update guidance document TD-1464S, regarding operational practices during elevated fire risk conditions, and implement to operational teams across the company.

**2019 Performance:** Leading up to the 2019 wildfire season, PG&E refreshed field employee and contractor teams on safe operations during wildfire risk conditions through in-person Wildfire Season Readiness Kick-off meeting. PG&E finalized a comprehensive update to guidance document TD 1464S and associated Safety training courses in August 2019. PG&E also verified that field employee annual refresher training on safe operations during wildfire risk conditions was completed.

### 6.3 Situational Awareness

Completed

**Incorporate wildfire risk situational awareness into daily briefings**

**2019 WSP Commitment:** Incorporate wildfire risk situational awareness into daily briefings..

**2019 Performance:** As of 06/19/2019, PG&E's WSOC had incorporated wildfire risk situational awareness into Distribution and Transmission daily briefings. The Wildfire Incident report includes fire conditions, fire locations, assets at risk, potential impact, and outage information pertaining to active incidents.

## 6. Technology

6.4 Rapid Earth  
Fault Current  
Limiter, Pilot

On Track

### Implement R&D Rapid Earth Fault Current Limiter (REFCL) pilot project

**2019 WSP Commitment:** REFCL is a technology that rapidly reduces the energy in certain three-wire overhead distribution systems when it detects phase-to-earth faults, reducing the risk of an ignition. PG&E planned to begin engineering and design work in 2019 for pilot field implementation of this technology in 2020.

**2019 Performance:** PG&E completed the four key components of preparations for 2020 pilot field implementation: 1) Civil design, 2) Electrical substation design, 3) Ground Fault Neutralizer (GFN) and substation regulator specifications, and 4) Contract awarded. 2020 workplan includes system installation, release to operations and activation of SCADA functionality.

6.5 Enhanced  
Wires Down  
Detection

100%

Completed

### Enhanced Wires Down Detection Project

**2019 WSP Commitment:** Deliver the phase 1 scope of the project, SmartMeter Partial Voltage (PV) alert functionality (firmware) deployed to provide Operations and Dispatch situational awareness of a majority of single-phasing conditions that may indicate the occurrence of a wire down event.

**2019 Performance:** PG&E had successfully deployed the Phase 1, enhanced wires down alert functionality (firmware) to over 4.5 million SmartMeters by the end of March.

6.6 Disable Manual  
Reclosers

100%

Completed

### Disable any remaining manual reclosing devices in advance of exposure to elevated wildfire risk conditions.

**2019 WSP Commitment:** Disable manual reclosing devices (both Distributing and Transmission) by the beginning of the Wildfire Season (05/31/2019).

**2019 Performance:** Note that commitment 4.1 “Recloser Operations” had SCADA enabled the majority of active / operational line reclosers in the Tier 2 and Tier 3 HFTD areas, by 05/29/2019. The small volume of remaining manual reclosing devices were deactivated prior to wildfire season.

6.7 Recloser Daily  
Operations

100%

Completed

### Recloser daily operations conformance with TD-1464B-001 and monitor program for effectiveness

**2019 WSP Commitment:** Recloser daily operations conform to TD-1464B-001 and monitor program for effectiveness.

**2019 Performance:** As of 09/30/2019, PG&E implemented a change in the process to disable reclosing during period of potential fire risk. Rather than disabling the devices that feed into Tier 2 and Tier 3 based on local conditions, PG&E has disabled all reclosing devices that feed into Tier 2 and Tier 3 for the entirety of fire season. This change exceeded the level of risk reduction implicit in this commitment as PG&E implement this change in order to have even greater assurance that the appropriate devices are disabled during elevated risk conditions.



# Situational Awareness

## 7. Situational Awareness – Safety & Infrastructure Protection Teams (SIPT) & WSOC

### 7.1 Aviation Resources

Completed Late

**Operate four heavy-lift helicopters to aid in fire suppression and restoration efforts by May 2019, available at CAL-Fire's discretion**

**2019 WSP Commitment:** PG&E acquired four heavy-lift helicopters in 2018 and will operate them to respond to agency (e.g., CAL-Fire) requests for PG&E to operate under agency's control to support in the 2019 fire season, unless unavailable.

**2019 Performance:** As of 06/14/2019, PG&E had 4 heavy-lift helicopters available and authorized by the FAA for operations to respond to agency (Cal-Fire) request to support fire events in 2019 fire season.

### 7.2 Safety & Infrastructure Protection Teams (SIPT)

Completed Late

**Safety & Infrastructure Protection Teams (SIPT)**

**2019 WSP Commitment:** Obtain and operate a minimum of 25 trucks + 3 trucks for extra coverage and the capability of type 6 wildland engines, staffed with 60 employees through an internal PG&E SIPT in partnership with International Brotherhood of Electrical Workers (IBEW)

**2019 Performance:** As of 07/19/2019, PG&E had 28 trucks operational and over 60 employees staffed to further support SIPT.

