Southern California Edison
2022-WMPs – 2022 Wildfire Mitigation Plan Updates

DATA REQUEST SET O E I S - S C E - 2 2 - 0 0 2

To: Energy Safety
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Received Date: 3/15/2022

Response Date: 3/17/2022

Question 12:
Fast Curve:
a. SCE uses Fast Curve (FC) settings on selected circuit breaker relays.
i. What percentage of relays currently have FC settings enabled?
ii. What percentage of circuits within the HFRA use FC settings?
iii. What is the target percentage of relays that are planned to have FC settings enabled by 2024?
iv. If the target percentage of relays planned to have these FC settings enabled by 2024 is reached, what percentage of circuits within the HFRA would this account for?
v. How is SCE prioritizing enabling FC settings?
vi. Why did SCE implement FC settings on 10 relays outside of the HFRA?
vii. What "high fire threat conditions" trigger enabling the FC settings?
viii. Provide the percent effectiveness for ignition risk reduction and any associated calculations performed for enabling FC settings.
ix. Do FC settings affect reliability?
x. If FC impact reliability, provide any analysis completed to determine reliability impacts.

Response to Question 12:

i. SCE has 4627 distribution circuits. Of those circuits, 642 have Fast Curves on the circuit breaker. This equates to 642/4627 = 14% of SCE distribution circuits have Fast Curves on the circuit breaker.

ii. SCE has 1071 distribution circuits in HFRA. SCE currently has approximately 900 circuits protected by Fast Curves using a combination of circuit breakers and/or Remotely Controlled Automatic Reclosers. 642 HFRA circuits have Fast Curves on the circuit breaker. This equates to 642/1071 = 60% of HFRA circuits have Fast Curves on the circuit breaker. The roughly 258 remaining HFRA circuits have Fast Curves on Remote Controlled Automatic Reclosers, with a total of approximately 1100 Remote Controlled Automatic Reclosers installed on HFRA circuits.

iii. By 2024, SCE is targeting to have roughly 200 more circuit breakers with Fast Curves. This equates to 842/1071 = 78% of distribution lines in HFRA protected by circuit breakers with Fast Curves. The remaining lines will be protected by Remote Controlled Automatic Reclosers with Fast Curves, and/or branch line fuses. Overall, this should provide 100% of HFRA distribution circuits with Fast Curve protected devices and/or branch line fuse.

iv. If SCE reaches it 2024 target, 78% of HFRA distribution lines will have circuit breakers with Fast Curves.

v. SCE is prioritizing the installation of circuit breakers with Fast Curves with planned construction work to bundle this effort with other station work along with availability of construction crews.

vi. SCE implemented Fast Curve settings on 10 relays outside of HFRA where other protective devices were required to be replaced due to space considerations, on circuit breakers which act as backup to HFRA circuits, or on circuits between 2018 to 2020 to provide arc flash protection while crews were working on the circuit. Since 2020, dedicated arc flash protective settings have been used to provide arc flash protection.

vii. The Fast Curve settings are enabled per System Operating Bulletin 322, under the following conditions:

Declaration of RFW, FWT, FCZ, Thunderstorm Threat

1. Red Flag Warning (RFW) issued by the National Weather Service. The NWS will declare a RFW anytime weather conditions warrant.

A. Recloser Restrictions will be applied to all sub-transmission and distribution circuits within the county under the declaration.

B. Operating Restrictions will be applied to all sub-transmission and distribution circuits within the county under the declaration.

2. Fire Weather Threat (FWT). SCE Weather Services will declare a FWT based on assessments provided by SCE's Meteorology Group of possible fire threats. Fire threats may also be declared by Fire Climate Zones (FCZ) based on assessments provided by SCE Fire Science Group.

A. Recloser Restrictions will be applied to all sub-transmission and distribution circuits by Switching Center and county, unless Individual Recloser Restrictions are in effect for distribution per Auto-322. Refer to Section 3.5. Fire Climate Zone (FCZ) recloser restrictions will be applied to HFRA distribution circuits by zones utilizing the Auto-322 program.

B. Operating Restrictions: The Switching Center System Operator must reference the PSPS Watch List following a relay operation to determine if Operating Restrictions apply. Circuits that are not listed on the Watch List may be tested without a patrol.

3. Thunderstorm Threat. SCE Weather Services will declare a Thunderstorm Threat based on assessments provided by the Meteorology Group of possible thunderstorms producing dry lightning and strong downburst winds during periods of increased fire threat.

A. Recloser Restrictions will be applied to all sub-transmission and distribution circuits and circuit sections by Switching Center and county.

B. Operating Restrictions will be applied to all sub-transmission and distribution circuits and circuit sections by Switching Center and county.

4. Fire Climate Zones

• This group seeks approval to build on the existing seasonality approach of FCZ Operating Restrictions. The new methodology will include a weekly forecast of Fire Science's newly developed Fuels Index.

• Analysis has been conducted to determine breakpoints for fuel dryness and to determine periods of time that FCZ Operating Restrictions should be implemented on a weekly basis.

• Utilizing this new index will incorporate a weekly assessment of fuel dryness to limit the negative work impacts, improve reliability and customer experience, and allow for a more targeted approach in implementing FCZ Operating Restrictions.

viii. CB with Fast Curve settings have a 15% mitigation effectiveness against ignition drivers such as contact-from-object and equipment/facility failure. Using the mitigation effectiveness at the sub-drivers, SCE calculated an associated RSE value of 17,873, which was high compared to other wildfire mitigation activities. This information can be found in SCE's 2022 WMP Update on Table SCE 4-11, beginning on page 72.

ix. Yes, Fast Curve settings do affect reliability during some fault conditions. The Fast Curves may operate either at the same time or faster than downstream devices and do not provide traditional relay coordination between protective devices on the circuit. This may cause larger sections of the circuit to be deenergized and may cause longer patrol times.

x. SCE does not presently differentiate between outages that would have remained the same, or potentially impacted a greater amount of circuitry as described in response ix. SCE has not included potential reliability benefits from ignition reductions from Fast Curve settings in the following SAIDI values. Fast Curves activated during adverse weather conditions contributed roughly 14 mins of SAIDI in 2021.