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***VIA OEIS E-FILING***

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**RE: PacifiCorp (U 901 E) 2021 Wildfire Mitigation Plan Update – Progress Report**

Dear Director Jacobs:

PacifiCorp d/b/a Pacific Power (PacifiCorp or the Company) provides this report to demonstrate progress made on its 2021 Wildfire Mitigation Plan Update as required by Resolution WSD-017 Attachment A.

If you have any questions regarding this request, please contact Pooja Kishore, Regulatory Affairs Manager at (503) 813-7314.

Sincerely,



Shelley McCoy  
Director, Regulation

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## **2021 WMP UPDATE - PROGRESS REPORT**

PacifiCorp d/b/a Pacific Power (PacifiCorp or company) submits this WMP Progress Report to the Office of Energy Infrastructure Safety, in relation to the Action Statement of the Wildfire Safety Division on PacifiCorp's 2021 Wildfire Mitigation Plan Pursuant to Public Utilities Code Section 8386 (Action Statement), which was ratified in Resolution WSD-017 of Rulemaking 18-10-007 by the California Public Utilities Commission on July 15, 2021. The Action Statement identified ten issues as key areas for improvement, listed as follows:

- PC-1 Failure to follow format for Section 7.3.b, subparts 1-5, of 2021 WMP Guidelines
- PC-2 Lack of consistency in approach to wildfire risk modeling across utilities
- PC-3 GIS and non-spatial data discrepancy
- PC-4 Limited evidence to support the effectiveness of covered conductor
- PC-5 Reconductoring projects not prioritized based on wildfire risk
- PC-6 No separate process for replacing expulsion fuses and tracking progress
- PC-7 Limited explanation for how initiatives reduce PSPS impacts
- PC-8 Lack of details on automatic recloser settings
- PC-9 Inadequate justification of initiative-selection process
- PC-10 Inadequate approach to PSPS

### **PC-1 Failure to follow format for Section 7.3.b, subparts 1-5, of 2021 WMP Guidelines**

*Issue description: PC does not follow the format for Section 7.3.b of the 2021 WMP Guidelines for all mitigation initiatives provided in its 2021 WMP Update. Specifically, PC omits the subpart 1-5 headers along with some of the corresponding details from many of its initiative discussions. This makes it difficult to identify key information, such as "Progress on initiative" or "Future improvements to initiative."*

*Remedies required: PC must include and address all components of the WMP Guidelines Section 7.3.b "Detailed information on mitigation initiatives by category and activity," including all subparts 1-5, for each of its initiatives. PC must follow and address all other WMP Guideline components in its future submissions.*

### **PacifiCorp Response:**

PacifiCorp recognizes the importance of meeting specific details and guidelines set by the Commission. Upon further review of the submitted 2021 WMP Section 7.3.b, subparts 1-5, PacifiCorp has identified deviations from the template. In certain instances, PacifiCorp omitted

the explicit sections in an attempt to avoid using repetitive language for certain common themes applicable to all initiatives within a given category. Examples of this included, namely, the risk to be mitigated, the rationale for initiative selection, and regional prioritization, progress, and future improvements for asset management and inspections initiatives in Section 7.3.4.

PacifiCorp recognizes that this approach led to confusion. For the 2022 WMP update, PacifiCorp will uniformly address all template components for each initiative.

**PC-2 Lack of consistency in approach to wildfire risk modeling across utilities**

*Issue description: The utilities do not have a consistent approach to wildfire risk modeling. For example, in their wildfire risk models, utilities use different types of data, use their individual data sets in different ways, and use different third-party vendors. The WSD recognizes that the utilities have differing service territory characteristics, differing data availability, and are at different stages in developing their wildfire risk models. However, the utilities face similar enough circumstances that there should be some level of consistency in their approaches to wildfire risk modeling statewide.*

*Remedies required: The utilities must collaborate through a working group facilitated by Energy Safety to develop a more consistent statewide approach to wildfire risk modeling. After the WSD completes its evaluation of all the utilities' 2021 WMP Updates, it will provide additional detail on the specifics of this working group.*

*A working group to address wildfire risk modeling will allow for:*

- 1. Collaboration among the utilities;*
- 2. Stakeholder and academic expert input; and*
- 3. Increased transparency.*

**PacifiCorp Response:**

PacifiCorp has attended and presented detailed information about risk modeling during the Office of Energy Infrastructure Safety-guided risk modeling working group to develop a more consistent statewide approach to wildfire risk modelling. During this workshop on October 5<sup>th</sup> and 6<sup>th</sup> PacifiCorp presented a thorough, detailed, and technical explanation of how the PacifiCorp wildfire risk modeling tool, localized risk assessment model (LRAM), functions to the public and other California utilities. As requested by Energy Safety, PacifiCorp also provided detailed supplemental information on October 13, 2021 in accordance with Energy Safety's

Wildfire Risk Modeling Working Group Workplan guidelines to better support collaboration and transparency. In doing so, PacifiCorp is also committing to this effort, including setting aside key resources to evolve the company's wildfire risk modelling through collaboration with the other CA utilities.

Separately, but not associated with this calibration effort, PacifiCorp has proactively reached out to other utilities to generally outline its approach and hear theirs; these conversations have been informative, and PacifiCorp has discovered several similarities between the risk models. Consistent with other utilities, PacifiCorp's approach to wildfire risk modelling uses risks due to utility operations (including fault events) and risk due to environment. This approach to evaluating fire risk is incorporated into PacifiCorp's "Combined Score" value from its LRAM tool. As these workshops progress, PacifiCorp will continue to collaborate with other utilities to maintain alignment with the other utilities approach to wildfire risk modelling.

