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Cold plate upgrade at the SNS

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The Spallation Neutron Source (SNS) employed over 200 cold plates in its Injection Kicker and quadrupole power supplies for semiconductor cooling. Each cold plate consisted of an aluminum base with interconnected copper tubes that were brazed together. Unfortunately, the durability of these plates was compromised over time due to corrosion of the copper tubes by de-ionized water. This corrosion led to the formation of small pinhole leaks, which became increasingly problematic in recent years, causing more frequent leaks and subsequent operational downtime for the SNS system. To tackle this issue, a novel solution was pursued involving the incorporation of stainless-steel tubes in the redesign. Two types of cold plates underwent rigorous simulations and extensive testing. One of the redesigned cold plates demonstrated competitive performance and was identified as a feasible replacement option. Consequently, a comprehensive initiative was executed to replace all cold plates.

Footnotes

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North America

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