NCSP – AWE Collaboration

Criticality
Incident
Neutron
Dosimetry

CIDAAS
IS820 &
IS859

Large
Epithermal
Multiplicity
Counter
U.S. Nuclear Criticality Safety Program (NCSP) Technical Program Review (TPR), February 2023

Appendix F International Collaborations

AWE (UK) Collaborations Progress & Look Ahead

Matt Harker  Non-Destructive Assay (NDA)
Radiation Detection Group (RDG)/Physics/Science
Appendix F International Collaborations AWE UK

- Criticality Incident Detection and Alarm System (IE12) Simon Garbett, Graham Auld, Trevor Birkett

- Neutron Time Correlation Measurement and Analysis Bulk Nuclear Material Nigel Kelsall

- Criticality Incident Dosimetry; inter-comparison trials Phil Angus

- Hands-on Criticality Safety Training Chris Hodkinson, Mark Roydhouse
CIDAAS Testing (IE12) –
Criticality Incident Detection System (CIDS) Update

**MENSA Project at AWE**
- One IS820 CIDS Rack – Currently at subsystem level testing. The next stage Factory Acceptance Testing (FAT) due April 2023.
- Three IS821 Detector Head Assemblies (DHA) – Due for FAT in February 2023.

**AWE Project refurbishment project (multiple facilities)**
- An order for a further eight IS820 CIDS Racks (with 140 IS821 DHA’s) currently due for quotation by the manufacturer March 2023.

**IS859 Mini CIDS**
- Currently in the development stage, first prototype due April 2023.
- Intended to support the IS820 CIDS hot spares however, the system has been designed for a viable transition into a future portable CIDS.
CIDAAS Testing (IE12) – Additional News

Supply of IS820 CIDS to external entities
- AWE continue to work with Ploughshare (MOD) to explore licencing.
- For US Govt applications supply under MDA is also being investigated.

White Sands Missile Range Testing
- Survivability testing using multiple IS821 DHA design adaptations to safeguard against component obsolescence.
- Discussions ongoing for testing January 2024 onwards.

GODIVA IV Testing
- Further testing on the IS820 CIDS post event capabilities.
- Discussions with LANL for testing October 2023 onwards.

Criticality Audible Visual and Alarm System (CAVAS)
- A commercially available system providing audible and visual alarms when triggered by the IS820 CIDS.
- Three units have now undergone FAT, a fourth currently being manufactured.

AWE System management
- Project ongoing to develop a site wide monitoring capability for CIDS and other systems to provide system status and access to post incident data for relevant personnel on our corporate IT platform.
International Inter-comparison Exercise for Criticality Accident Dosimetry, August 2022
International Inter-comparison Exercise for Criticality Accident Dosimetry, August 2022

- Aug ‘22 Inter-comparison exercise a great success
- Welcome opportunity to deploy PNS alongside equivalent developments from LLNL and Y-12
- Phil & team pleased with the results
- Progress Li-6 TLD loading

Upcoming,
- Share Li-6 TLD progress
- TRIGA experiment sometime 2023
- Series of presentations between AWE and UKAEA showcasing neutron spectrum unfolding codes to U.S. colleagues
Nuclear Material Control & Nuclear Security

Neutron Time Correlation: Bulk Material

Nov ‘22 DAF Campaign a welcome return to experimental collaboration

• New 36 ZPPR plate holder
  • 36 ZPPR assembly inside smallest TACS shell
• All TACS inside lucite
  • LEMC unexpectedly high count rate
  • Cf252 & Cs137 investigation, outer ring sensitive to Cs137, γ ray breakthrough (?)
• PTR-32 data allows selection inner & middle ring data only
Nuclear Material Control & Nuclear Security

- Cosmic reaction rate experiments, overnight counting, LEMC
  - 10 steel shells
  - 16 x nominal 14kg lead (Pb) bricks

Look ahead,

- Data to benchmark computer models
- Better understand cosmic reaction rates in uranium
- Diagnose LEMC fault and repair
Hands-on Criticality Safety Training

- Four Criticality Safety Group team members immensely enjoyed a week of hands-on training at DAF following a 7-year hiatus.
- The 4 AWE attendees thoroughly enjoyed the hands-on training course describing it as informative, engaging and an invaluable opportunity to undertake hands-on training experiments. The course will support the training and development of each of the AWE attendees and we look forward to sending attendees to future courses.
- Thank you NCSP and DAF 😊😊