### **PC-3 GIS and non-spatial data discrepancy**

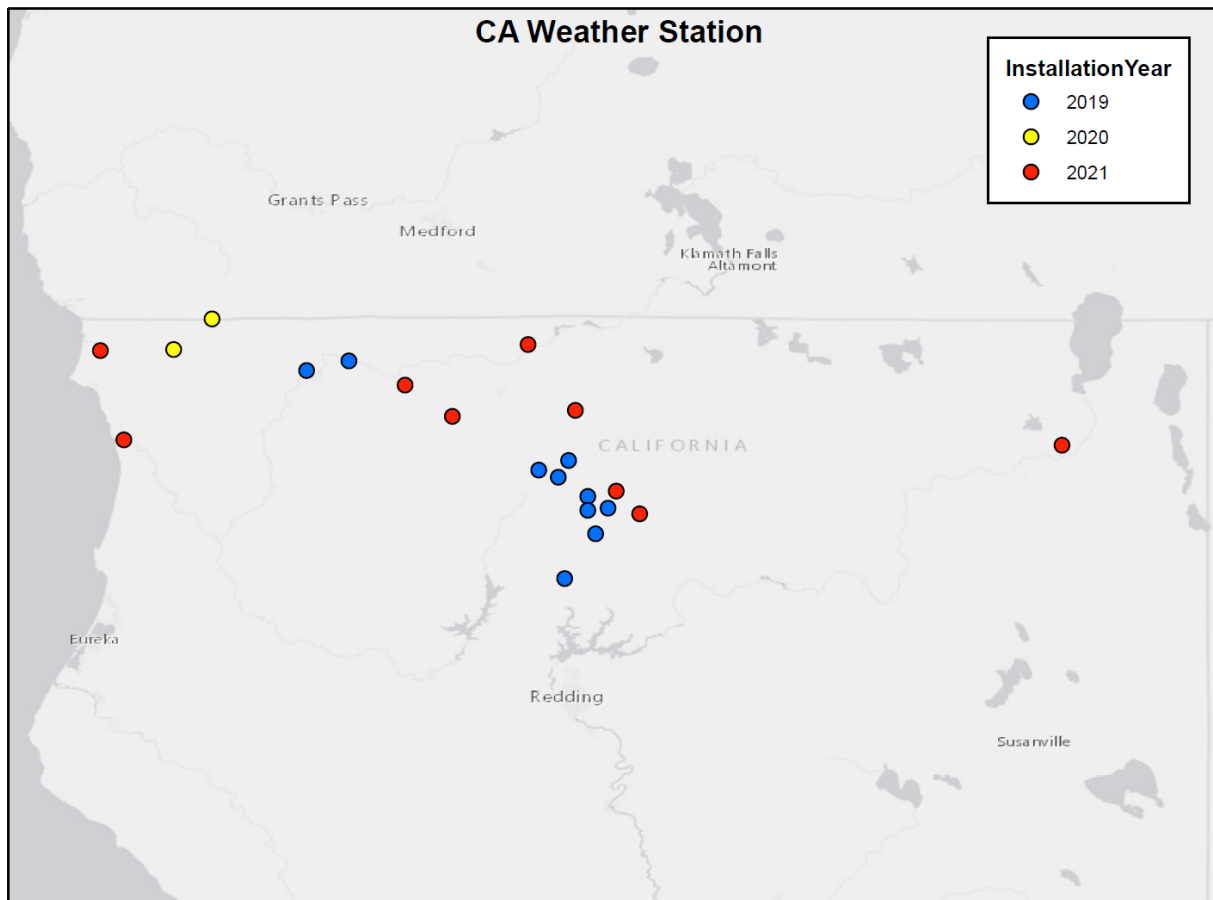
*Issue description:* PC's weather station GIS data does not match the non-spatial data included in its 2021 WMP Update, nor does it match the numbers provided in response to a data request (see Appendix 10.2 for more information). PC reports that it completed installation of ten weather stations in 2019 and two in 2020, which brings its current total to twelve. However, PC's GIS weather station data, submitted as part of its 2021 WMP Update, only includes ten GIS data points.

*Remedies required:* PC must provide complete, accurate, and the most current information, including GIS data, pertaining to all of its program targets and performance.

### **PacifiCorp Response:**

PacifiCorp is continuously developing and improving methodologies for reporting in conjunction with the evolution of the WMP data schema requirements and compliance protocols. PacifiCorp makes every attempt to provide complete, accurate and the most current information. Sometimes, due to the rapidly evolving environment, the data PacifiCorp provides is the best

available at the time. Additionally, as schema and template changes occur, ensuring accurate and complete data in the various formats and methods for reporting sometimes needs time to “catch up.” PacifiCorp is working to make sure that future submissions are consistent, with all weather stations being captured in Geospatial Information System (GIS) submissions. See the image below, which is a snapshot from the most recent Q3 Quarterly Data Responses (QDR) Spatial Data submission.



These values have been verified by weather station installation reports and are now in the GIS and inventory systems. This data, which was included in the Q3 QDR submission, demonstrates, in GIS format, that ten weather stations were installed in 2019, 2 additional

weather stations were installed in 2020, and 9 installed to date in 2021, for a total of 21 PacifiCorp owned weather stations installed today.

Regular quarterly reports, such as the Q4 QDR spatial data submission or the 2022 WMP Update, will continue to report accurate information for all 12 weather stations installed prior to 2021, as well as any newly installed weather stations in 2021.

#### **PC-4 Limited evidence to support the effectiveness of covered conductor**

*Issue description:* The rationale to support the selection of covered conductor as a preferred initiative to mitigate wildfire risk lacks consistency among the utilities, leading some utilities to potentially expedite covered conductor deployment without first demonstrating a full understanding of its long-term risk reduction and cost-effectiveness. The utilities' current covered conductor pilot efforts are limited in scope and therefore fail to provide a full basis for understanding how covered conductor will perform in the field. Additionally, utilities justify covered conductor installation by alluding to reduced PSPS risk but fail to provide adequate comparison to other initiatives' ability to reduce PSPS risk.

*Remedies required:* The utilities must coordinate to develop a consistent approach to evaluating the long-term risk reduction and cost-effectiveness of covered conductor deployment, including:

1. The effectiveness of covered conductor in the field in comparison to alternative initiatives.
2. How covered conductor installation compares to other initiatives in its potential to reduce PSPS risk.

#### **PacifiCorp Response:**

The utilities initiated the Utility Covered Conductor Effectiveness Workstream in August 2021 and have since held bi-weekly meetings. The initial meetings have focused on identifying the purpose of the workstream, organizing administration of the workstream, and sharing of covered conductor practices. On the administrative front, the work group has defined roles for project management, workstream lead, and subject matter expert (SME) and established a workspace to share and collaborate on documents.

