



Long-length Scintillating Fibers for Nuclear Waste Repository (Poster)

November 2022

Changing the World's Energy Future

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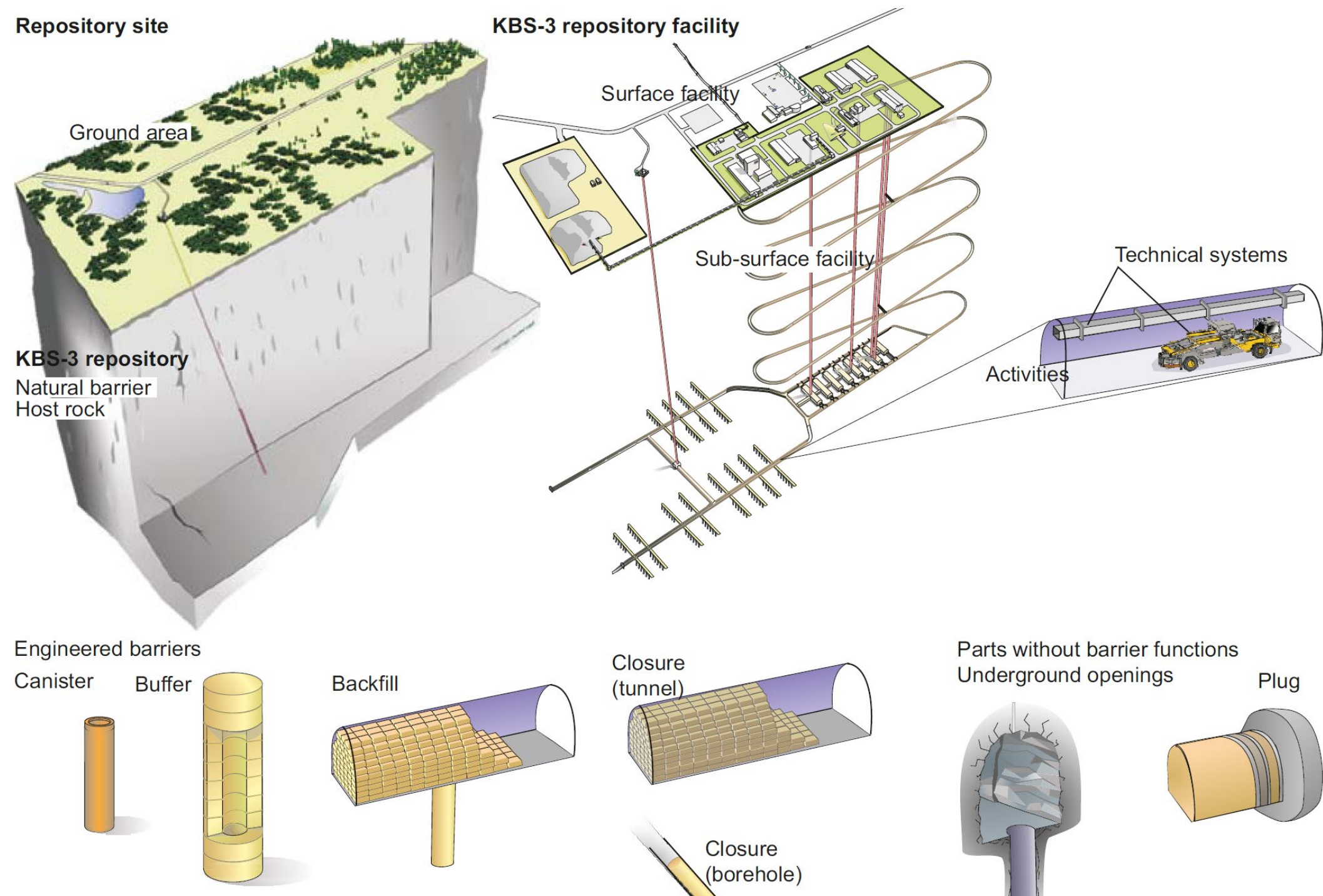
**Prepared for the
U.S. Department of Energy
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14517**

