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Re: CA R.18-10-007
CalAdvocates-PacifiCorp-2021WMP-04

Please find enclosed PacifiCorp's responses to CalPA data requests 4.1-4.9. Also provided is Attachment CalPA 4.1.

If you have any questions, please call me at (503) 813-7314.

Sincerely,

 /s/
Pooja Kishore
Manager, Regulation

CalPA Data Request 4.1

PacifiCorp's 2021 Wildfire Mitigation Plan (WMP)

Please provide an Excel table that lists the following for each circuit that PacifiCorp plans to install covered conductor on in 2021:

- (a) The name of the circuit.
- (b) The circuit ID number.
- (c) The miles of covered conductor that PacifiCorp plans to install on the circuit.
- (d) The forecasted start date of covered conductor installation.
- (e) The forecasted end date of covered conductor installation.
- (f) Whether it is a one-phase or three-phase circuit.

Response to CalPA Data Request 4.1

See Attachment CalPA 4.1.

When reviewing the attachment, keep in mind that PacifiCorp plans and tracks implementation of covered conductor on a project basis. Each project, which is included in the attachment, reflects grouping assets into smaller scopes of work to facilitate completion and allow phased delivery of the overall plan. In developing these projects, it is common to break up implementation of covered conductor on a given circuit into multiple projects and, therefore, covered conductor may be installed in phases over multiple years on a given circuit.

Additionally, it is common for distribution circuits to exist as three phase installations near the substation but transition to single phase as the system is built out or taps are added to accommodate new connections. Therefore, many of PacifiCorp's covered conductor projects are a mix of single and multiple phase installations. This detail has been included in the attachment with a relative breakdown of single and multiple phase circuit miles for each project.

CalPA Data Request 4.2

PacifiCorp's 2021 Wildfire Mitigation Plan (WMP)

On page 130 of its 2021 WMP, PacifiCorp states that it intends to install covered conductor on all single-phase distribution circuits that are in HFTD.

- (a) How many circuit miles of single-phase distribution circuits in PacifiCorp's service territory are located in HFTD?
- (b) Does PacifiCorp intend to install covered conductor on any three-phase distribution circuits in 2021?
- (c) How many years does PacifiCorp expect it will take to replace all single phase conductor within the HFTD with covered conductor?
- (d) Do PacifiCorp's current construction standards for new single phase distribution lines within the HFTD require the use of covered conductor?

Response to CalPA Data Request 4.2

- (a) There are approximately 88 circuit miles of single-phase distribution circuits located in High Fire Threat District (HFTD) areas.
- (b) Yes.
- (c) These projects are scheduled to be completed on or before December 31, 2023.
- (d) No. PacifiCorp's current construction standards for a new single-phase distribution lines within the HFTD do not require the use of covered conductor. PacifiCorp has created a new set of construction standards for deployment within the HFTD to allow incorporation of more fire resilient materials. PacifiCorp is leveraging these construction standards for implementation of grid hardening initiatives included in the WMP. However, PacifiCorp experiences relatively few new connections or new installations in its California service territory and has not yet had the opportunity to implement this change. As new connections are requested, PacifiCorp plans to work with customers to leverage new fire resilient materials where needed.

CalPA Data Request 4.3

PacifiCorp's 2021 Wildfire Mitigation Plan (WMP)

On pp. 130-131 of PacifiCorp's 2021 WMP update, PacifiCorp describes its program for installing covered conductor in the HFTD. PacifiCorp indicates that the program has two main components: installing insulated cable on all single-phase overhead conductor circuits, and installing spacer cable on multi-phase overhead conductor circuits.

