

Isotopic Mapping Program at Prairie Island Nuclear Plant



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Background to Isotopic Mapping Program at Prairie Island Nuclear Plant

- Site purchased H3D instrument in 2013 to use to verify the adequacy of the temporary shielding installed during refueling outages
- RP staff soon discovered many of valuable applications of the 3D individual isotopic mapping technology
- Identifying contamination in plant work areas including hot particles and hot spot was a new area of investigation
- Shipments of refueling equipment was also helpful to make sure the shipment box was properly labelled and the radioactive contents properly characterized

RPM Perspective on the New ALARA Tool

- After initial break-in period at Prairie Island, it became clear that Prairie Island personnel could benefit from benchmarking H3D applications and results from other PWR users
- Contacted the North American Technical Center to set up a CZT working group to share experience with the new ALARA tool developed by the University of Michigan

NATC CZT Data Analysis Working Group Established

- In January 2015, after the ISOE ALARA symposium at NATC, a CZT Data Analysis Working Group was established
- Collected charter members by June 30
- Organized monthly conference calls on the 2nd Wednesday
- Discussed each site experience with 3D imaging during the past month
- Lessons learned and good practices were documented on a website maintained by NATC

Prairie Island RP Department CZT Results

- Initially started with verifying the adequacy of temporary shielding
- If streaming was identified in shield overlap area, the problem could be corrected immediately
- Examined refueling equipment shipment
- Monitored areas for hot particles and contamination control

Experience with CZT Imaging at Other Site

- Assigned a dedicated health physicist to manage the CZT measurement program at PI
- Sent individual to a Cook refueling outage to assist in imaging each level of the Aux bldg. and contaminated scaffolding
- Also participated in the Palisades Fall 2015 refueling team of 6 who characterized a US PWR with high contamination levels

Fall 2015 Prairie Island Refueling Outage Plan

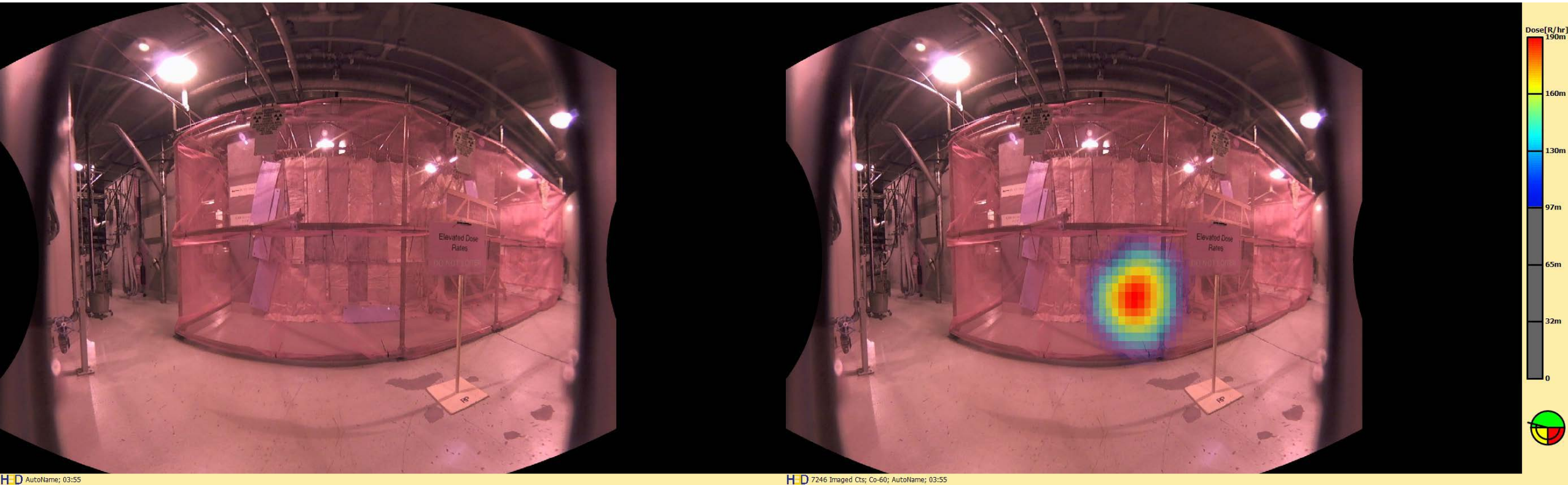
- PI developed a specific CZT imaging plan prior to the refueling outage based on the prior experience at PI and other PWRs
- Focus on looking for spread of contamination
- Surveillance on hot spot identification
- Temporary shielding adequacy
- Radioactive waste shipments