Long-length Scintillating Fibers for Nuclear Waste Repository

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Containment verification in inaccessible radiological & nuclear waste repositories

Proposed Repository Approach & Conceptual Deployment

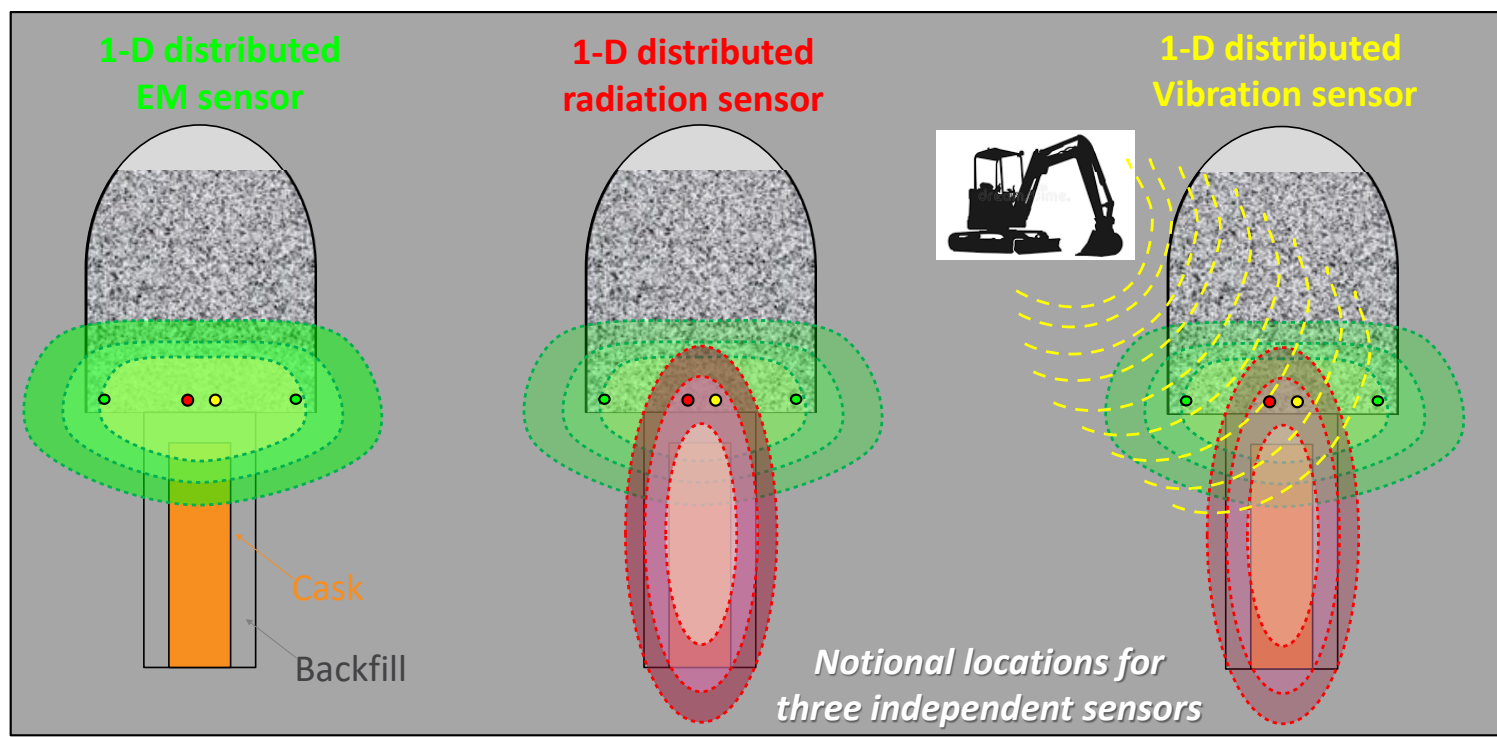


KBS-3 repository by the Swedish Nuclear