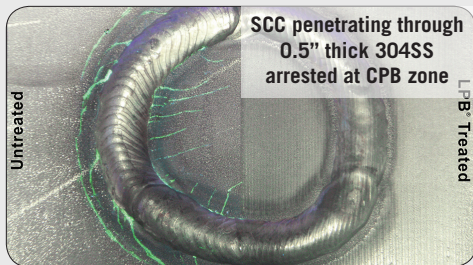


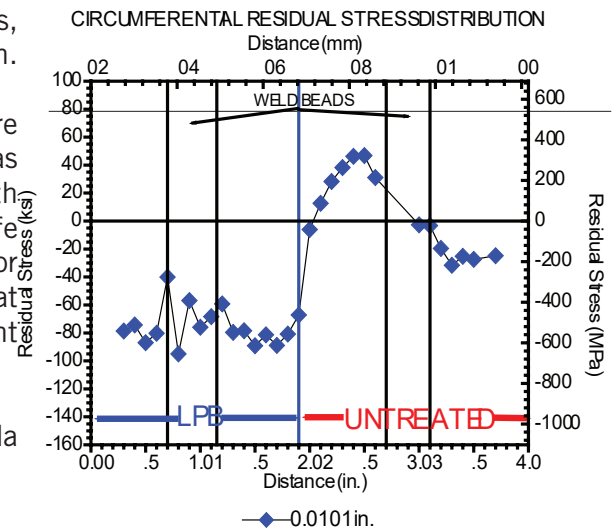
Nuclear power is a practical source of energy capable of meeting the world's requirements. However, it requires long-term storage solutions for hazardous materials created in production. Despite being made of corrosion-resistant Alloy-22, stress corrosion cracking has plagued nuclear waste containers, impacting design life, safety, and cost. When waste containers are welded shut, shrinkage during cooling causes high tensile stresses, leaving the welds in tension and vulnerable to stress corrosion cracking. Though they are designed to last for over 10,000 years, the combination of tension and stress corrosion cracking pose a significant threat of containment failure.



SOLUTION: Lambda developed a solution to completely eliminate stress corrosion cracking in the closure welds, ensuring waste containers could last for the entire designed component life. A deep, stable layer of designed residual compression was applied to the closure welds using controlled plasticity burnishing (CPB). CPB replaces tension from weld shrinkage with deep residual compression, preventing shallow cracks from propagating and effectively eliminating stress corrosion cracking, as well as the risk of failure. In 2006, CPB was selected over other surface treatments to eliminate residual tension in the final closure welds of long-term nuclear waste storage containers for the Yucca Mountain Project. A dual CPB system was integrated with the robotic container positioning and welding system designed by Idaho National Labs (INL). During initial trials, INL staff reported that the system integration and initial trials were flawless, demonstrating reliability, efficiency and 100% processing documentation.

IMPACT: In the years since, the CPB process has only become more efficient and reliable. CPB has been shown to produce compression as deep as 12mm in these nuclear waste containers, exceeding the depth required for the surface to resist stress corrosion cracking for a design life of 50,000 years. The dual CPB system has been in the INL facility for over a decade. Designed compression applied with CPB has ensured that nuclear waste containers will last, providing safe, clean, and efficient storage of hazardous waste materials.

To learn how CPB can extend the life of your components, contact Lambda Technologies at 1-800-883-0851 or visit www.lambdatechs.com.



1 Scheel, Hornbach, Prevey "Mitigation of Stress Corrosion Cracking in Nuclear Weldments Using Low Plasticity Burnishing." ICONE16. May 11-15, 2008, Orlando, Florida, USA. No. 48597