- (a) In 2020, PacifiCorp reports installing 1.4 miles of covered conductor. Please break out the mileage installed into: installing insulated cable on single-phase circuits; installing insulated cable on three-phase circuits; and installing spacer cable on multi-phase circuits.
- (b) In 2020, PacifiCorp reports spending a total of \$4.3 million for this program. Please break out total cost into: installing insulated cable on single-phase circuits; installing insulated cable on three-phase circuits; and installing spacer cable on multi-phase circuits.
- (c) In 2021, PacifiCorp forecasts installing 81.2 miles of covered conductor. Please break out the mileage installed into: installing insulated cable on single-phase circuits; installing insulated cable on three-phase circuits; and installing spacer cable on multi-phase circuits.
- (d) In 2021, PacifiCorp forecasts spending a total of \$15 million for this program. Please break out total cost into: installing insulated cable on single-phase circuits; installing insulated cable on three-phase circuits; and installing spacer cable on multi-phase circuits.
- (e) In 2022, PacifiCorp forecasts installing 49.8 miles of covered conductor. Please break out the mileage installed into: installing insulated cable on single-phase circuits; installing insulated cable on three-phase circuits; and installing spacer cable on multi-phase circuits.
- (f) In 2022, PacifiCorp forecasts spending a total of \$11.6 million for this program. Please break out total cost into: installing insulated cable on single-phase circuits; installing insulated cable on three-phase circuits; and installing spacer cable on multi-phase circuits.

Response to CalPA Data Request 4.3

- (a) 1.4 miles of single-phase circuits were installed.

- (b) Projects for installing insulated conductor often span across calendar years. The costs provided include installed costs along with design, engineering, and procurement costs realized in 2020 for projects to be completed after 2020.

	Single phase	2 phase	3 phase
costs	\$1,004,269.09	\$239,695.67	\$3,081,693.34

- (c)

	Single phase	2 phase	3 phase
Miles	26.6	15.4	43.4

* The miles provided in the attached table include the 4 miles of small diameter conductor being replaced as further described in Section 7.3.3.12 on page 137 of the 2021 Wildfire Mitigation Plan (WMP) Update.

- (d) Projects for installing insulated conductor often span across calendar years. The costs provided include installed costs along with design, engineering, and procurement costs expected to be realized in 2021 for projects to be completed after 2021.

	Single phase	2 phase	3 phase
costs	\$4,680,305	\$3,385,799	\$8,388,620

- (e)

	Single phase	2 phase	3 phase
Miles	18.9	8.0	25.5

* The miles provided in the attached table include the 2.7 miles of small diameter conductor being replaced as further described in Section 7.3.3.12 on page 137 of the 2021 WMP Update.

- (f) Projects for installing insulated conductor often span across calendar years. The costs provided include installed costs along with design, engineering, and procurement costs expected to be realized in 2022 for projects to be completed after 2022.

	Single phase	2 phase	3 phase
costs	\$3,590,408	\$1,763,994	\$6,369,961

CalPA Data Request 4.4

PacifiCorp's 2021 Wildfire Mitigation Plan (WMP)

- (a) Has PacifiCorp used drones to conduct inspections at any time since January 1, 2018?
- (b) If PacifiCorp has used drones for inspections at any time since January 1, 2018, provide a description of the types of inspections that PacifiCorp for which has used drones.
- (c) If PacifiCorp has used drones for inspection at any time since January 1. 2018, provide a table that shows the number of findings that PacifiCorp has identified with drones. Separate the number of findings by each type of inspection for which PacifiCorp has used drones; by each priority level used by PacifiCorp; and by year.

Response to CalPA Data Request 4.4

- (a) No. PacifiCorp has not used drones to conduct inspections at any time since January 1, 2018.
- (b) Not applicable.
- (c) Not applicable.