The utilities believe that the long-term effectiveness of covered conductor, both in its ability to reduce wildfire risk and PSPS impacts (and in comparison, to alternatives), requires multiple sets of information. The data will need to be compiled, assessed, discerned and updated

over time. Because widespread installation of covered conductor in the utilities' service areas is relatively recent, recorded events alone are not appropriate to discern the effectiveness of covered conductor. To date, all the utilities have used estimated effectiveness percentages in developing the risk reduction of covered conductor. These estimates have been informed by subject matter expert judgment, testing, benchmarking/research, and/or historical recorded results. To improve current estimates of the effectiveness of covered conductor, the utilities will compile and analyze not only existing data sets but also new information within the following categories: benchmarking, testing and studies, estimated effectiveness, and recorded effectiveness, alternative comparison, potential to reduce PSPS risk, and costs.

PacifiCorp has participated in, and plans to continue participating in, the workgroup. The utilities plan to prepare a coordinated report evaluating the long-term risk reduction and cost effectiveness of covered conductor deployment. PacifiCorp plans to apply the conclusions of this coordinated report to guide its review of alternative initiatives, including with respect to the potential for reducing PSPS risk.

**PC-5 Reconductoring projects not prioritized based on wildfire risk**

*Issue description: PC states that it is replacing small diameter copper and iron conductors "throughout PacifiCorp's California service territory" instead of focusing on areas of highest risk.*

*Remedies required: PC must demonstrate that its copper and iron reconductoring projects prioritize locations with the highest wildfire risk, both in scope and timing.*

**PacifiCorp Response:**

To clarify the description in section 7.3.3.12-3 of PacifiCorp's WMP Update, PacifiCorp is replacing copper and iron conductors in the areas of highest wildfire risk. This initiative to replace copper and iron conductors to facilitate enhanced protection and control schemes is implemented coincident with the covered conductor initiative, which has a general prioritization

based on location in a Tier 3 or PSPS area. Therefore, small diameter copper conductor is being prioritized in high-risk areas, consistent with the same prioritization methodology applied to the implementation of covered conductor. Additionally, initiative targets and progress scale with the covered conductor initiatives.

As described in section 7.3.3.12-4 of PacifiCorp's 2021 WMP Update, PacifiCorp identified 5.48 miles of small diameter conductor for replacement alongside planned covered conductor projects by 2022. This scope is well defined, reflects the highest risk locations of small diameter conductor in PacifiCorp's California service territory, and reduces PSPS impacts through wildfire mitigation in these targeted locations. Beginning in 2023, when the volume of planned covered conductor reduces, PacifiCorp intends to identify other locations outside of these extreme risk areas where the replacement of small diameter conductor can facilitate advanced protection and control schemes and incrementally reduce wildfire risk. However, these projects will be independent of covered conductor in medium to lower risk locations and are therefore planned after the completion of the covered conductor scope. PacifiCorp has currently identified approximately 100 miles of small diameter covered conductor in non-extreme risk locations that could be replaced beginning in 2023.

**PC-6 No separate process for replacing expulsion fuses and tracking progress**

*Issue description: PC does not currently have a separate method established for replacing expulsion fuses and tracking these replacements.*

*Remedies required: PC must demonstrate that its current methods are adequate for tracking and assessing the need for expulsion fuse replacements. If its methods are not sufficient, PC must enhance its current operations to properly identify, analyze, and track expulsion fuse replacements.*



### **PacifiCorp Response:**

In 2021, PacifiCorp tracked expulsion fuse replacements at the circuit level as part of the covered conductor initiative, demonstrated during the Independent Evaluation conducted during May and June of 2021. However, in response to the Action Statement, PacifiCorp has established a different system for tracking expulsion fuse replacements independently and at a more granular level. These replacements will be reported in future data submissions. In addition, PacifiCorp has expanded the program for expulsion fuse replacements (also described in the Change Order being submitted to the California Public Utilities Commission in Rulemaking 18-10-007 on November 1, 2021).

In the 2021 WMP, PacifiCorp planned to replace expulsion fuse with non-expulsion fuses concurrently with other grid hardening programs, namely the covered conductor initiative. In basic terms, this approach was driven by efficiency considerations, to save on labor cost by completing all work at one time. Predictably, however, this approach did not expedite expulsion fuse replacements. As described in the Change Order Report, PacifiCorp is both (a) expediting the replacement of expulsion fuses on lines where covered conductor installation is planned and (b) expanding the expulsion fuse replacement program to circuits in the HFTD where installation of covered conductor is not currently planned. Consistent with the new approach, PacifiCorp plans to replace all expulsion fuses located in Tier 3 and Tier 2 as part of a multi-year effort. PacifiCorp has just initiated this new program. Future data submissions will include separate numbers for tracking and assessment of PacifiCorp's expulsion fuse replacement initiative as well as the overall planned delivery of the initiative scope. This risk-informed strategy will fully address the risk ignition probability due to expulsion fuses in HFTDs. Furthermore, giving

immediate priority to expulsion fuse replacements will result in expedited completion of work contemplated in this initiative.

**PC-7 Limited explanation for how initiatives reduce PSPS impacts**

*Issue description:* PC fails to explain how initiatives will reduce PSPS impacts despite selecting some initiatives (such as covered conductor installation) specifically to reduce PSPS risk.

*Remedies required:* PC must clearly explain how all initiatives reduce scale and scope of PSPS.

**PacifiCorp Response:**

From a general perspective, PacifiCorp believes that all initiatives play a role in reducing PSPS impacts, because if the wildfire risk is sufficiently diminished, then it becomes unnecessary to ever implement a PSPS.

Along those lines, PacifiCorp perceives that the best way to reduce PSPS impacts is to reduce the number, geographic scope, and duration of PSPS events. To date, PacifiCorp had had very few PSPS events; and the events initiated by PacifiCorp have been of a short duration. Nonetheless, in reference to this Action Statement item, PacifiCorp recognizes the need for clear explanations for how each initiative reduces the scale and scope of PSPS. To that end, PacifiCorp will generally strive, in this and other future submissions, to make more detailed explanations of how an initiative affects PacifiCorp's PSPS program. In addition, there is overlap between any discussion of public safety power shutoff in PacifiCorp's Wildfire Mitigation Plan and the separate proceeding being conducted by the California Public Utilities Commission under Rulemaking 18-12-005. Especially because the Wildfire Safety Division has transitioned to the Office of Energy Infrastructure, PacifiCorp will endeavor to include explanations provided in Rulemaking 18-12-005 in separate submissions to OEIS.

