

# CPUC Workshop Envista (RCA) Report

12/5/22



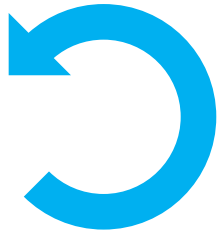
Together, Building  
a Better California



# Actions taken as a result of Envista feedback

## **PG&E's STAND: CATASTROPHIC WILDFIRES SHALL STOP**

*We are uniting world's best for breakthrough solutions. We demand and deliver excellence in wildfire mitigation.*



**Overhauled and augmented our wildfire mitigation efforts**



**Acted on the Root Cause Analysis recommendations**



**Decided no action needed on 4 recommendations**

**Worked with agencies and stakeholders to improve programs**



**Addressed 9 recommendations through our robust Wildfire Mitigation Plan & other initiatives**



**Identified 3 other potential corrective actions for consideration**



# Envista Themes and Recommendations



## Institutional Learnings

1. Enterprise-wide CAP for all incidents and events
2. Incorporate the After-Action Reports (AARs)
3. Institute a process to align plans to actions



## Vegetation Management

1. Provide VM training to VM senior leaders
2. Define minimum level of education for personnel
3. Streamline VM program for efficiency
4. Consider auditing 100% of HFTD/HFRA circuits
5. Consider switching to time and materials contracts



## Circuitry

1. Proceed with System Enhancement Initiative No. 20: engage an independent engineering firm to complete a study
2. Implement a comprehensive program that balances approaches to maintenance



## Emergency & Crisis

1. Consider full implementation of the ICS
2. Convert to a Crisis Management Team (CMT)
3. Shift OIC responsibilities to fall under the IC



# Institutional Learning Recommendations



|   | <b>Envista Recommendation</b>   | <b>PG&amp;E Response</b> | <b>PG&amp;E Corrective Actions Completed since 2018</b>   |
|---|---|--------------------------|---|
| 1 | Implement an enterprise-wide CAP for all incidents and events   | Agree                    | <ul style="list-style-type: none"> <li>Implemented enterprise-wide CAP in 2017</li> </ul>   |
| 2 | Incorporate After-Action Reports (AARs) into the enterprise-wide CAP  | Agree                    | <ul style="list-style-type: none"> <li>Implemented a new CAP process that integrated the AARs</li> <li>Our AAR Process Standard specifically addresses how findings from AARs are incorporated in the CAP process</li> </ul>  |
| 3 | Institute a process to ensure that plans, operational programs, and procedures are aligned with actions to address identified threats | Agree                    | <ul style="list-style-type: none"> <li>Process and risk models to address all-hazards, including wildfires</li> <li>Risk Spend Efficiency (RSE) and 2020 Risk Assessment Mitigation Phase (RAMP) Report and other risk focused initiatives were implemented</li> <li>Put a plan of reorganization in place for the Chief Risk Officer (CRO) and Chief Safety Officer (CSO) positions</li> <li>Received PAS 55 and ISO 55 -001 certifications for electric operations</li> </ul> |

|                |   |
|----------------|---|
| <b>Summary</b> | We have implemented significant corrective actions in the area of institutionalized learning. No additional corrective actions have been identified in this area. |
|----------------|---|



# Vegetation Management Recommendations



|   | <b>Envista Recommendation</b>  | <b>PG&amp;E Response</b> | <b>PG&amp;E Corrective Actions Completed since 2018</b>   |
|---|--|--------------------------|---|
| 1 | Vice President and other senior program leaders should have professional VM education, experience, training, and certifications                            | Partially Disagree       | <ul style="list-style-type: none"> <li>• Senior Management are required to have broad managerial experience</li> <li>• Leadership closest to work have arboreal certification and/or a forestry education</li> </ul>                                  |
| 2 | Personnel performing tree risk assessments shall have a minimum defined level of education, training, skills, and experience                               | Agree                    | <ul style="list-style-type: none"> <li>• VM program now meets or exceeds the proposed training requirements</li> <li>• Contractors are required to attend extensive company vegetation management training</li> </ul>                                 |
| 3 | Combine various VM programs into a more efficient, streamlined program   | Agree                    | <ul style="list-style-type: none"> <li>• Began transitioning from three separate VM Program elements to a “One Veg” program</li> <li>• Transition to be completed in 2023</li> </ul>  |
| 4 | The QA/QC programs should consider auditing 100% of all circuits in high fire-risk areas. Ensure 100% auditing of circuits with unsatisfactory performance | Partially Disagree       | <ul style="list-style-type: none"> <li>• Company performs 100% work verification of EVM work which is considered sufficient</li> <li>• We do not agree with auditing 100% of all circuits in high fire-risk areas for all types of VM work</li> </ul> |
| 5 | PG&E should consider converting from lump sum contracts to time and materials contracts  | Partially Disagree       | <ul style="list-style-type: none"> <li>• Company uses a mix of contract strategies that are appropriate for the specific program and scope of work</li> </ul>   |

