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Fitness For Service Assessment of a Corroded Heat Exchanger

Wednesday 13 August 2025 16:00 (2 hours)

Fermilab's Main Injector Accelerator has used shell & tube heat exchangers to cool various beamline components since its construction in the late 1990s. Many of the heat exchangers still around today are original to the machine. Untreated pond water has been used to exchange heat with the Low Conductivity Water. Throughout the lifetime of Fermilab's heat exchangers, they have undergone significant material degradation in the carbon steel end channels due to corrosion. Wall thickness measurements (per API 510) of each heat exchanger were used to generate a 3D model of the corroded surfaces. In order to continue their safe and reliable operation, ASME FFS-1/API 579 (Fitness-For-Service) was implemented to address their integrity. The assessments consisted of finite element analysis techniques outlined in ASME Section VIII Div. 2 (design by analysis methods for pressure vessels), in accordance with the requirements of ASME FFS-1 Part 4: General Metal Loss, Part 5: Local Metal Loss, and Part 9: Crack Like Flaws. The assessments concluded that each heat exchanger is coined "Fit For Service". The Fitness-For-Service standard offers a unique opportunity to facilities and institutions within the DOE National Lab complex to properly and safely assess the integrity of aging equipment necessary to conduct science and research. This poster demonstrates the assessment process and techniques used to determine the heat exchangers are fit for service.

Please consider my poster for contributed oral presentation

No

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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