Reducing the impact of PSPS is a significant goal of PacifiCorp's wildfire mitigation planning. While de-energization of power lines during periods of extreme wildfire weather

benefit public safety by reducing the risk of a utility-related wildfire, PacifiCorp understands that there can also be negative consequences on the community if electric power is unavailable. De-energization can impact communication systems, businesses that rely on power to serve customers, residential customers, irrigation systems, and traffic lights. Accordingly, a PSPS is only implemented when necessary, and successful deployment of wildfire mitigation initiatives reduce the likelihood that a PSPS will occur.

While recognizing the general application of all mitigation initiatives to help reduce the impact of PSPS, PacifiCorp also acknowledges that certain initiatives are more directly tied to the PSPS program. In particular, PacifiCorp is developing a more robust and sophisticated decision-making model for the express purpose of minimizing the impact of PSPS. PacifiCorp's PSPS goals are three-fold: (1) to implement PSPS only when necessary; (2) if there is a PSPS, to impact as few customers as possible; and (3) to make restoration as efficient as possible. Along these lines, PacifiCorp is developing PSPS plans so that any potential PSPS is targeted to localized conditions. A targeted approach not only reduces the total number of people out of power for any period of time, but also significantly mitigates the impact of the PSPS event on those experiencing a loss of power, because people out of power will likely be in closer proximity to services which depend electric power. Certain initiatives advance these goals more directly.

Above all, improved situational awareness reflects a category of initiatives closely related to the PSPS decision-making process. Like other utilities, PacifiCorp's situational awareness plans include the installation of additional weather stations to access localized risk and inform decision making. Currently, PacifiCorp owns and operates 21 weather stations in the company's California service territory. These weather stations are already proving incredibly valuable in

providing insight on localized weather patterns. Additional installations will continue to better inform decision making, which reduces PSPS impacts by (i) reducing the likelihood that a PSPS will be implemented unnecessarily and (ii) facilitating a more surgical application of PSPS, thereby reducing its scope.

To better leverage the available weather data, PacifiCorp has purchased a High-Performance Computing Cluster (HPCC) to run a high-resolution Weather Research and Forecast (WRF) model to support PSPS decision-making. HPCC specs and WRF configuration is similar to what SDG&E and SCE currently operate. With the HPCC in place, PacifiCorp plans to run an operational, high-resolution WRF twice-daily across PacifiCorp's entire service territory. In addition, PacifiCorp plans to create a 30-year historical WRF reanalysis, which will serve as the foundation for sophisticated forecast products. PacifiCorp will also correlate the historical reanalysis with various outcomes to create impacts-based and risk-based forecast products. Advanced machine learning techniques will combine reanalysis data, operational WRF data, and historical observations to generate bias-corrected wind forecasts for weather station point locations. PacifiCorp has also purchased Technosylva's Wildfire Analyst-Enterprise to support PSPS decision making.

In addition to improved weather forecasting, PacifiCorp is also developing a deeper understanding of localized risks associated with the circuits themselves. PacifiCorp's Localized Risk Assessment Model (LRAM) is built around the primary objective of assigning a composite wildfire risk score for every section of the electric grid which can be isolated by protective devices. The LRAM model is described in detail in the Localized Risk Assessment Model Overview recently submitted to OEIS on October 14, 2021, as part of the Risk-Model-Group work. LRAM is particularly useful in reducing PSPS impacts because it provides the analytical

tool which facilitates more surgical application of PSPS. By using the composite scores calculated in LRAM, PacifiCorp can de-energize only the highest risk portions of circuits, while keeping other (and nearby) sections energized.

The composite scores produced by LRAM will also facilitate prioritization of existing grid hardening initiatives. This helps reduce the impacts of PSPS, because it helps PacifiCorp focus on the specific sections of circuits which should be hardened first due to elevated risk and heightening probability of PSPS events. Thus, the frequency and scope of PSPS should be reduced, precisely because those are the same sections of circuits which would have otherwise been at greatest risk of PSPS.

Other initiatives have less direct involvement in the PSPS decision-making process. But those initiatives can still have a dramatic influence on reducing PSPS impacts by reducing the likelihood of PSPS. Many of PacifiCorp's initiatives are specifically geared to reduce wildfire ignition risk. Above all, PacifiCorp's covered conductor will materially reduce PSPS impacts by (a) making PSPS substantially less likely and (b) helping PacifiCorp surgically reduce the size and areas of impact.

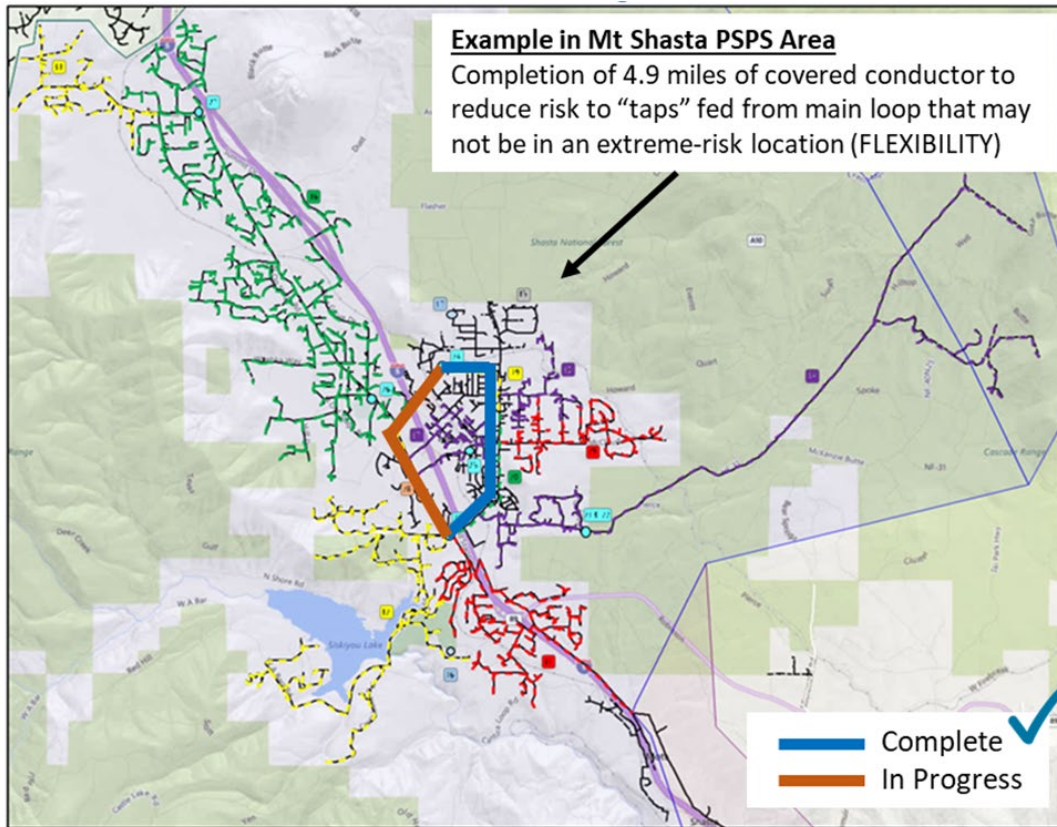
As discussed above, fully evaluating the effectiveness of covered conductor is the specific subject of a different work stream, being worked in coordination with other utilities. Nonetheless, based on expert evaluation of the basic properties and functionality of covered conduct, PacifiCorp remains convinced that covered conductor will provide massive mitigation gains by greatly reducing any chance of ignition due to incidental contact with energized power lines. Above all, the mechanical properties of a covered conductor design physically prevent the initiation of a flash-over due to vegetation on the line. Notably, while data continues to be gathered to better understand specific relationships, the general correlation between wind,