CalPA Data Request 4.5

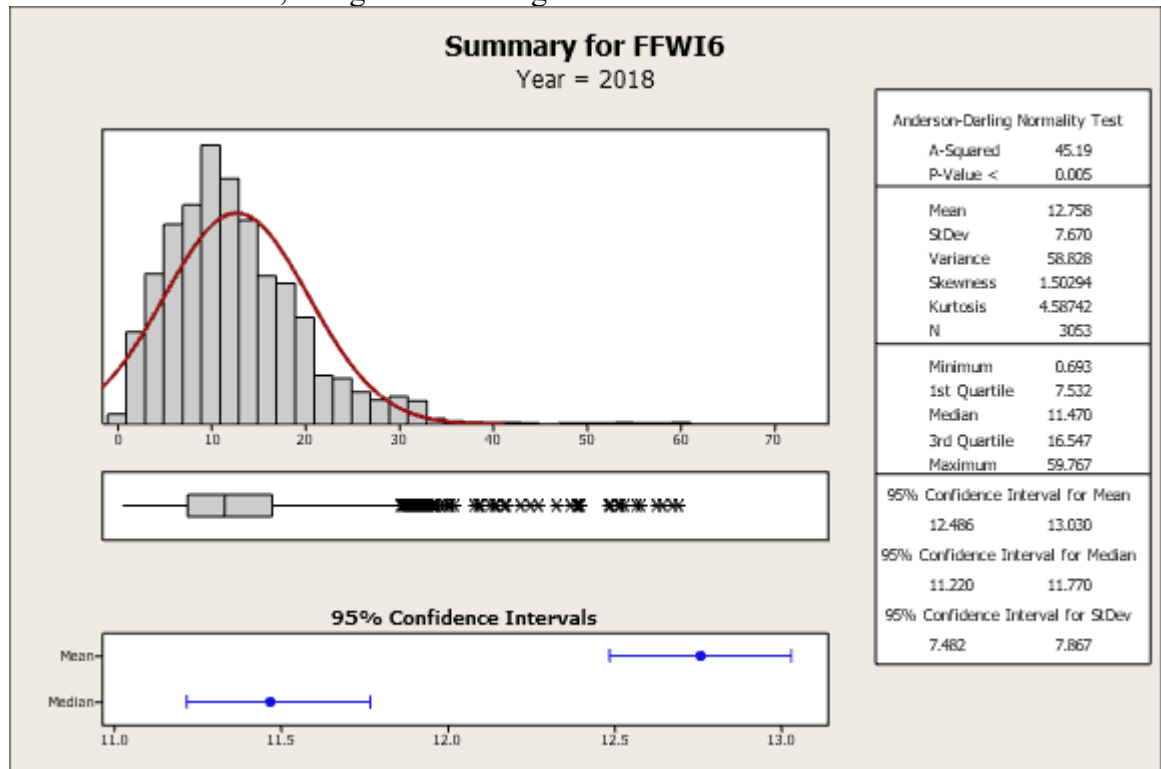
PacifiCorp's 2021 Wildfire Mitigation Plan (WMP)

Provide the analysis that PacifiCorp used to select the numerical PSPS Watch thresholds for:

- (a) Hourly Fosberg Fire Weather Index.
- (b) The Keetch-Byram Drought Index.
- (c) Forecasted sustained wind speeds.
- (d) Forecasted wind gust speeds.

