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Geospatial Sciences and Human Security Division

**FEEDBACK ON THE ELECTRIC EMERGENCY INCIDENT AND DISTURBANCE
REPORT, OE-417**

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February 2024

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1. BACKGROUND

The US Department of Energy (DOE) Office of Electricity (OE) mandates requirements for reporting electric emergencies and disruptions in the United States. Specific electric power industry organizations (such as balancing authorities, reliability coordinators, some generating entities, and electric utilities) report this information through the OE-417 *Electric Emergency Incident and Disturbance Report* via Form OE-417. Entities are required to submit Form OE-417 when at least one of the qualifying 26 criteria is met pursuant to Section 13(b) of the Federal Energy Administration Act of 1974 (Public Law 93-275). Entities are required to report, within 6 hours of the incident, loss of electric service to 50,000 customers or more for 1 hour or longer. The deadline for submitting Form OE-417 depends on the nature of the incident. An updated Form OE-417 Schedule 1 and all of Schedule 2 are both due within 72 hours of the incident to provide complete disruption information. Additionally, a Final Report must be filed within 72 hours of the incident, unless an interim update has been provided. If the incident meets specific criteria, the form must be filed within one hour, six hours, or by the later of 24 hours after the recognition of the incident or by the end of the next business day.¹

The ability of DOE to respond quickly to energy emergencies that could affect the nation's infrastructure and help alleviate or prevent further disruptions depends on the industry's prompt and complete submission of information. This report summarizes current issues with Form OE-417 and the reporting process and presents recommendations for improvements.

2. PROPOSED CHANGES TO FORM OE-417

On August 30, 2023, the DOE Energy Information Administration posted proposed changes to Form OE-417 to continue to ensure future alignment with the North American Electric Reliability Corporation (NERC) CIP-008-6 Reliability Standard and the NERC EOP-004-6 Reliability Standard. The stated goal of the changes is to “minimize confusion among industry stakeholders about where and how to file reports and enable industry stakeholders to train personnel to report using a single form.” The changes consist primarily of additional filing criteria, causes for emergencies and incidents, and updates to instructions (DOE 2023). The revised form will be available online only.

3. CHALLENGES

3.1 REPORTING PROCESS CHALLENGES

Although changes to Form OE-417 are important, improving the submission process to fit the need is just as critical. A thorough evaluation of the data flow processes for mapping out process improvements is needed to speed up the process and expediently deliver data to those who need it (e.g., emergency responders).

Three main issues are limiting the effectiveness of electric emergency reporting:

1. The current reporting threshold leaves out significant outages and data that should be reported.

- Researchers at both Oak Ridge National Laboratory (ORNL) and the National Renewable Energy Laboratory (NREL) commented that because the emphasis for OE-417 is on reporting extreme

¹https://www.oe.netl.doe.gov/docs/OE417_Form_Instructions_05312021.pdf
<https://www.reginfo.gov/public/do/DownloadDocument?objectID=29261601>

events using a generic nationwide threshold (e.g., 50,000 customers affected, 300 MW power loss) or on aggregated data at the utility or state level rather than high-resolution data such as at the county level, a considerable number of smaller scale but important events might not be captured (Abdelmalak 2023).

2. Because of the short time requirements, reporting often contains errors and/or is incomplete, which can lead to significant bias in the statistical analysis or findings.

- An ORNL researcher noticed incomplete data within Form OE-417 in columns such as “Demand Loss” and “Number of customers Affected.” However, OE-417 data could be useful for “Vandalism,” “Actual Physical Attack/Vandalism,” and “Suspicious Activity” analysis if the “Demand Loss” and “Number of customers Affected” columns were filled with the actual numbers.
- Because source data are often incomplete and inaccurate, any findings based on a time-series analysis of these data is likely based on incomplete data, which might embed a bias in the analysis and cast doubt on the validity of the analysis. For example, if underreported, the actual frequency of an outage might be more. If the number of events seems to increase over the year, it could be because of improved reporting (Fisher 2012). The outage duration of some of events is negative, which is infeasible, necessitating the need for careful quality checking of the data before reporting (Shen and Tang 2019).
- NREL also states that OE-417 reports provide information on when and where widespread outages occurred but that the data are insufficient for estimating the duration of outages because reports of outages are sometimes incorrect and are not always tracked and that outages are often longer than what average customers experience (Ericson 2022).

3. There is no follow-up requirement to report on the resolution of the outage.

- Because Form OE-417 is required to be filed only when the threshold is met before the full scope of the event is understood and is not updated later (even if a detailed investigation was conducted), the data provided is only an estimate of the incident (Shen and Tang 2019; Kenward and Raja 2014).

4. RECOMMENDATIONS

4.1 FORM OE-417 RECOMMENDATIONS

1. When the form is being filled out initially, there should be a set of questions to guide the person filling out the form so that important threshold data can be added without the entire form having to be filled out while getting the crucial information to emergency responders, NERC, or whomever gets the data from OE-417. The update/follow-up process will need to be in place to gather updated/completed information after the event is over.
2. Require changes in outage reporting criteria to capture outages that may not impact a very large number of customers but the outages might have lasted for 2 days or more.
3. For section L of the form, add additional CIM based standard causes to simplify ongoing reporting and cause analysis. The open field should be available only if a user selects “Other” as a cause. A few additional CIM standard defined causes are listed below:
 - **Equipment Failure**
 - Transformer failure

- Switchgear failure
 - Insulator failure
 - **Vegetation Interference**
 - Tree contact
 - Vegetation in substation
 - **Human and Animal Interference**
 - Vehicle accident
 - Animal contact
4. Expand emergencies such as “weather or natural disaster” so that the specific cause can be mentioned (e.g., hurricane, windstorm, snowstorm, heat wave, cold wave). Knowing the event type can help in developing appropriate planning strategies.
 5. Include a way to indicate cyber incidents, which it is believed are being underreported (Weiss 2023).

4.2 REPORTING PROCESS RECOMMENDATIONS

1. Clearly designate the service areas (e.g., operating company or substation area) upon which reporting thresholds should be measured rather than leaving that determination to each utility.
2. Require all OE-417 forms to be submitted online.
3. To the extent possible, automate the process so that reporting timing thresholds can be reduced and so that those in need of critical information receive that information sooner.
4. Require follow-up reporting to share lessons learned and after-action reports.
 - An additional mandatory reporting mechanism is needed to collect final information about reliability events. This information will provide a solid basis for analysis and will provide some level of data redundancy offering researchers a way to validate or calibrate the results of the analysis (Fisher 2012).
5. Ensure that all events are reported (Fisher 2012).
6. Conduct quality checks on submitted data. The reported outage duration of some events is negative (Shen and Tang 2019).
7. Expand the data reporting structure to an “archival” report with a longer reporting time (on the order of weeks not hours) to ensure that a careful investigation is undertaken. Allow organizations to correct and update information on the number of customers affected and the start time and duration and to add new information that might not have been available at the time of reporting (Fisher 2012).

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