Fire Risk Statement

Corshellach BESS

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Revision History

Issue	Date	Name	Latest changes
01	15/02/2024	William Miskelly	First Created

Contents

1 Introduction

This document forms the Corshellach BESS fire risk statement. The document indicates how the project has been developed to address fire risk in several ways. It contains key mitigation measures against the risk of fire ignition and propagation within the battery energy storage system (BESS) site.

2 Project Description

2.1 General project information

Renewable Energy Systems Ltd (RES) is developing a 49.9MW BESS facility near Berryburn Substation. The BESS will consist of 32 no. battery storage enclosures (BSEs), power conversion systems (PCSs), transformers, electrical infrastructure, foundations, access track, crane hardstanding, and spares storage containers. The grid connection will be via an onsite 33kV substation.

2.1.1 Battery selection

The proposed battery technology for the development is anticipated to be lithium iron phosphate (LFP). LFP has better stability against thermal runaway at higher temperatures compared to some other battery chemistries. This is supported by the UL 9540A test results of RES' preferred battery system which show that, at a unit level following deliberate initiation of thermal runaway:

- No flaming outside the initiating battery rack was observed.
- Surface temperatures of modules within the target battery rack adjacent to the initiating battery rack do not exceed the temperature at which thermally initiated cell venting occurs.
- Wall surface temperature rise does not exceed 97°C above ambient.
- Explosion hazards were not observed during the test.

Data from UL9540A testing can also be used to inform detailed design of the site and safety systems.

Each battery unit has approximately capacity of 1.75MW / 3.7MWh and footprint of approximately 6.1m x 2.4m. The exact battery form factor will be determined during detail design phase.

3 Design Factors

3.1 Mitigation Measurements

The following points define all the preliminary design decisions that have been carried out to minimise the risk against fire ignition and propagation within the BESS site.

3.1.1 Equipment spacing

The site has been developed to include adequate spacing between the battery storage enclosure (BSE) to mitigate against the risk of fire spread in the event of a fire within one BSE. The site layout aligns with applicable NFPA 855 spacing criteria as well as the spacing recommendations outlined in FM Global Property Loss Prevention Datasheet 5-33 (Interim revision July 2023). The layout allows minimum distance of 3m between batteries enclosures and any other infrastructure.

3.1.2 Protection systems

Each BSE will have a dedicated fire protection system, comprising flammable gas detection and venting, fire detection and alarm, and an automatic fire suppression system. Additionally, key battery health and environment parameters will be continuously monitored with alarms sent to a control centre. Automatic electrical disconnection will be enacted by the battery management system should operational temperature, current or voltage limits be breached. There will be multiple levels of alarms prior to protection limits which warn the operator of proximity to safe operating limits.

3.1.3 Access to battery storage enclosure

All BSEs will be accessed via external doors only, i.e. no internal corridor to eliminate the risk of people being caught inside an enclosure during a fire or thermal runaway gas venting incident.

3.1.4 Location of BESS facility

The location of the facility has been selected considering the distances from existing nearby premises. Berryburn Substation is located approximately 140m northeast of the BESS compound and is considered outside the influence of any direct fire risk. Attendance at this substation is expected to be infrequent an access/egress is independent of the proposed BESS site. A distance of at least 5m is achieved between BSEs and the site boundary, in line with NFPA 855 (2023), and there are no existing or planned bushes or trees within 6m of any BSE.

3.1.5 Access for emergency services

The fenced BESS compound has a wide access route along the Southeastern edge, allowing the fire service to access the site during an incident. In addition, two site access points have been proposed to ensure that fire services would have an alternative option for approaching site if the combination of wind direction and smoke made one direction particularly onerous.

Vehicular access to allow the emergency services to safely reach the development during design flood conditions has been considered and achieved.

4 Conclusion

During the preliminary design, efforts have been made to mitigate, minimise, and prevent any fire hazard on site by incorporating specific design factors as described in this document.