
Substation Protection & Control Batteries: The Proposed Fire Standard for Energy Storage Systems

What has changed?

NFPA 855 (Standard for the Installation of Energy Storage Systems) is a new National Fire Protection Association Standard. It is being developed to define the design, construction, installation, commissioning, operation, maintenance, and decommissioning of stationary energy storage systems (ESS) including **traditional battery systems such as those used by utilities**. This Standard currently includes all variations of chemical energy (battery) storage as well as other forms of mechanical energy storage such as pumped hydro, thermal energy storage, flywheel, etc. that do not pose such unique fire or safety risks.

It is expected that once NFPA 855 is issued, it will be adopted as part of the next revision of the International Building and Fires Codes, and ultimately into the individual state building codes, making it a requirement source for all new construction. These new requirements for battery or mechanical energy storage systems, if imposed, may significantly impact the design, construction, installation, operation, and maintenance of new energy storage systems, potentially rendering some projects uneconomical.

NRECA became aware of these developments in mid-June. EEI has taken the lead on this and engaged with NRECA and related trade associations to organize a coalition of electric utility members and affiliates to represent our industry's interests during the development of NFPA 855.

What is the impact on electric cooperatives?

For battery energy storage specifically, this Standard could regulate batteries used by utilities for grid scale energy storage as well as those which **supply DC power for protection and controls in substations, generating stations, or other applications which were previously exempt from such regulation**. Examples of the proposed requirements that could be imposed on these installations include: fire detection and suppression systems (including water based suppression systems), UL listing of battery systems, as well as battery size and separation restrictions.

The utility coalition group submitted 550+ individual Public Comments (out of about 875 total) on the First Draft Report, and many of these comments were reviewed and voted upon during the Second Draft Technical Committee meeting in Salt Lake City on July 24-26. The following is a high-level summary of the results of that meeting:

- Several proposals for a general utility exemption in Chapter 1 were submitted for the entire scope of the draft standard. The NESC supported this general exemption along with many utilities as the simplest and cleanest solution, but all such proposals were voted down by the Technical Committee.
- The utility coalition was successful in obtaining specific utility exemptions for items such as fire sprinklers and UL listings for traditional battery technologies (lead acid and nickel-cadmium) in

generation and substation facilities used for protection and controls, but there are still outstanding issues that need to be addressed. These carveouts closely mirrored the carveouts provided to telecommunications facilities earlier in the draft process, but still require compliance with some provisions of the proposed Standard.

- Many of the comments have still not been addressed and will be reviewed at the next meeting.

The draft Standard can be viewed at www.nfpa.org/855. A login is required, but creating an NFPA profile is free and only takes a minute.

Next Steps

Affiliated industry stakeholders including several EEI member company SMEs will be attending the most recent Technical Committee meeting on August 21-23 at NFPA's headquarters in Quincy, MA. An update on the meeting should be available in September. The next major milestone will be NFPA's issuance of the Second Draft Report, which is expected to be released on November 1, at which point we will work with EEI to determine the most appropriate course forward.

What do cooperatives need to know or do?

In order to support our continued efforts, it is necessary to quantify the potential cost of compliance if this standard is implemented as written. Please contact us if you have questions, concerns, or comments regarding the following:

1. Please let us know if you are able to provide cost estimates to comply with the draft standard for new stations or upgrades to existing stations.
2. Please also identify any remaining concerns you may have with the draft standard as written.

Additional Resources

- [The Attachment](#) provides EEI's NFPA 855 Technical Summary for Utility Members
- The draft Standard can be viewed at www.nfpa.org/855. A login is required, but creating an NFPA profile is free and only takes a minute.

Contacts for More Information or Questions

Robert Harris
Senior Principal Transmission & Distribution Engineering, Business & Technology Strategies
robert.harris@nreca.coop

Thomas Gwinn, Jr,
Principal Engineer, Business and Technology Strategies
thomas.gwinn@nreca.coop

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NFPA 855 Technical Summary for Utility Members

Sent to EEI Members on 8-3-18

Below is a technical summary of the actions taken related to utilities at the second draft meeting of the NFPA 855 Committee in Salt Lake City on July 24-26. Note that the action taken at the meeting allows for proposed Code changes to proceed to a written ballot (at least half of those attending the meeting must approve). These changes will not be considered “approved” until they pass the written ballot that will be cast in September.

All provisions related to a wholesale utility exemption from NFPA 855 were rejected, the Committee believes that exemptions / carveouts should be handled for each of the requirements individually.

Electric utilities were defined – essentially those that produce or distribute power to the public and are recognized / regulated by a government entity / commission.

For capacitors, a note was added to Table 1.3 to remove capacitors used for “power factor correction, filtering, and reactive power” from the scope of NFPA 855. The intent of this section was to exclude the capacitors used in traditional utility applications. *Note that there was a single Committee member that agreed with the utility exemption, but felt strongly that the exemption as written was too broad. With that in mind, this may be a provision that changes during the second public meeting.*

For lead acid and nickel cadmium batteries, designed in accordance with IEEE C2, used for DC power for control of substations and control / safe shutdown of generating stations under the exclusive control of the electric utility located outdoors or in building spaces used exclusively for such installations, the following exemptions would be granted

- 4.2.1.2 – Exempt from listing requirements in accordance with UL 9540
- 4.2.3.3 – Exempt from retrofit requirements of the Standard when batteries are changed out / retrofitted (and kept as lead acid or NiCad) and the system size / capacity is not increased by more than 10%
 - *Note that this exemption is significant for existing substations / generating plants. It keeps these facilities away from the construction requirements of NFPA 855 when we change out batteries.*
- 4.2.9.5 - Exempt from battery management system, including isolation during fire event
 - *Note that this type of system may be provided already by some larger utilities, such as in their battery charger monitoring alarms, but would allow the utility to continue utilizing their current battery installation systems on existing and new installations*

- 4.4.2.4.5 - Exempt from elevation requirements (both above and belowgrade) that pertain to fire department access
 - *Note that these requirements typically require fire department laddering capabilities (bad idea in a substation) as well as restrict the usage of batteries belowgrade*
- 4.6.6 - Exempt from size and separation requirements for batteries
- 4.8 - Exempt from maximum rated energy (generating stations only, substations do not approach this threshold)
- 4.10.3 – Smoke detection system can be monitored by process control system instead of listed fire alarm panel
- 4.11.2.4 – Exempt from fire suppression requirements
- 4.12.3.3 – Exempt from explosion control requirements
 - *Note – this assumes that the battery space has a ventilation system installed per IEEE 1635 to prevent H2 accumulation*

IEEE C2 was added to working space requirements in addition to the reference to NFPA 70 that was already present (4.3.2)

Electric utilities received an exemption from requirements to post disconnect locations at the ESS due to concerns related to grid security (4.3.5.3.1)