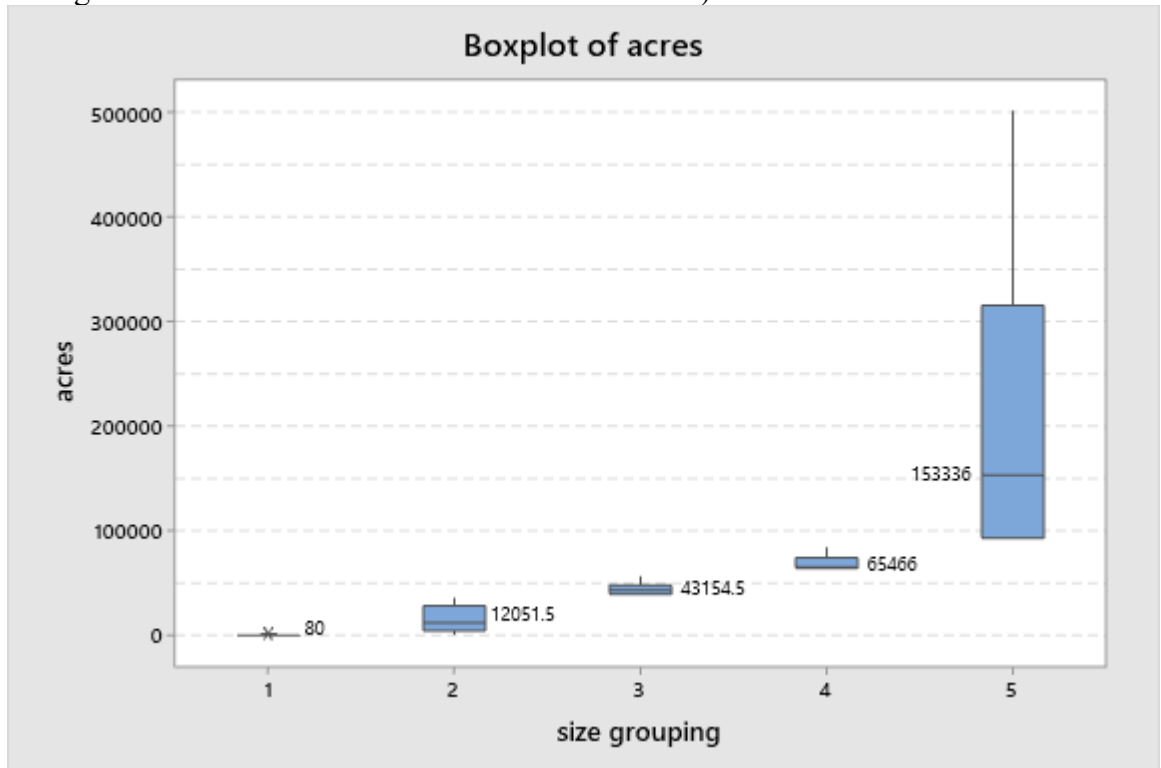
Response to CalPA Data Request 4.5

- (a) For subparts (a) and (b), in order to establish a stable fire weather value from which to initiate Public Safety Power Shut-off (PSPS), the Company utilized the Fosberg Fire Weather Index (FFWI) but averaged it over six hours (to recognize a standard burn period often considered by fire scientists) and limited the potential for short term activation of a PSPS for the fire season (June-early October). The Company performed analysis of this metric's ranges to determine a level at which FFWI6 should be considered, using a basic histogram as shown below.