## Summary

We have implemented significant corrective actions in the Vegetation Management Area. We continue to review and enhance our VM practices. However, no additional corrective actions are planned.



|   | Envista Recommendation   | PG&E Response | PG&E Corrective Actions Completed since 2018  |
|---|--|---------------|---|
| 1 | Proceed with System Enhancement Initiative No. 20, which requires PG&E and the CPUC to engage an independent engineering firm to study grounding methods, circuits and transformer configuration | Agree         | <ul style="list-style-type: none"> <li>This study is expected to be completed by the end of 2023</li> </ul>   |
| 2 | PG&E should implement a comprehensive program that includes the proper balance of approaches to maintenance, including preventive, predictive, and corrective measures                           | Agree         | <ul style="list-style-type: none"> <li>Provided a comprehensive description of our current asset management program in our 2022 Revised Wildfire Mitigation Plan (WMP)</li> <li>Provided significant details about our strategy for reducing our tag backlog at the request of Energy Safety in our Revised WMP</li> <li>It has been proposed to accelerate completion of overdue maintenance tags in HFTD areas</li> </ul> |

|                |  |
|----------------|--|
| <b>Summary</b> | Based on the Envista recommendations and findings we believe we have an opportunity to implement additional corrective actions in this area. For example, accelerate remediation of overdue maintenance tags in HFTD areas |
|----------------|--|



# Recommendations - Emergency and Crisis Management



|   | Envista Recommendation   | PG&E Response | PG&E Corrective Actions Completed since 2018  |
|---|--|---------------|---|
| 1 | PG&E should consider full implementation of the ICS, including for daily operations, as has been done at other major utilities, including ConEd in New York and Consumers Energy in Michigan | Disagree      | <ul style="list-style-type: none"><li>• We disagree with the recommendation. Our ICS is implemented for our all-hazards approach and is part of the company's daily operating procedure. All company emergency responders and those assigned Emergency Operations Center (EOC) positions must complete assigned training</li><li>• Emergency preparedness exercises are conducted regularly and representatives from federal, state, and local agencies are invited to participate in or observe the annual CERP exercise</li></ul> |
| 2 | Redefine the role of the executive management team to a Crisis Management Team (CMT)   | Agree         | <ul style="list-style-type: none"><li>• Implemented a CMT named the Corporate Incident Management Council (CIMC)</li><li>• Roles and responsibilities for CIMC are in the Company Emergency Response Plan (CERP)</li></ul>  |
| 3 | OIC responsibilities under the IC  | Agree         | <ul style="list-style-type: none"><li>• We have centralized the OIC responsibilities under the IC. The roles and responsibilities for these positions have been clarified in our CERP</li></ul>   |

## Summary

We have implemented significant corrective actions in Emergency and Crisis Management Area. No further corrective actions are planned.



# Proposed PG&E Corrective Actions

## Envista Recommendations

Institutional Learnings

Vegetation Management

Circuitry

Emergency and Crisis Management



**(1)**  
**Review Findings of RCA  
& Evaluate Complete  
WMP Activities – Identify  
Potential Areas of  
Corrective Actions**

**(2)**  
**Review planned  
corrective actions with  
stakeholders - receive  
feedback**

**(3)**  
**Adjust corrective actions  
and develop detailed  
plans based on input**

**(4)**  
**Receive approval of  
corrective actions and  
implementation plans  
from CPUC**

**(5)**  
**Initiate implementation  
by July 2023**

### Summary

Once we receive input on the planned corrective actions, we will determine the allocation of the ~ \$63M in shareholder funds.