vegetation contacts, and wildfire spread is well-understood. Installing covered conductor will increase the grid's resiliency against wind-driven vegetation contacts, which can lead to devastating wildfire ignitions. Wind and wind speeds are, of course, a critical factor of consideration in any PSPS decision-making process. The mitigation benefits of covered conductor, especially when combined with other grid hardening efforts implemented as part of a rebuild effort, will significantly decrease PSPS impacts by significantly decreasing the likelihood of a PSPS. If the powerlines can withstand higher wind speeds, it will decrease the occurrence of PSPS events.

A specific example helps illustrate this relationship. The PSPS decision-making process is always dependent on local circumstances and many factors. Isolating for wind, however, we can theorize that a wind speed of 35 mph may exceed the 95<sup>th</sup> percentile trigger and result in a watch or de-energization event on a circuit with normal, bare overhead power lines. In those typical settings, the bare conductor is the most exposed element and at greatest risk of vegetation contact or damage. Therefore, the analysis of forecasted wind speed is based on the risk of tree blow-in contacting the bare conductor. After the installation of covered conductor, the conductor itself ceases to be the greatest risk element in the system. Instead, wind speeds can be assessed based on the potential for trees to damage or impact structural elements, such as poles, which would require significantly more force to cause damage. Therefore, Pacific Power may expect the wind threshold to increase, for example, to 60 mph, after the installation of covered conductor projects, as the risk and mechanism have changed.

Covered conductor projects also give PacifiCorp flexibility to take a more surgical approach to PSPS. Again, a specific example helps illustrate this potential. As part of the Mt Shasta grid hardening plan, PacifiCorp plans to complete 4.9 miles of covered conductor

installation in 2022 on circuits 5G77 and 5G79 (see image below). Once complete, high risk events experienced along the main loop will no longer have an impact on taps or other sections of the circuit.



To further explain, it is important to understand that, while the entire Mt Shasta grid hardening plan above includes the implementation of approximately 82 miles of covered conductor over three years, currently, any extreme or localized risk experienced by the inner 4.9-mile loop that may require implementation of a PPS event, impacts any taps or other circuits or circuit segments fed from this loop. PacifiCorp is not able to isolate the risk posed to the main loop from the taps or distant portions of the circuit. For example, the circuits highlighted in yellow or red may need to be de-energized due to localized events experienced on the main loop. This initial project of 4.9 miles highlighted in the diagram will eliminate this direct linkage and provide flexibility in decision making. Conditions experienced by the main loop will no longer

necessitate a PSPS event on the entire circuit, such as the yellow or red portions highlighted, unless the risk posed to the outer portions is also extreme.

Other initiatives specifically address reducing the impact of a PSPS that has actually been implemented. Because of the infrequent application of PSPS in PacifiCorp's service territory, PacifiCorp has not prioritized such initiatives relative to the initiatives geared towards reduction of actual wildfire risk. Nonetheless, because of the increasing threat of wildfire and potential for PSPS, PacifiCorp is continuing to enlarge PacifiCorp's PSPS mitigation initiatives. Along these lines, PacifiCorp is implementing a program, at no cost to the customer, of back-up batteries to medical baseline customers who depend on medical equipment powered by electricity. Pacific Power is pleased to update that the program is now operational. A contract with a third-party vendor was executed on September 10, 2021, and battery assessments are slated to begin in the near term. Pacific Power anticipates that batteries will be delivered to all registered medical baseline customers within PSPS areas by the end of 2021.

For all customers living in the High Fire Threat District, PacifiCorp is in the process of offering a rebate program for the purchase of back-up power equipment. The rebate program will include options for electric batteries, which are more efficient, more reliable, and safer; the program will also include traditional combustion generators as alternatives eligible for a rebate.

Finally, PacifiCorp is improving its readiness to open community resource centers in any community which might be impacted by a PSPS. And PacifiCorp is enlarging the offerings it plans to provide at CRC's. The details of these efforts will be much more fully described in PacifiCorp's CRC plans, included as part of the Pre-Season Report required under the Phase 3 Guidelines in Rulemaking 18-12-005 and filed with the California Public Service Commission.



## **PC-8 Lack of details on automatic recloser settings**

*Issue description: PC fails to provide the actual recloser settings utilized during heightened wildfire risk and associated wildfire risk reduction.*

*Remedies required: PC must:*

1. Provide the automatic recloser settings described on p. 173 of its 2021 WMP Update, including:
  - a. The “more restrictive system operating procedures” used; and
  - b. The thresholds of heightened wildfire risk for initiating the procedures described in (a).
2. Provide a timeline for when it intends to develop a metric demonstrating the effectiveness of using automatic reclosers, as described on p. 94 of its 2021 WMP Update.

## **PacifiCorp Response:**

A more detailed discussion of automatic recloser settings requires distinction between the transmission and distribution systems. On the transmission system, the “more restrictive system operating procedures” referenced in the 2021 WMP Update are governed by the company’s Confidential Operating Procedure PCC-200-T “Operating Transmission Assets During Elevated Fire Risk Events,” a copy of which will be submitted along with an application for confidential treatment of the document. Detailed, step-by-step procedures are described in PCC-200-T for application to relevant scenarios, and the flow-chart included as Appendix-1 Transmission and Sub-Transmission Flow Chart illustrates those steps. Above all, PCC-200-T details when automatic reclosing functions will be disabled and when system operators are allowed to test energize a line.