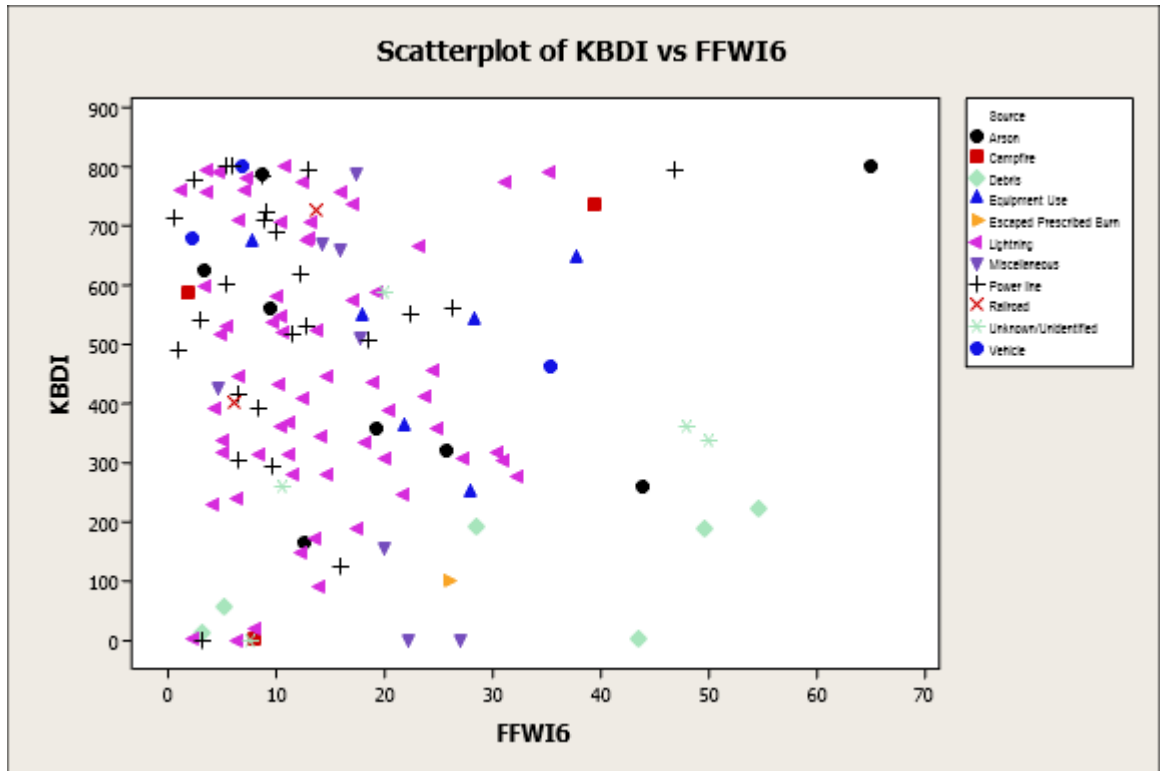


Despite PacifiCorp's diligent efforts, certain information protected from disclosure by the attorney-client privilege or other applicable privileges or law may have been included in its responses to these data requests. PacifiCorp did not intend to waive any applicable privileges or rights by the inadvertent disclosure of protected information, and PacifiCorp reserves its right to request the return or destruction of any privileged or protected materials that may have been inadvertently disclosed. Please inform PacifiCorp immediately if you become aware of any inadvertently disclosed information.

Then, the Company analyzed weather conditions, fire sizes, and ignition sources for 176 fires which occurred in northern California (north of the 40th parallel), segmenting the fires into size families (1-5, with 4 and 5 being targeted as large acreage that would set a threshold for PSPS activation).



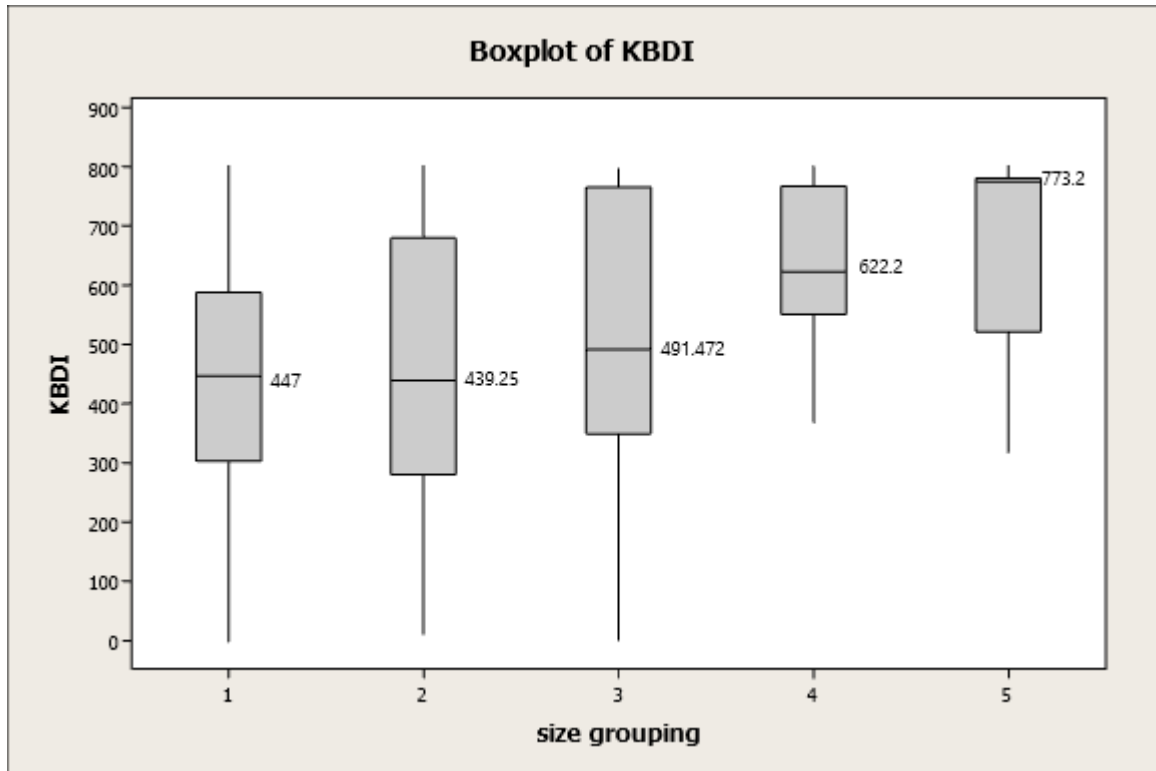
After further evaluating fire history as discussed in subpart (b) below, including assessment of the graphic below, the Company established a FFWI6 threshold of 30 as a key trigger.



