

## Testing and Demonstration Results for the Transmission-Level (138kV) 2G Superconducting Fault Current Limiter at SuperPower

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HTS Superconducting Fault Current Limiter for Electric Power Transmission Lines)

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**Abstract**—Development of Superconducting Fault Current Limiters (SFCLs) has been pursued for decades [1-4] and has been limited thermally and/or mechanically by the available superconducting materials performance characteristics [5]. However, within the past few years a newer, more robust type of superconductor known as 2G HTS wire, has become available in sufficient quantity and lengths for developers to build prototype devices and test their capabilities. This new material has re-invigorated the worldwide race to develop a successful SFCL device that will meet the stringent demands of the electric utility application. SuperPower is pursuing the development of a transmission level (138kV) SFCL based on its proprietary 2G HTS wire and SFCL technologies. This paper will discuss testing and improvements made to optimize Recovery Under Load (RUL) performance. We also discuss low and high-power tests and the influence of the different variables that have an important impact in RUL. A wide operating RUL window has been tested in order to define where RUL is feasible.

**Index Terms**—Fault current limiters (FCL), high-temperature superconductors, quench current, quench time, second generation high-temperature superconducting wires (2G HTS conductors), superconducting fault current limiter (SFCL)

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