As indicated in the policy and illustrated in the flow-chart, certain distinguishing characteristics or events will dictate a different procedural path. The procedures in PCC-200-T consider and factor a number of variables, including:

- whether a line is in a geographic area experiencing the declared Fire Season;
- whether a line is located in a Fire High Consequence Area – meaning, in California, the line is in the High Fire Threat District (HFTD);

- whether a line is part of the Bulk Electric System (BES);
- whether a line is located in an area where there is a Red Flag Warning;
- whether a line has tripped;
- whether an automatic recloser has functioned properly;
- whether SCADA is available; and
- the voltage of the line.

For specific scenarios and application, reference to the policy itself is appropriate. For example, if a non-BES line is located in the High Fire Threat District (HFTD) and there is a Red Flag Warning, reclosing is turned-off immediately. Conversely, automatic reclosing is disabled after one trip event if a line is not located in the HFTD or if there is no Red Flag Warning. And if a transmission line is located outside the HFTD with no Red Flag Warning, automatic reclosing will be disabled only if there are multiple trips on a given day. From a practical perspective, the objective of these procedures is to require disabling of automatic reclosing when and where wildfire risk is greatest. In addition, during fire season, line testing of non-BEW lines prior to patrol is generally limited to scenarios outside the HFTD and not during a Red Flag Warning.

On the distribution system, automatic reclosing functions may be either disabled or modified during times of elevated wildfire risk. To provide context for such procedures, some discussion of “normal” system operations on distribution is helpful. If there is fault on a typical circuit, toward the end of the radial circuit, there will be an increase in current throughout the line. Protection and control devices such as relays and reclosers are engineered to detect higher-than-normal currents, often referred to as fault currents, and those devices will operate when they detect fault current. Depending on the numbers of devices installed on a circuit and complexity of the scheme, the operation generally involves a time delay (up to a few seconds) to ensure

proper device coordination and multiple reclosing cycles, to eliminate “false positives” that can occur due to short-term, momentary faults. If a fault persists through the time delay, a couple outcomes are possible. In a normal “fuse-blow” scheme, the nearest fuse upstream of the fault will operate, meaning that only sections of the circuit downstream of the fuse will be de-energized. Alternatively, if there is no intervening fuse or if the fault is insufficient to cause a fuse to blow, a relay or recloser will operate to open and de-energize the line downstream from that device. This results in safe operation of the system with the least impact to customers.

When wildfire risk conditions are elevated, however, the normal operations described above can pose some degree of risk. Traditional circuit coordination, which aims to balance customer impact and reliability with fault isolation, will result in slower isolation of the potential fault location. Additionally, reclosing schemes reintroduce electricity to fault locations to restore power to customers where the cause of the fault no longer exists. Longer isolation times under fault current conditions and reclosing schemes generally trend toward higher potential energy release at the fault site, which obviously increases the risk of utility-related fires. Conversely, more sensitive settings and disabled reclosing can significantly reduce such risk, as discussed below. These strategies are designed to reduce isolation time and to reduce the amount of energy released at the fault location. Such strategies, come, however, with certain disadvantages. There will be more frequent outages. Due to the wildfire conditions, more patrolling will be required prior to testing a line. And, due to the operation of devices often farther upstream on a circuit, patrols may take longer to complete, also delaying restoration times. As a result, implementation of more sensitive protection and control settings can be a delicate and iterative process to find the right balance of risk reduction and reliability impacts. In this context, PacifiCorp’s procedures

for when and where to deploy more sensitive protection and control settings continue to actively evolve.

In 2021, PacifiCorp implemented more sensitive protection and control schemes throughout the HFTD. Settings were generally applied and maintained throughout the fire season. Specifically, modified settings were applied to circuit breaker relays and line reclosers to allow for two instantaneous trips with one reclosing cycle. This strategy was engineered to allow temporary faults to clear with no impact but isolate and de-energize permanent faults. Rather than use a time-delay on the second trip (which would encourage fuse blowing), PacifiCorp use a second instantaneous trip setting to limit energy to the fault location and to prevent operation of an expulsion fuse (itself a fire risk). Additionally, in 2021, PacifiCorp implemented high impedance fault detection on circuits with compatible devices. High impedance fault detection uses different data to look for potential scenarios that may reflect downed wires, often camouflaged as load in typical time-current curves.

Moving into 2022, PacifiCorp plans to revise this methodology to move away from a “one-size-fits-all” approach and allow for real time risk-based decision making where possible. Similar to how the company is evolving its PSPS decision-making capabilities, PacifiCorp plans to identify, at the circuit level, when conditions warrant more restrictive settings. On some circuits, this could be an extended period of time (e.g. perhaps even all of fire season on the highest risk circuits). For other circuits, however, it might be appropriate to modify settings for a much shorter period of time. PacifiCorp anticipates that this methodology, similar to PSPS decision-making, will focus less on absolute thresholds and more on localized probability and fragility that leverages the overlay of meteorological inputs and historic outages for a given zone of protection.

In addition to making application more localized and limiting duration, PacifiCorp also plans to use additional alternative fire settings, effectively integrating a more tiered approach. While options are still being evaluated, PacifiCorp anticipates, based on more localized risk assessments, to use modified settings less frequently but to also introduce a strategy of disabling all reclosing, with instantaneous tripping, during periods of greatest risk. To further support this approach, PacifiCorp is proposing, as a component of its 2021 Change Order Report, to install communicating fault indicators on circuits most likely to have enhanced fire settings in 2022. PacifiCorp has been testing this technology, which is showing benefits in reducing patrol times and the impact of outages on customers. PacifiCorp is also evaluating the effectiveness of high impedance fault detection and alternatives associated with that emerging technology. The company will further report on of its development of new fire settings in the 2022 WMP Update.

PacifiCorp anticipates having an initial metric to demonstrate the effectiveness of using automatic reclosers in the 2022 WMP Update and anticipates that this metric will evolve over time. Stated simply, to develop a metric along these lines, more data is required. PacifiCorp believes that at least two seasons of data where the fire settings have been in use is needed to have a meaningful metric. Generally, trends and observations derived from small datasets can be misleading or not meaningful. Additionally, new types of data may need to be collected. Traditional outage data is available, but PacifiCorp is evaluating options in trying to measure outcomes related to the objectives of reducing fault duration and energy released at the fault location. In addition, resolution of metrics related to the effectiveness of covered conductor, which is still in progress with a joint utility work group, will inform the structure of other metrics designed to assess the effectiveness of other initiatives. PacifiCorp will report progress on a metric in the 2022 WMP Update.

