

IER 500: AWE-LLNL Measurement Campaign at DAF

William Zywiec

NCSP Technical Program Review
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AWE-LLNL Measurement Campaign at DAF

- Hosted at DAF from Oct 24 - Nov 4, 2022
 - First week: Pu measurements
 - Second week: HEU measurements
- First time hosting AWE since COVID started

Accomplishments

- We performed multiple measurements over a two-week period
 - 12 unique objects were measured
 - Several neutron and gamma-ray detection systems used
 - All equipment arrived on-time
 - No equipment failures
 - No safety/security issues that affected work
 - LLNL deployed new machine learning software platform that automatically performs diagnostic assessments

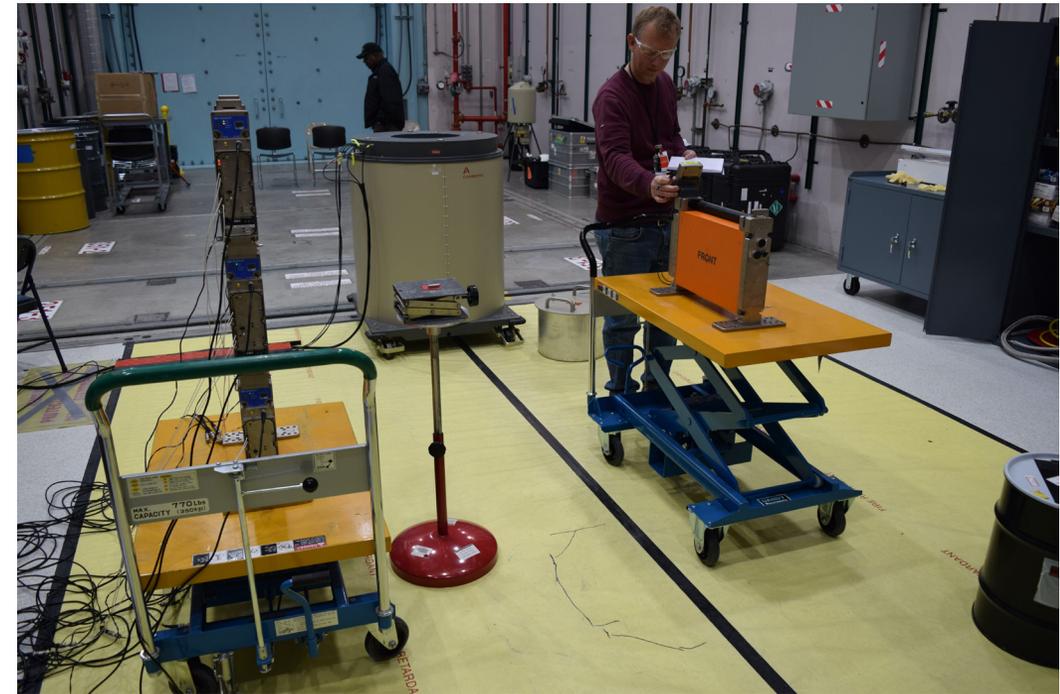
AWE-LLNL Measurement Team

- Jointly led by AWE and LLNL
 - Nigel Kelsall
 - William Zywiec
 - Lawrence Jones
 - Ryan Simpson
 - Paul Yap-Chiongco
 - James Sevier
 - Brian Daniels
 - Daniel Siefman
 - Joseph O'Brien