# PG&E Corrective Actions

## SYSTEM HARDENING

- Reduces sources of ignition
- Eliminate Tree Contacts
- Eliminate Down Wires

## EXPULSION FUSES / FUSE SAVERS

- Eliminate potential source ignition from molten metal material when fuse opens
- Eliminates potential source of ignition from feedback

## ACCELERATED MAINTENANCE

- Accelerate the completion of previously identified maintenance tags
- Eliminates potential sources of wildfire ignition

*The Implementation of the Corrective Actions will be closely monitored*

### Develop Plan and Secure Approval

- Input from workshop
- Evaluate potential funding options
- Focus on rapid implementation and risk reduction
- Gain CPUC support

### Work Execution

- Focus on project management
- Execute to agreed schedule
- Monitor each stage of execution
- Use a mix of contract and employee labor

### Spend and Results Tracking

- Monitor spend to committed levels
- Monitor completion of committed actions

### Periodic Reporting

- Utilize bi-annual reporting to provide updates to CPUC
- Alert CPUC to any significant schedule variance

### Compliance Audit

- Grant Thornton to audit results and spend as part of existing Compliance Audit Scope






# Envista's general observations about PG&E's electric operations and findings from the RCA

- 1 PG&E's electric distribution protection system allows for **down conductors to remain energized and undetected** for prolonged periods
- 2 A **majority of wildfires were ignited by trees or branches** that fell onto the electric distribution system wires, which should have been identified and addressed before the fire ignitions per state and CPUC rules
- 3 **Wildfires were often attributed to conductor failure as a result** of tree caused breaks
- 4 Wildfires frequently involved possible **downed energized conductors, possible high impedance fault conditions and possible back feeds**
- 5 **Dead foliage was often found in or around the right-of-way for electrical structures** that was identified as burnable



# There have been 3 areas identified for potential corrective action

|                               | System Hardening in HFTD areas  | Expulsion Fuse Replacement in HFTD areas   | Maintenance tag remediation in HFTD areas   |
|-------------------------------|---|--|---|
| <b>Theme</b>                  | Circuitry   | Circuit Protection Design  | Circuitry   |
| <b>Action</b>                 | Undergrounding overhead conductors and other facilities   | Replace expulsion fuses with non-expulsion fuses or FuseSavers   | Complete overdue Maintenance tags   |
| <b>Benefits</b>               | <ol style="list-style-type: none"> <li>1. This will eliminate tree contacts and wire down incidents</li> <li>2. Reduced potential of sources for outages</li> </ol> | <ol style="list-style-type: none"> <li>1. Eliminates potential source ignition</li> <li>2. Reduces outage time</li> <li>3. Can be operated remotely</li> </ol> | <ol style="list-style-type: none"> <li>1. Reduces risk of wildfire ignition associated with these outstanding tags</li> </ol> |
| <b>Ease of implementation</b> | Requires extensive time for job preparation, material acquisition, and project scheduling   | Requires circuit protection studies and project scheduling   | Requires project scheduling   |
| <b>Cost/unit</b>              |    |   |    |



# Appendix



# Accelerate System Hardening in HFTD Areas

*Reconstruction works in Tiers 2 and 3 HFTD areas is done as part of the system hardening program, and is recommended to be accelerated*

## System Hardening Program Targets

- The top 20 percent of highest wildfire risk miles are identified by PG&E's 2021 WDRM for system hardening
- Overhead structures previously impacted directly by wildfires
- Areas most impacted by PSPS

## Overhead Hardening

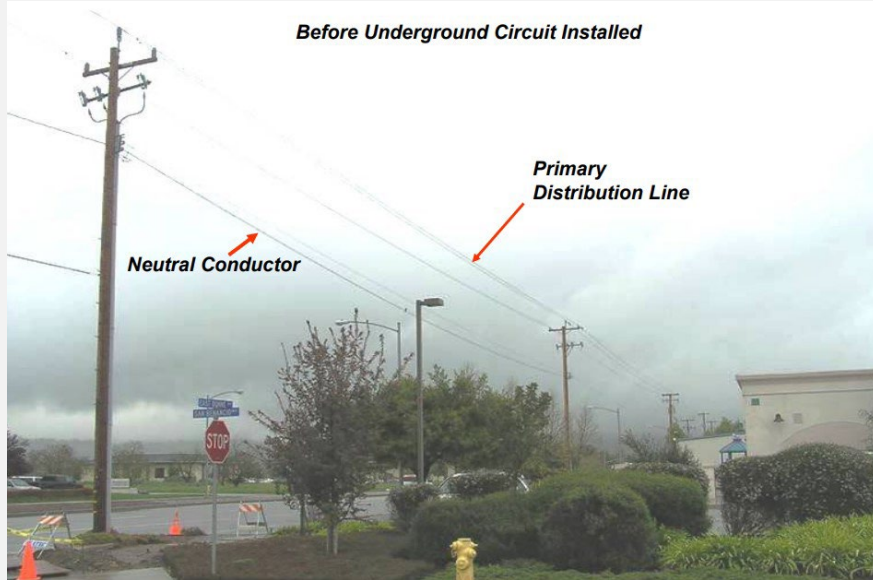
- Replacement of bare conductors with covered conductors
- Pole replacements
- Replacement of non-exempt equipment
- Replacement of overhead distribution line transformers with fire resistant insulation fluid
- Framing and animal protection upgrades
- Vegetation clearing

