WECC

Reliability Coordinator Best Practices for Wildfire Impacts and Mitigation

WECC RC Wildfire Advisory Group

February 2023

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Introduction

Several NERC and WECC documents (ex., NERC State of Reliability, WECC State of the Interconnection, NERC 2021 ERO Reliability Risk Priorities, WECC 2022 Reliability Risk Priorities) identify wildfires as extreme events that can significantly affect the reliability of the BPS. As wildfires continue in the Western Interconnection, coordination among the Reliability Coordinators (RC) to identify, monitor, and report on the effects of wildfires to each other and their members is critical to maintaining reliability.

Purpose and Responsibilities

At the request of Western Interconnection RCs, the WECC Event Analysis and Situation Awareness department formed the Wildfire Advisory Group (WAG), composed of members from WECC and all RCs within the Western Interconnection. The group worked to help identify and document ways to increase coordination and use of tools among the western RCs and to create a reference document which identified common best practices that can be considered in real-time operations and used to assist operating personnel in future events.

RC Wildfire Practices

Current Wildfire Identification and Monitoring Tools

Fire detection and monitoring tools are used by the western RCs to identify and monitor active wildfires within the Western Interconnection. These tools are predominantly based on data from the Moderate Resolution Imaging Spectroradiometer (MODIS) instruments on board the Terra and Aqua satellites and the Visible Infrared Imaging Radiometer Suite (VIIRS) instruments flying on the Suomi National Polar-orbiting Partnership (Suomi NPP) satellites. While these instruments can detect fires and monitor changes on at least a daily basis, only a small subset of these fires may pose a credible threat to the bulk transmission system. To help identity which fires pose a risk, the RCs have developed their own tools, processes, and procedures to help refine this data to determine those threats for their respective areas. The following information provides a brief overview of the tools currently used today.

RC West

To help the system operators identify and monitor wildfires, RC West developed the "RC West Threat Monitor Dashboard." This dashboard includes inputs from the National Interagency Fire Center (NIFC) and the Integrated Reporting of Wildland Fire Information (IRWIN). The dashboard also includes transmission line coordinates that are overlaid with the information in the IRWIN database to determine every 15 minutes whether a fire is close to a transmission line. If a fire perimeter is within two miles, the dashboard sends an email notification to the operator, who can then access the fire information, which includes the date and time it began, percentage of containment, fire perimeter data,

and a link to Windy.com that has an animated graph of wind speed in the area. This information is beneficial to the operator in predicting the spread and direction of the fire. In addition to the dashboard, RC West also provides access to a large subset of public cameras, live video, and weather stations for additional aids in the detection and monitoring of wildfires. Twitter and other social media are also used as sources of wildfire information as they may contain information and pictures from the public.

SPP

To assist the Southwest Power Pool (SPP) operators, SPP built its own wildfire dashboard through a product called Macomber Map. This dashboard uses the thermal imagery from NASA and the app Windy.com, which is provided through Macomber Map, to help its operators identify wildfires and weather trends. In addition to this dashboard, SPP also uses the InciWEB, which is a publicly available source of information and provides wildfire incident information that includes the date and time a wildfire began, percentage of containment, and fire perimeter data.

AESO

The operators at Alberta Electric System Operator (AESO) use a product called Indji Watch and import the data from this product into AESO's Eterra Vision Energy Management System's (EMS) displays and alarms. As Indji Watch provides situational awareness information for wildfire and other hazards, such as weather and lightning, the data is overlayed on the transmission map for the operators to see the information and location of the threat. To help the operator identify a new wildfire that threatens the transmission system, AESO configured the displays to alarm when a wildfire is within 16 kilometers of a transmission line corridor. The operator can then look at the fire details, including the location.

BCRC

The British Columbia Reliability Coordinator (BCRC) also uses Indji Watch. The tool provides geographic and tabular indications of wildfires and is the main tool used by BCRC for detection and monitoring. Alerts for wildfires are configured within the tool and alarm when an approaching wildfire is within 10 kilometers of a microwave tower or transmission line. If a wildfire is greater than 12 acres (5 hectares) and within 25 kilometers of a transmission line, an alarm will trigger. BCRC uses data from the BC Ministry of Forests, and satellite hotspots with a confidence greater than 70% are incorporated into the tool. BC Hydro has also built an in-house Emergency Operations Dashboard. This is an ArcGIS site that displays wildfires (including perimeter and areas of restriction), fires of note, new fires, out-of-control fires, fire being held, fire under control and, fire out.

WECC SA

The WECC Situational Awareness (SA) Team developed the WECC Wildfire Dashboard in 2020. The dashboard is available to all RCs, as all information is available to the public through other means. The dashboard provides information and options such as:

- Active wildfires greater than 10 acres, including the name of the fire;
- Transmission lines at risk 100 kV and above for the interconnection;
- Perimeter, size, and general location of the fire;
- The option to overlay the WECC transmission system on the map; and
- The ability to filter to a specific BA and transmission in its BAA.