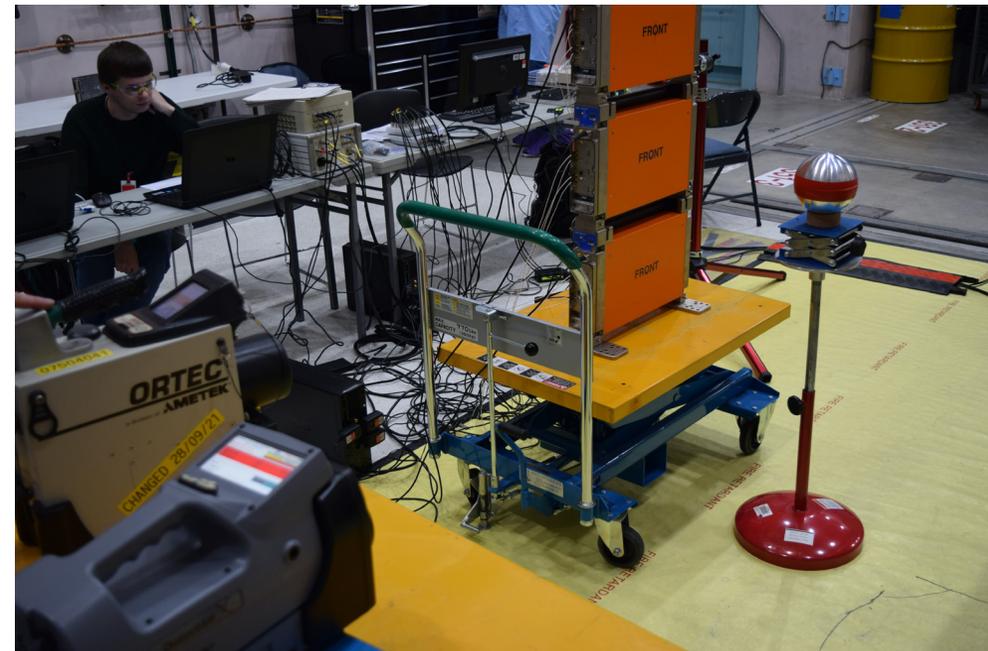
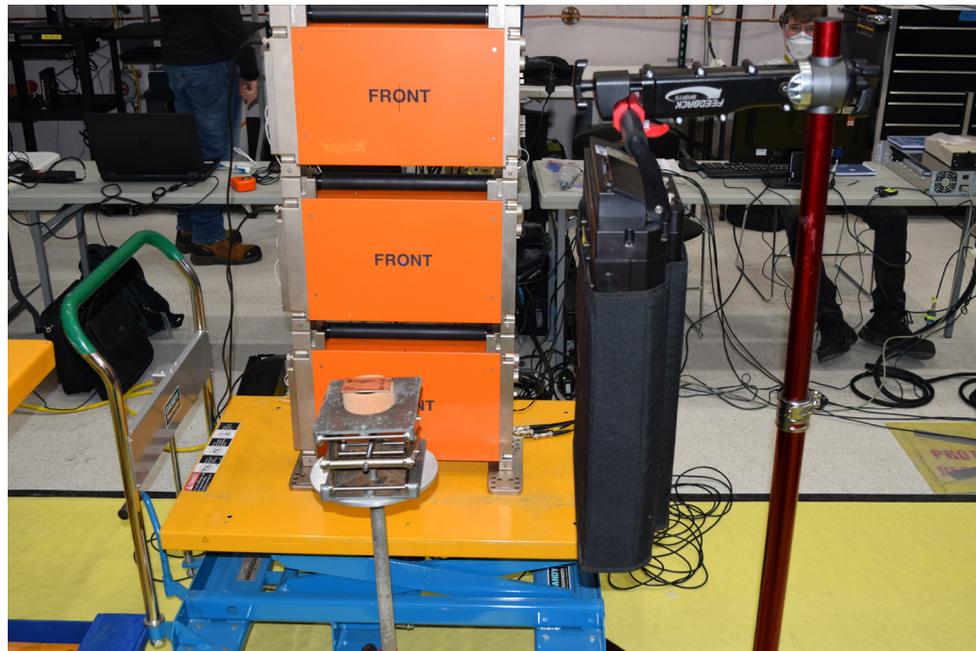
Measurement Planning

- LLNL designed two new reconfigurable radiation test objects (RTOs)
 - 1000+ different configurations
 - Ideal for building large machine learning datasets
- LLNL provided HEU samples to perform small sample measurements at AWE's request
 - Samples were machined and packaged in LLNL gloveboxes



Pu and HEU Measurements

- AWE-LLNL performed measurements with several portable neutron multiplicity counters, gamma-ray detection systems, and the LEMC



Current Status

- LLNL now has a dedicated DAF team
 - 6 FTEs
 - 6-8 measurement campaigns per year
- Putting together a report on AWE-LLNL measurements
- LLNL is designing multiple Global Security benchmark experiments

Future Work

- AWE would like to come out to DAF once a year
 - U-233 ZPPR plate measurements
 - LLNL has already finalized criticality safety analysis for next trip
- LLNL has requested NCSP assets to perform additional measurements in May 2023
- LLNL is procuring and building:
 - Diagnostics equipment (detectors/hardware)
 - Software
 - Moderators and reflectors

Special Thanks

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- Anthony “AJ” Jackson, Executive at Obsidian Solutions Group
- Anthony Nelson, Data Scientist at North Wind Group



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