Shipping Container



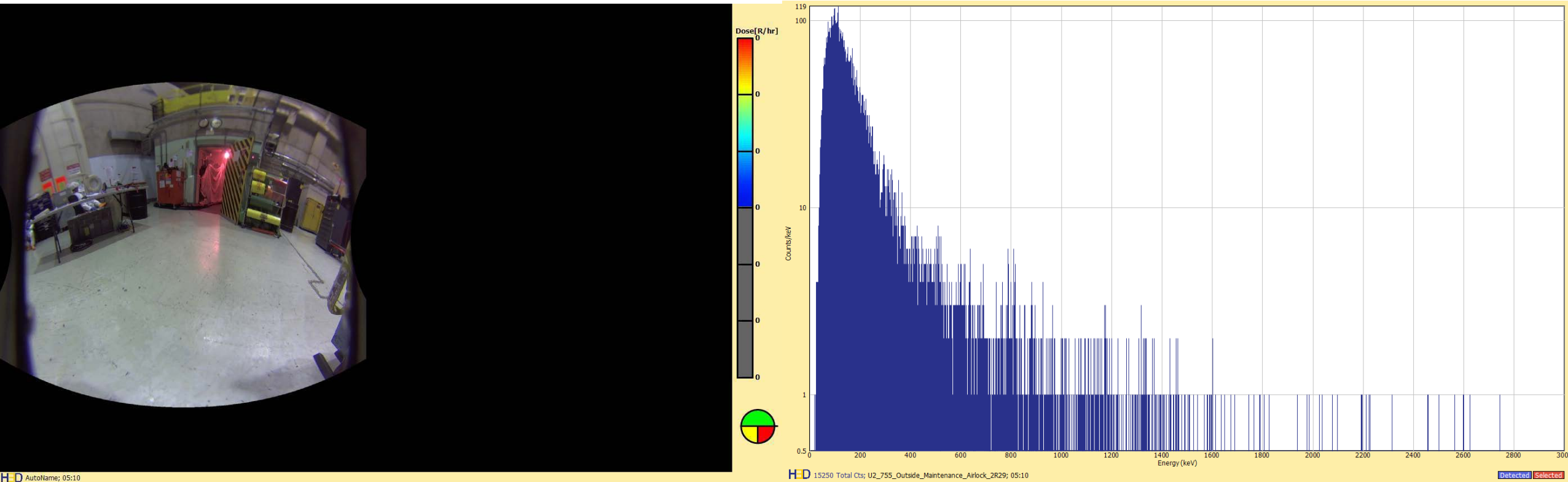
The image on the left shows just the camera image of a RAM shipping container. On the right, the image shows the area with the highest concentrated activity of Co-60.

Shielding Verification



The image on the left shows just the camera image of the Sump C shielding package. On the right, the image shows the area with the highest concentrated activity of Co-60. There is no identified streaming in this image, and additional shielding was placed in the colored area.

Contamination Control



This image is just outside of the Maintenance Airlock during the Unit 2 refueling outage. There was not enough data to create a radiation image, and there was not enough information to identify any nuclides on the spectrum. This shows that no hot particles or contamination was coming out of the Maintenance Airlock.