## **PC-9 Inadequate justification of initiative-selection process**

*Issue description:* PC does not provide any risk-spend efficiency (RSE) estimates for its mitigation initiatives. Without the quantified risk reduction values, PC's qualitative approach to justify the initiative-selection process is insufficient and lacks transparency.

*Remedies required:* PC must include the risk model information it has been developing and use that information to elaborate on its decision-making process to include a thorough overview of the initiative-selection procedure. The overview must show the rankings of the decision-making factors (i.e., compliance-based activities, geographic wildfire tiers, operation efficiencies, etc.) and pinpoint where RSE estimates are considered in the initiative-selection process. The WSD recommends a cascading, dynamic "if-then" style flowchart to accomplish this prioritization requirement.

### **PacifiCorp Response:**

PacifiCorp is in the process of developing a risk-spend efficiency model, but PacifiCorp has not yet progressed to the point where it can compute a quantified risk reduction value. As discussed above, PacifiCorp's Localized Risk Assessment Model (LRAM) is an important reference for PSPS decision makings. (Again, LRAM is described in detail in the Localized Risk Assessment Model Overview recently submitted to OEIS on October 13, 2021, as part of the Risk-Model-Group work). LRAM's core functions, however, center on initiative prioritization. Accordingly, LRAM's development was an essential first step in improving PacifiCorp's internal risk assessment capability, which, in turn, informs the approach PacifiCorp will apply in building a risk-spend model.

While it is theoretically possible that LRAM and a risk-spend efficiency model could have been developed on parallel tracks, PacifiCorp believes that consistency between the two is important. Specifically, the LRAM approach involves a quantitative evaluation of the Utility Wildfire Risk (as defined in the LRAM guide), which itself is driven by quantitative determinations in individual LRAM risk assessment layers, namely the Tree Canopy, Utility Outage Rates and Available Probabilistic Arc Energy Risk, Component Damage or Mechanical

Failure from Short Circuit Current, and Utility-Related Fires. PacifiCorp anticipates that the structure of these layers will impact how PacifiCorp will calculate a quantified risk reduction value which correlates to any localized application (i.e. assessing the risk reduction value of any initiative in a real world application). To improve on initiative prioritization in the current WMP, PacifiCorp believes that localized application is essential to sufficiently rank initiative mitigation benefits to properly inform the initiative-selection procedure. PacifiCorp plans to include its risk-spend efficiency model, together with quantified risk reduction value, with its 2022 WMP Update. As part of its risk-spend efficiency model, PacifiCorp will include a cascading, dynamic “if-then” style flowchart.

### **PC-10 Inadequate approach to PSPS**

*Issue description: PC's 2021 WMP Update lacks specific short-term PSPS reduction commitments, sufficient justification, and mitigation initiative targets, apart from covered conductor.*

*Remedies required: PC must: 1) Acknowledge that, based on its own triggering criteria, it is subject to risk of PSPS in the near-term and describe its vision for reducing potential use of PSPS next fire season, normalized for changes in weather; 2) Provide a firm commitment to a quantifiable reduction in risk of a) frequency, b) scope (i.e., customers impacted), and c) duration of PSPS events during the plan term, including timelines for achieving these reductions; and 3) Identify which initiatives in its 2021 WMP Update are contributing to the goals in (2) above.*

### **PacifiCorp Response:**

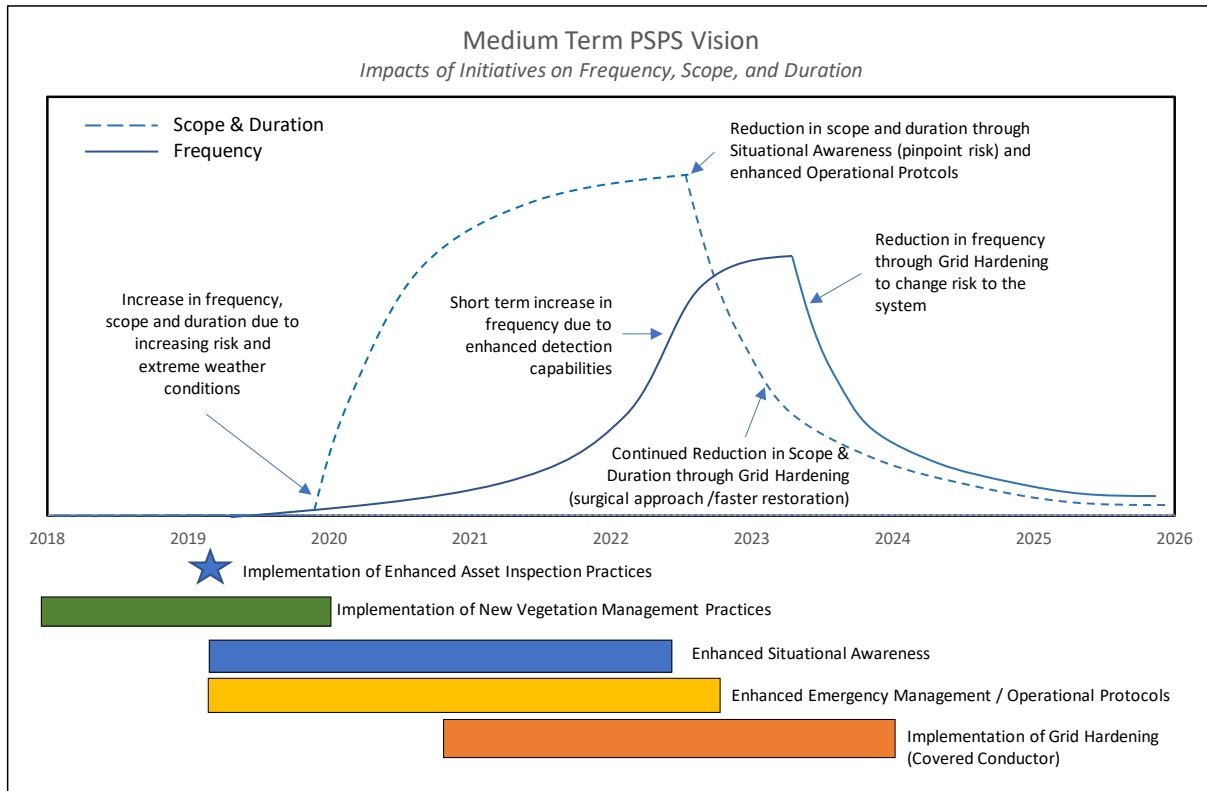
One, PacifiCorp acknowledges that there is a risk of PSPS in the near-term. Candidly, because of increasingly elevated wildfire risks in the far northern parts of California, PacifiCorp anticipates that PacifiCorp will likely be compelled to employ more frequent use of PSPS than seen in the past (recognizing the PacifiCorp's current use has been extremely limited). With respect to use of PSPS during the 2021 fire season, PacifiCorp's vision for reducing potential use of PSPS was very similar to the broader vision for reducing the potential use of PSPS over the

