

# AVANTech's Application of Commercial Grade Dedication (CGD) in Radioactive Waste Systems

Fred Yapuncich, Lawrnel Harrison, Todd Bunting  
AVANTech, Inc.



**AVANTech**  
INCORPORATED

Technology Solutions Services  
avantechinc.com  
2050 American Italian Way, Columbia, SC 29209 • 803.407.7171  
2680 Westcott Boulevard, Knoxville, TN 37931 • 865.539.9000  
2155 Robertson Drive, Richland, WA 99354 • 509.943.6706

## Introduction

- ✓ AVANTech performs technical evaluations to determine critical characteristics and acceptance criteria on Design-Build projects where AVANTech is the design agent. For Build-to-Print projects, AVANTech utilizes the client's technical evaluation input to perform the dedication process, providing interpretation and guidance to assist in implementation. AVANTech utilizes in-house testing/inspection capabilities along with independent testing performed by qualified laboratories and certified Non-Destructive Examination (NDE) providers.
- ✓ AVANTech has provided CGD services for a variety of clients and radioactive waste system projects and is continually expanding and enhancing the CGD program. AVANTech's program has the capability to use all four CGD methods: Inspections/Tests/Analyses, Commercial Grade Survey, Source Verification, and Acceptable Supplier/Item Performance Record.
- ✓ AVANTech has developed over 200 CGD plans and reports that have been approved by customers and implemented. Examples include fasteners, pipe and fittings, valves, instruments, bearings, material, shielding, gaskets, O-rings, and electrical cable.



Seismic Restraint

## Evaluation

- ✓ This material was used in the fabrication of the Tank Side Cesium Removal (TSCR) System. The TSCR System is a modular, quickly-deployable, and passively safe system for efficiently removing solids and cesium from alkaline liquid waste raffinate created by spent fuel processing on the Hanford site.
- ✓ Safety Functions:
  - To ensure containment (knock down of process stream supernatant), separation (between the facility workers and the process equipment), and maintain structural integrity.
  - To limit radiation dose rates at the outer surface of the ion exchange (IX) column and maintain confinement of IX media.



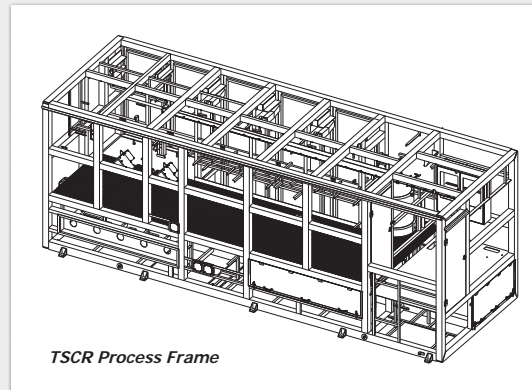
Riverbend Hose Assemblies Attached to TSCR Ion Exchanger

## Critical Characteristics

- ✓ Material Chemistry – stainless steel
- ✓ Material Strength – hardness testing
- ✓ Dimensions – various shapes
- ✓ Out of Range for Instruments
- ✓ Protection from Environment
- ✓ Accuracy for Meters
- ✓ UL Rating – NEMA Enclosure
- ✓ Configuration
- ✓ Shielding – Lead



Rotometer



TSCR Process Frame

## Lessons Learned

- ✓ Graded approach is important
- ✓ Procure complicated items through a supplier's NQA-1 program
- ✓ Verify if Client has components already CGD-approved for cost and schedule savings
- ✓ Work closely and early with Client on development of equipment failure modes
- ✓ Complete verification by a third-party accredited laboratory
- ✓ Limit verification to calibration and documentation of accuracy



TSCR Ion Exchanger