## System Hardening Proposals

- All overhead
- All lines underground
- Hybrid solutions



# Acceleration of Undergrounding in HFTD Areas





# Accelerate the Replacement of Non-Exempt Fuses with FuseSavers in HFTD Areas

*Non-exempt or expulsion fuses drop molten metal material when the fuse operates providing potential for ignition, and the accelerated replacement of these fuses is recommended*

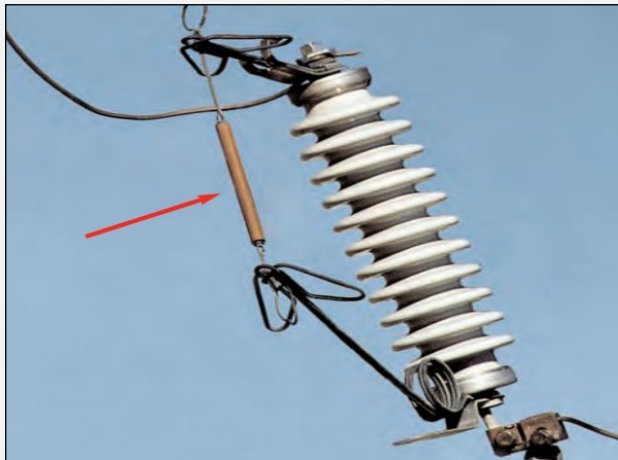
## Replacement Requirements

- There is required to be 10 feet clear around structures with expulsion fuses
- There are approximately 13,000 non-exempt fuses in HFTD, which are expected to be replaced in the next five years

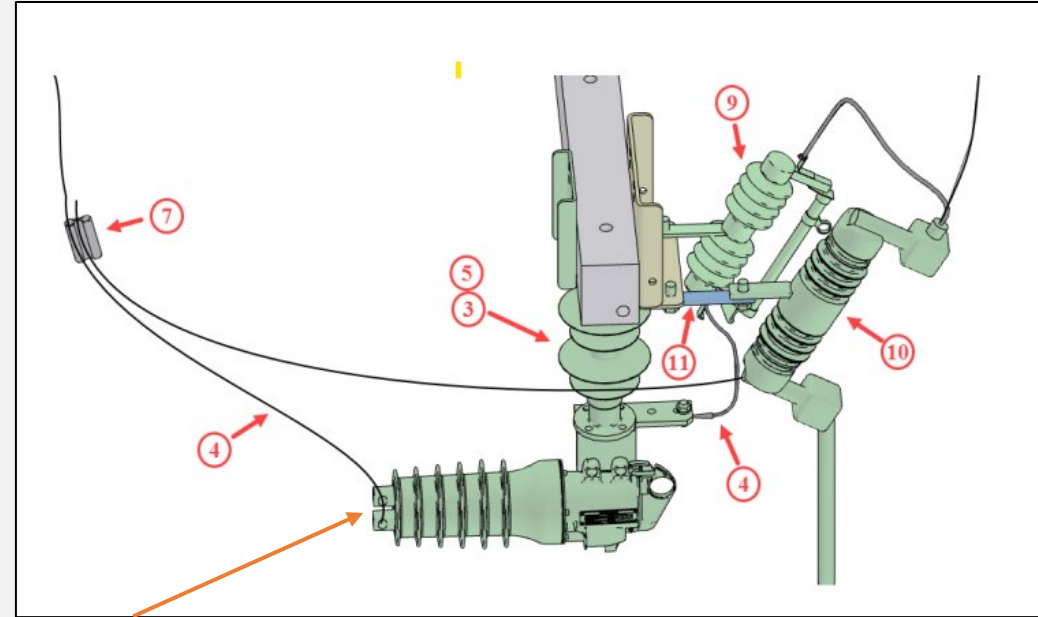
## FuseSaver Pilot

- The pilot was initiated in 2019 and was able to replace fuses with the capability to trip or open all phases:
- The new intelligent device eliminates the risk associated with wire down events where a downed wire remains energized by a back-feed condition by opening all phases when one phase is opened
  - It can be installed with SCADA allowing for remote operation including non-test and open and close capability
  - Allows PG&E to investigate outages and restore power more quickly
  - It is recommended to accelerate this program

# Examples Expulsion Fuses and FuseSaver



Examples of Expulsion Fuses



FuseSaver

FuseSaver installation  
on crossarm





# Examples of Work Associated with Overdue Tags