next few years, essentially prior to the installation of covered conductor and other grid hardening initiatives in any given area of high fire risk as discussed below. For the 2021 fire season, PacifiCorp was particularly focused on (a) improvements to its weather forecasting abilities and situational awareness to inform the PSPS decision-making process and (b) strategies to refine the geographic scope of PSPS and/or isolate sections of circuits from a PSPS event to facilitate a more surgical approach. This will be true for the 2022 fire season as well.

Two, PacifiCorp is firmly committed to reducing the potential scope, frequency, and duration of PSPS in PacifiCorp's service territory where possible. At the current time, PacifiCorp has employed PSPS only on a limited basis. Prior to 2020, PacifiCorp did not implement a PSPS. In 2020, PacifiCorp initiated one PSPS event, impacting 2,557 customers, with a maximum duration for any customer of approximately eight hours. In 2021, PacifiCorp initiated one PSPS event, impacting 1,953 customers, with a maximum duration for any customer of approximately 9.5 hours. Against these figures, PacifiCorp certainly cannot commit to a quantifiable reduction as compared to actual outcomes. (As stated earlier, it is more likely for there to be more PSPS events, because of the trending increase in wildfire risk). Appreciating the inclusion of forward-looking estimates, "normalized for changes in weather," PacifiCorp understands that the remedies required to address this issue involve imagining a short-term future in which weather conditions justifying the use of PSPS could be more common in PacifiCorp's service territory, in the most northern reaches of California. Nonetheless, considering the challenges in weather forecasting generally, as compounded by how forecasts of climate change causing dynamic weather events (versus using more reliable historical actuals), PacifiCorp believes it is particularly challenging to quantify how much any effort might reduce the risk of PSPS.



However, the diagram below depicts PacifiCorp’s future PSPS vision and relative changes to frequency, scope, and duration in future years as a result of wildfire mitigation activities.



With respect to frequency, improvements to weather forecasting and situational awareness may identify new localized risks resulting in a greater need for PSPS commensurate with the growing risk associated with climate change or changes in extreme weather in the short term. However, PacifiCorp believes that the improvements to its weather forecasting, in conjunction with implemented initiatives, such as increased asset inspections, more timely corrections, and increased vegetation management, may offset any negative trends in the growing wildfire risk. Additionally, implementation of grid hardening initiatives such as covered conductor will impact PSPS thresholds, further reducing the frequency and necessity of PSPS events. Accordingly, PacifiCorp has an aspirational goal to have zero (0) PSPS events in any given year. Recognizing, however, the trend for an increased severity in the wildfire risk,

PacifiCorp reasonably estimates that it may have to implement a PSPS up to three times annually in its California service territory in the near term. In the longer term, PacifiCorp envisions PSPS events may be less frequent but still a possibility and a necessary tool for utilities to leverage as a last resort during events of extreme risk.

With respect to scope, PacifiCorp is committed to minimize the scope of all PSPS events, both in terms of the numbers of people impacted by any particular event and by the geographic breadth of the event. Again, improvements in situational awareness, facilitating better weather forecasting, and in risk assessment, providing more localized assessments of the wildfire risk, are helping PacifiCorp reduce scope. So long as weather conditions allow – which is driven largely by the geographic breadth of a wind event – PacifiCorp is committed to reduce scope by isolating sections closer to substations and/or excluding nearby circuits. This strategy means that fewer customers will be impacted. Additionally, thoroughly described in PC-7, grid hardening projects such as covered conductor also give PacifiCorp flexibility to take a more surgical approach to PSPS, limiting the scope of any given event.

With respect to duration, PacifiCorp is committed to have power restored to all customers within 12 hours. This commitment is, of course, weather dependent, especially driven by the length of a particular wind event. While weather is unpredictable, PacifiCorp is committed to make ready on the variables within its control. Similar to scope, both situational awareness and grid hardening initiatives are expected to reduce the potential duration of PSPS events. Situational awareness provides greater accuracy in the prediction and assessment of risk, resulting in clearer, more precise decision making, such as determining that the risk has passed, and restoration is safe to begin. Additionally, the implementation of grid hardening initiatives, such as covered conductor will significantly reduce the potential duration of an event by

changing the threshold under which an “all-clear” decision can be given. A system with covered conductor will be more tolerant to higher thresholds, limiting the duration of the event.

Additionally, deployment of grid hardening initiatives will significantly reduce the time to patrol during restoration, reducing the overall duration of the event.

Additionally, PacifiCorp understands the importance of sufficient staffing to facilitate patrols prior to restoration. While an extremely far-reaching geographic event might negatively impact staffing levels, if personnel from nearby regions cannot be called to help, PacifiCorp is generally well positioned to complete PSPS patrols, using crews from nearby districts if necessary. PacifiCorp’s emergency operations center will also continuously monitor circuit sections which might be ready for patrol prior to re-energization. Again, better weather forecasting and more localized risk assessments will help PacifiCorp stage restoration efforts in the most time efficient manner possible. To date, PacifiCorp has successfully performed restoration activities for all PSPS events in less than 12 hours from the “all clear” decision. Based on this past experience, the historical weather patterns in northern California, and improvements in PacifiCorp’s PSPS program, PacifiCorp believes that a 12-hour maximum duration for restoration is an achievable longer-term objective.

Three, because PacifiCorp believes that PSPS frequency reduction is the best way to reduce PSPS impacts, the subject of PSPS reduction, and the initiatives which will help drive reduction in PSPS potential, is addressed in response to PC-7 above. Recognizing the overlap, for all of the reasons discussed in response to PC-7, PacifiCorp is making great strides to reduce the risk of PSPS frequency, scope, and duration.