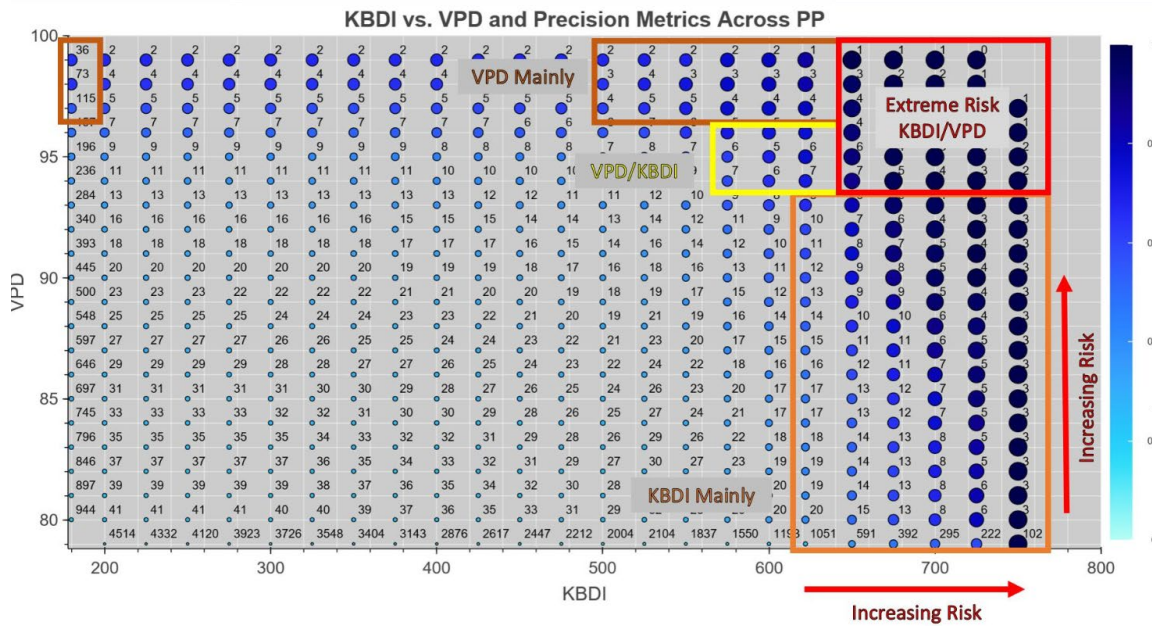
(b) The Company began by evaluating the “base conditions,” i.e. climatic dryness that would host catastrophic fires.

