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Upgrade of variable frequency drive for cryogenic system at NSRRC

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After nearly two decades of continuous operation, the Variable Frequency Drive (VFD) of Main Cryogenic Plant 1 (MCP1) experienced a critical failure following a routine shutdown in September 2021. Despite thorough inspection and part replacement, the root cause of the failure remained elusive. Additionally, several seemingly normal spare parts were found to be damaged. Given the discontinued production of many spare parts and the presence of two identical VFDs in operation, a decision was made to upgrade the entire MCP1 VFD. After undergoing specific customizations, the new VFD was retrofitted and commenced testing in late 2021. During the dismantling process of the original VFD, the underlying cause of the failure was uncovered: a short circuit resulting from damaged power wiring. This paper delves into the distinctions between the original and new VFDs, outlines the customized modifications, and presents the comprehensive test results of the upgraded system. Furthermore, the root cause of the failure and the extent of damage inflicted by the old VFD will be discussed.

Footnotes

Cryogenic system; Compressor system; Variable Frequency Driver

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