Impacts of Wildfire on the BES

While most impacts of wildfire on the electricity system are at the distribution level, wildfires pose a risk to the reliable operation of the BPS. These risks arise through damage to transmission infrastructure and through preemptive public safety power shutoffs. In 2021, the Bootleg Fire resulted in a BPS event that began on July 6 when three 500 kV lines tripped out of service over a seven-minute period. The effects on the BPS lasted just over five hours when the second of the three lines was returned to service. While no firm load was shed, one entity did use its demand response program to lower its load by 1,748 MW before escalating to an Energy Emergency Alert Level 3 (EEA-3).

To help the RCs understand the impacts of wildfires on the BPS, different activities are done.

Studies

When a fire is detected in real time that threatens a transmission facility, the RC may determine that a study (ex., pre-contingency) needs to be performed to determine the system impact and identify any mitigating actions that may be taken in the event of loss.

When a threat from a fire extends across several days, the Transmission Operator (TOP) should analyze its system to develop the operating plan (OPA), including the risk imposed by the fire, and send the OPA to the RC. The RC then coordinates and reviews the TOP's OPA, then develops an RC operating plan that includes the threatened facility(s).

Weather Stations and Cameras

RCs increasingly use various tools to monitor weather and environmental conditions that threaten the Bulk Electric System (BES). These tools alert the RC Operator when there are fires within proximity of BES lines and substations, as well as the potential for Remedial Action Scheme operation. RCs will coordinate with the affected TOP(s) and BA(s) when alerted to a fire that threatens the BES.

Public Safety Power Shutoff

An increasing number of utilities are using Public Safety Power Shutoffs (PSPS) or similar programs to mitigate the impact of wildfire. PSPS programs are designed so utilities can balance the risk of harm from utility-ignited wildfires against the public harm of shutting off power. Where the RC does not activate these procedures, it should be made aware of any activation to maintain the wide-area view of the interconnection and maintain reliability.

Documented Procedures

Having a documented procedure that includes clear guidelines and instructions, can assist the RC with mitigating wildfire impacts to the BES. It is recommended that all RCs maintain a written process on how to address wildfires and coordinate that information with their members, neighboring RCs, and WECC SA.

Communication During Wildfires

Communication during wildfire events is complex. Having a sound communication plan in place for RCs to communicate in a way that accurately and promptly informs others in fire-affected areas can increase effectiveness and ensure that accurate information is available on which to act and make good decisions.

The use of prebuilt templates or protocols can help RCs deliver and receive consistent messages. The following information should be considered in communication between the RC, its members, and WECC SA:

- Name of fire;
- Location of fire;
- Containment level;
- BES equipment threatened by the fire;
- Impacts on system transfer limits;
- Potential multiple-contingencies due to fire;
- Any actions being considered or taken in response to the fire (crew in route, equipment removed from service, PSPS activation, etc.); and
- Update schedule if needed.

One Western Interconnection RC has developed a "Transmission Emergency Due to Wildfire" procedure with guidelines for notification and coordination to help the RC address wildfire impacts. The procedure includes methods to determine the potential impact of the fire and credible contingency.

Best Practices

Identifying and monitoring active wildfire

- RC provide training to TOPs on wildfire communications.
- RCs and TOP's establish guidelines for continuous updates during wildfire events.
- RCs make use of multiple data sources to support situational awareness of wildfire events.

Addressing the impacts of wildfires

- Developing a wildfire process or procedure and maintaining a tool set that predetermines higher-impact facilities focusing fire monitoring on highest impact fire threats.

Communicating during active wildfires

- Documenting and maintaining a communication procedure that includes RC communications during wildfire events such as the RC West Wildfire Coordination Procedure RC0410B developed by RC West

Additional References

The following links are references to help provide additional information or practices.

- NERC Wildfire Mitigation Reference Guide—https://nerc.com/comm/RSTC/Documents/Wildfire%20Mitigation%20Reference%20Guide_January_2021.pdf
- Berkley News article—https://news.berkeley.edu/2021/07/21/1-5-million-grant-will-improve-wildfire-spotting-from-the-air-and-space/

Public Wildfire Dashboards

- USDA Forest Service Active Fire Mapping Program—https://fsapps.nwcg.gov/afm/
- Incident Information System—https://inciweb.nwcg.gov/
- National Fire Situational Awareness —https://maps.nwcg.gov/sa/#/F/F/40.8337/-129.1883/4
- Wildfire Assessment System (WFAS)—https://www.wfas.net/
- CPUC High Fire Threat District—https://capuc.maps.arcgis.com/apps/webappviewer/index.html?id=5bdb921d747a46929d9f00dbdb6d0fa2
- CAL FIRE—https://www.fire.ca.gov/incidents/
- SDGE Weather Awareness System—https://sdgeweather.com/
- B.C. Wildfire Tracker—https://vancouversun.com/news/local-news/b-c-wildfires-map-2020-updates-on-fire-locations-evacuation-alerts-orders

- WECC Wildfire Dashboard—https://weccgeo.maps.arcgis.com/apps/dashboards/index.html#/0577a7b0ae3f495492f0b478a63c70ca

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