As a result of that analysis, the Company produced the plots below, which supported the designation of an extreme fire at a Keetch-Byram drought index (KBDI) of 622.2.

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Over the last year, the Company further evaluated these levels; the graphic below supports these base conditions, augmenting with vapor pressure deficit (VPD), which is a shorter-range moisture measure that the Company has integrated into its 2021 Wildfire Mitigation Plan (WMP) Update. This is shown in the graphic below, in which size and color correspond to the correlation with catastrophic wildfires while the number is the average hours per year above that threshold.



For subparts (c) and (d), the Company evaluated outage data to determine wind speeds at which outage rates increase.

- (c) This analysis identified a correlation between equipment damaged by vegetation with wind, where fault rate impacts begin to be experienced at sustained windspeeds of approximately 17 miles per hour (mph) and increase somewhat sharply at 25 mph.
- (d) In contrast, at wind gusts of 31 mph, the Company generally found a better correlation to faults caused by vegetation and equipment damage.

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CalPA Data Request 4.6

PacifiCorp's 2021 Wildfire Mitigation Plan (WMP)

On p. 136 of PacifiCorp's 2021 WMP update, PacifiCorp states that it "does not currently have a specific grid design and system hardening wildfire mitigation program focused on maintenance, repair, and replacement of connectors, including hotline clamps."

- (a) Please describe the types of connectors used on PacifiCorp's transmission and distribution lines in the HFTD.
- (b) Does PacifiCorp have any hotline clamps currently in use in the HFTD, or in California overall?

Response to CalPA Data Request 4.6

- (a) Different connection methods are used for overhead bare and covered conductor on distribution systems. For distribution bare conductors, many different types of connectors have been utilized in the past. The most common connectors are automatic splices and dead end, compression type splices and dead end, bolted dead ends, H-tap connectors, shell fired connectors, vise type connectors, stirrup connectors, and hot line clamps.

For covered conductors, H-tap connectors are currently used on all size covered conductors. When insulation piercing connectors become available, H-tap connectors will be used for cables larger than 477 KCM or taps larger than 397 KCM. For dead-end applications, the Company plans to use dead-end grip, bolted dead end type and compression type connectors.

- (b) Hotline clamps are commonly used on bare conductors to jumper from primary to transformers or small tap lines. Hotline clamps are also used with stirrup connectors on the main line and hotline clamps on its bail wire.

While PacifiCorp does not have a specific inventory of hotline clamps currently in use in the High Fire Threat District (HFTD), ho lines clamps were included in engineering and construction standards historically deployed in the HFTD and, therefore, are assumed to be installed in the existing infrastructure.

CalPA Data Request 4.7

PacifiCorp's 2021 Wildfire Mitigation Plan (WMP)

On p. 182 of PacifiCorp's 2021 WMP update, PacifiCorp describes its plans to deploy Community Support Centers "should the need arise during a Public Safety Power Shutoff event."

- (a) Did PacifiCorp deploy Community Support Centers during its September 8, 2020 PSPS event?
- (b) If yes, please describe the deployment, including hours of operation and number of customer interactions.
- (c) If no, please explain why PacifiCorp did not deploy Community Support Centers.

Response to CalPA Data Request 4.7

- (a) No.
- (b) Not applicable.
- (c) The decision was made by the incident commander not to deploy Community Support Centers due to the short duration of the outage.

CalPA Data Request 4.8

PacifiCorp’s 2021 Wildfire Mitigation Plan (WMP)

Tables 3-1 and 3-2 on p. 23 of PacifiCorp’s 2021 WMP update provide a summary of WMP expenditures and expenditures by category for the years 2020-2022.

- (a) Please confirm that the figures in tables 3-1 and 3-2 are correct.
- (b) If these figures are correct, please explain the discrepancy between the figures in table 3-1 for 2020 planned and actual spend compared to the figures in table 3-2 for total planned and actual spend for 2020.
- (c) If the figures in tables 3-1 and 3-2 are incorrect, please provide corrected versions.