### 7.3 SIPT support WSOC

Completed

**SIPT Support of the Wildfire Safety Operations Center (WSOC)**

**2019 WSP Commitment:** The SIPT will assist in WSOC decision making by acting as observers on high-fire risk days to inform PSPS decision making, protect PG&E assets, and assist with emergency response as approved and directed by the Agency Having Jurisdiction (AHJ) e.g. CAL FIRE

**2019 Performance:** As of July SIPT teams were in place with these activities as part of their normal work duties. Further, by October, PG&E had developed and operationalized two tools that allowed STIP crews to submit field observations and a comprehensive view of those field observations to WSOC analysts to further inform wildfire risk assessments and PSPS decision making.

### 7.12 WSOC

Completed

**WSOC Technology Implementation**

**2019 WSP Commitment:** Increase situational awareness by integrating technology and processes intended to reduce wildfire risk into the WSOC to enable PG&E's collaboration with external and internal stakeholders and respond more effectively to wildfires

**2019 Performance:** As of 11/30/19, PG&E's WSOC had implemented new technology into the Wildfire Incident Viewer (WIV) tool, that allow for additional situational awareness of the ignitions, as they occur throughout the service territory.



# Situational Awareness

## 7. Situational Awareness – Wildfire Safety Operations Center (WSOC) Tools

7.4 Camera  
Deployment – Q2

103%

Completed on Time

### HD Cameras by End of Second Quarter

**2019 WSP Commitment:** Operationalize and install 30 HD cameras by June 30, 2019, in HFTD areas

**2019 Performance:** As of 06/30/19, 31 cameras were installed and operationalized in HFTD areas.

7.5 Camera  
Deployment – EOY

187%

Completed on Time

### HD Cameras by End of Year

**2019 WSP Commitment:** Operationalize and install 71 HD cameras by the end of 2019, in HFTD areas

**2019 Performance:** By end of year, 133 HD Cameras had been installed and operationalized in the HFTD areas.

7.7 Fire Spread  
Model – Phase 1

Completed Late

### Deploy operational fire spread modeling, driven by POMMS weather model, to allow improved understanding of catastrophic fire risk before the upcoming wildfire season (June 1, 2019)

**2019 WSP Commitment:** Deploy an operational fire spread model with weather and fuels information being driven by the PG&E POMMS weather model by June 1, 2019.

**2019 Performance:** As of 10/04/2019, PG&E had developed and operationalized two operational fire spread models on the vendors server, that use the POMMS weather model data as input in 2019. Further integration and enhancements for ease of tool use occurred through the remainder of 2019.

7.8 Satellite Fire  
Detection

Completed on Time

### Implement Satellite Fire Detection before wildfire season

**2019 WSP Commitment:** Develop, deploy, and maintain an automated tool to detect and track new fires as they occur, issue alerts about new fires, as well as simulate the potential spread of new and existing fires before the upcoming wildfire season.

**2019 Performance:** As of June, PG&E had developed and operationalized an automated satellite fire detection and alerting system tool available on PG&E's intranet. When a new fire is detected the system disseminates email alerts to applicable areas and PG&E leadership.





# Situational Awareness

## 7. Situational Awareness – Meteorology

7.6 Meteorological Operations

On Track

### Deploy enhanced PG&E Operational Mesoscale Modeling System (POMMS) if accuracy can be improved

**2019 WSP Commitment:** Deploy the next generation of weather forecasting using High Performance Computer capabilities (i.e. supercomputers) or cloud computing.

**2019 Performance:** PG&E implemented POMMS enhancements in the first half of 2019. In the second half of 2019 PG&E kicked off a project to further build out POMMS 3.0 in the cloud using supercomputing resources. Planned completion in mid-2020. Vendors have been selected for system deployment

7.9 Storm Outage Prediction Model (SOPP)

Completed

### Automate analog storm matching and prediction functions in the SOPP model

**2019 WSP Commitment:** The automated analog storm matching tool being implemented utilizes the latest forecast from the federal Global Forecast System (GFS) and matches the storm variables against historical data. The ‘Outage Producing Wind’ (OPW) model returns the historical outage frequency in an area based on the forecasted wind speed.

**2019 Performance:** As of June, PG&E had developed and operationalized the automated analog storm matching and prediction functions in the SOPP model.

7.10 Weather Stations – Q2

125%

Completed on Time

### Weather Stations by End of Second Quarter

**2019 WSP Commitment:** Install 200 weather stations by June 30, 2019, in HFTD areas

**2019 Performance:** As of 06/30/19, PG&E had installed and operationalized 249 weather stations

7.11 Weather Stations – Sept 1

107%

Completed Late

### Weather Stations by September 1

**2019 WSP Commitment:** Install 400 weather stations by September 1, 2019, in HFTD areas

**2019 Performance:** PG&E completed this initiative just a few days late, as the 400<sup>th</sup> weather station was installed by 09/04/19. By the end of 2019 426 weather stations had been installed and operationalized.