Response to CalPA Data Request 4.8

- (a) The figures in tables 3-1 and 3-2 are not correct. In compiling the document, values were improperly transposed.
- (b) The figures are not correct. A discrepancy does exist.
- (c) Corrected versions are provided below:

Table 3-1: Summary of WMP Expenditures – Total (REVISED)

Spend in thousands \$	
2020 WMP Planned	24,708
2020 Actual	19,708
Difference	5,595
2021 Planned	27,772
2022 Planned	24,015
2020-22 Planned	71,021

Table 3-2: Summary of WMP Expenditures by Category (REVISED)

WMP Category	2020 WMP Planned	2020 Actual	Difference	2021 Planned	2022 Planned	2020-22 Planned (w/ 2020 Actual)
Risk and Mapping	\$25	\$186	(\$161)	\$186	\$186	\$558
Situational Awareness	\$278	\$1,209	(\$931)	\$233	\$296	\$1,738
Grid Design and System Hardening	\$15,403	\$8,788	\$6,615	\$19,246	\$15,303	\$43,337

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WMP Category	2020 WMP Planned	2020 Actual	Difference	2021 Planned	2022 Planned	2020-22 Planned (w/ 2020 Actual)
Asset Management and Inspections	\$1,219	\$803	\$416	\$760	\$775	\$2,338
Vegetation Management	\$5,783	\$6,999	(\$1,216)	\$6855	\$6,900	\$20,754
Grid Operations	\$2,000	\$0	\$2,000	\$0	\$0	\$0
Data Governance	\$0	\$186	(\$161)	\$186	\$186	\$558
Resource Allocation	\$0	\$1,209	(\$931)	\$233	\$296	\$1,738
Emergency Planning	\$0	\$0	\$0	\$0	\$0	\$0
Stakeholder Cooperation and Community Engagement	\$0	\$36	(\$36)	\$73	\$73	\$0
Total	\$24,708	\$19,416	\$5,595	\$27,772	\$24,015	\$71,021

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CalPA Data Request 4.9

PacifiCorp’s 2021 Wildfire Mitigation Plan (WMP)

On p. 170 of PacifiCorp’s 2021 WMP update, PacifiCorp states the following: PacifiCorp has adopted expanded post work minimum clearance distances, of at least twelve (12) feet for all distribution lines and at least twenty (25) feet for transmission lines under 115 kV...

- (a) Please clarify PacifiCorp’s adopted post trim minimum clearance distance for transmission lines under 115kV.
- (b) PacifiCorp’s statement above refers to clearances of “at least” a minimum distance. For both distribution and transmission circuits, in what circumstances does PacifiCorp implement clearances distances above the minimum?
- (c) What circuit voltages does PacifiCorp classify as transmission?

Response to CalPA Data Request 4.9

- (a) Post work minimum clearances (minimum clearances following work) are clearances designed to maintain the minimum vegetation clearance distance. For transmission, the following minimum clearances following work have been identified by PacifiCorp. For transmission below 115 kV, minimum clearances following work range from 25 to 20 feet for 69 kV and 45 kV transmission, respectively.

	Line Voltage							
	500 kV	345 kV	230 kV	161 kV	138 kV	115 kV	69 kV	46 kV
Minimum Clearances Following Work (ft.)	50	40	30	30	30	30	25	20

- (b) PacifiCorp utilizes natural target pruning techniques (final pruning cut locations at strong points in the tree’s disease defense system, such as branch collars and proper laterals); as such, the actual distances achieved after work is performed will generally exceed the clearance distances specified. PacifiCorp foresters may also increase the minimum clearances following work, depending upon local conditions, which may include appropriate vegetation management techniques, fire risk, reasonably anticipated tree and conductor movement, species types and growth rates, species failure characteristics, local climate and rainfall patterns, line terrain and elevation, location of the vegetation within the span, worker approach distance requirements and other factors.

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(c) Transmission voltages on PacifiCorp's system are 46 kV and above.

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