Fuel and Waste Management Company

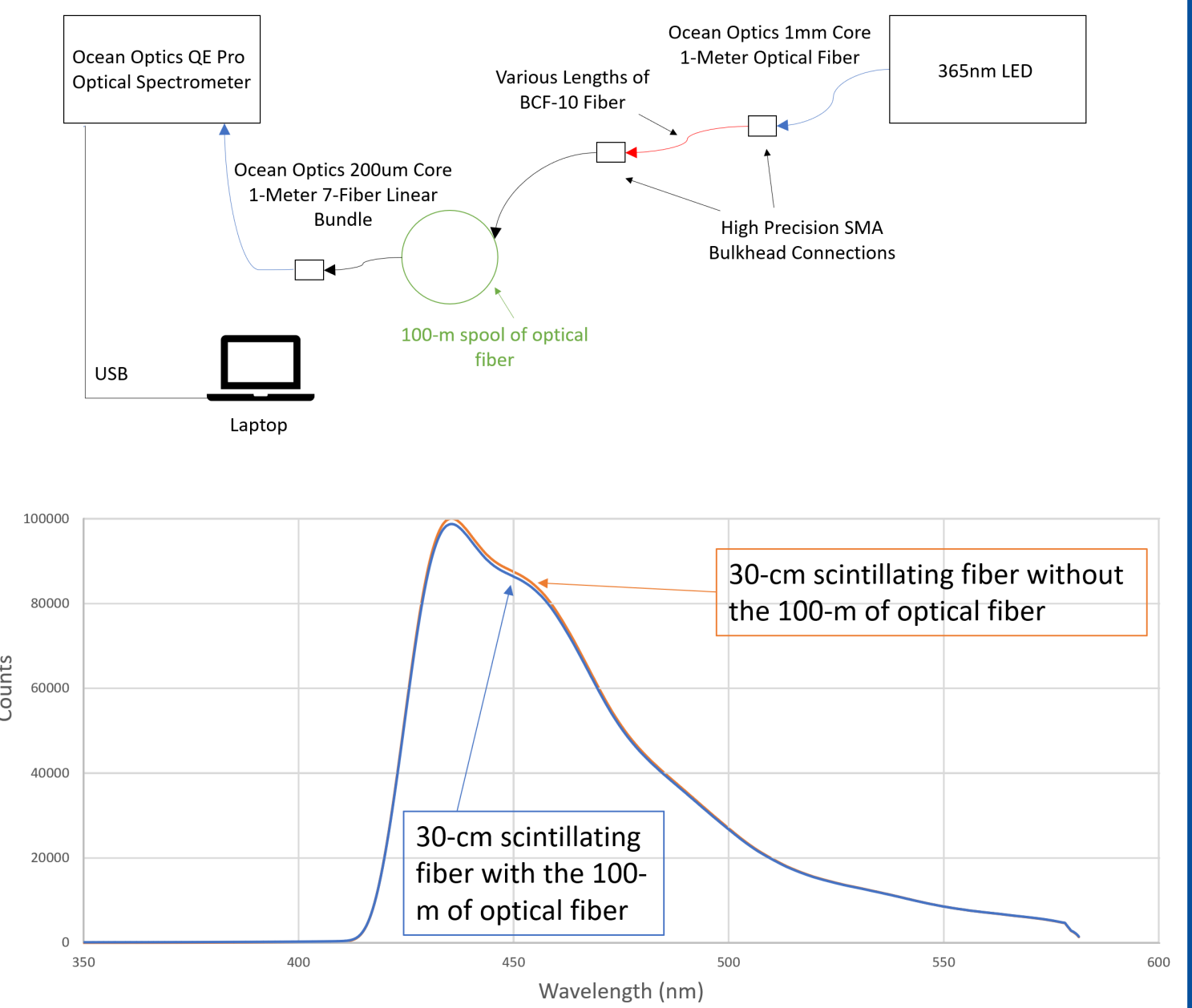
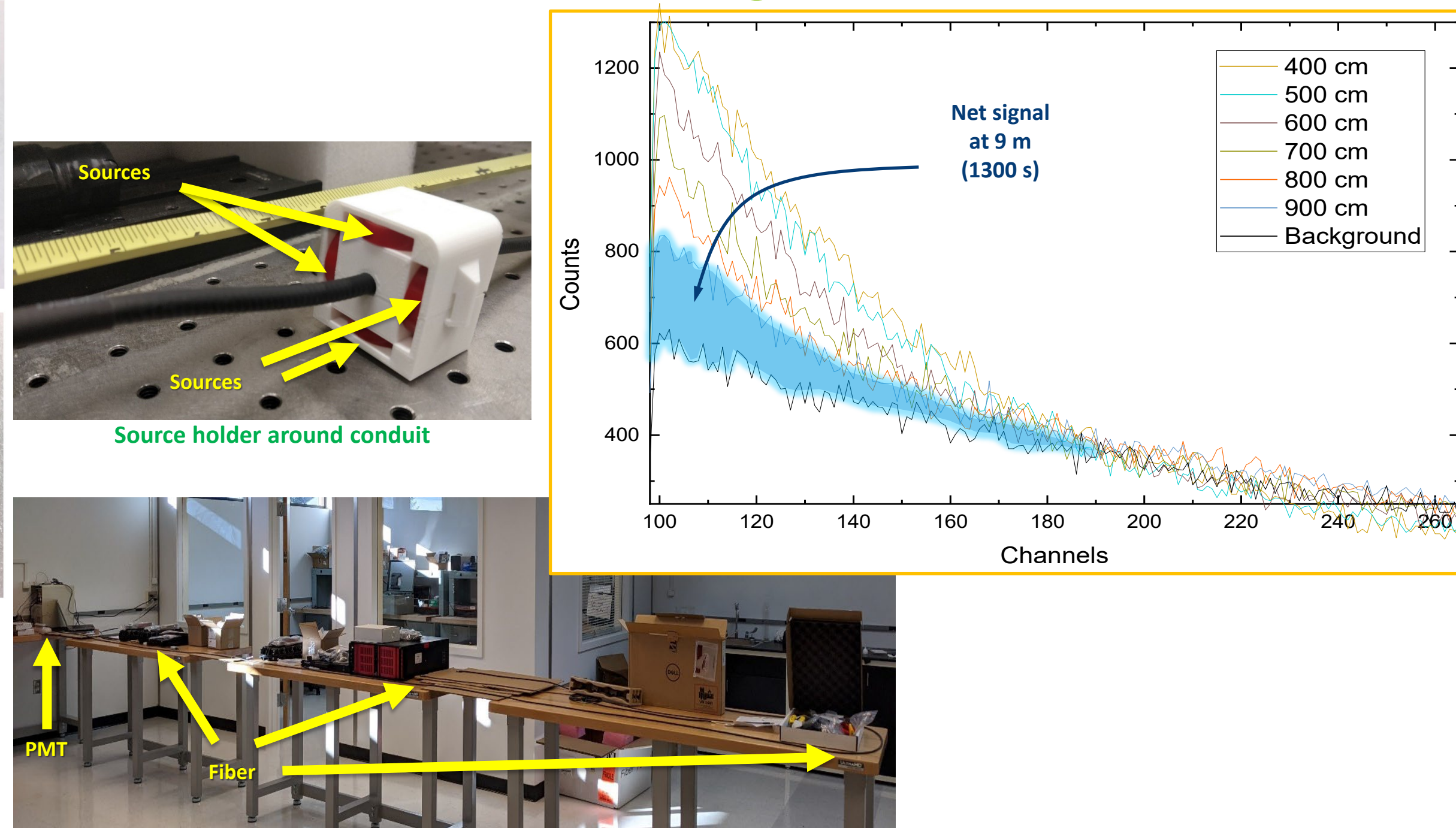
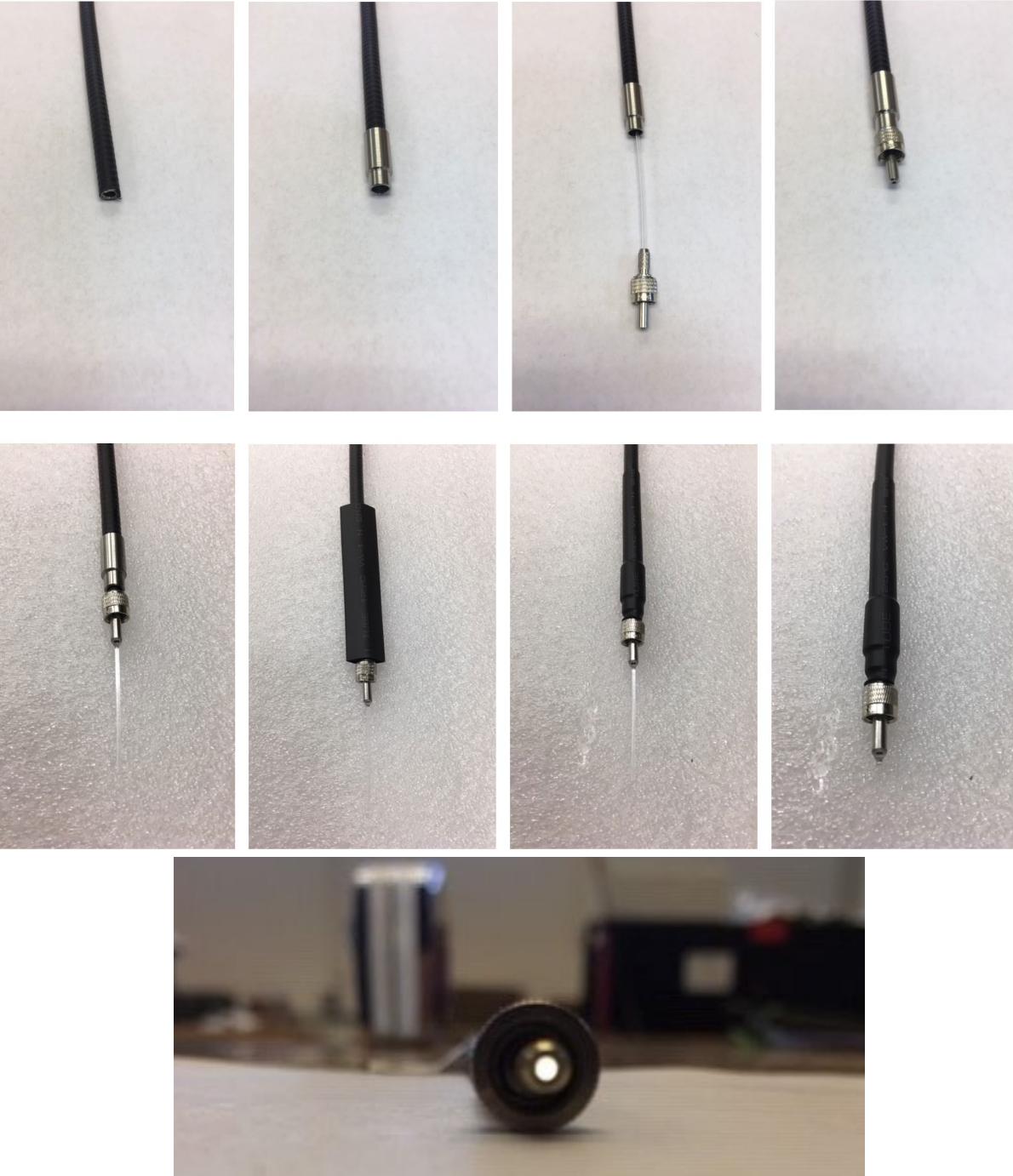
SKB, "Design and production of the KBS-3 repository", SKB Technical Report TR-10-12, Svensk Kärnbränslehantering AB (2010)

Ionizing Radiation Sensing Goals

- Using radiation-sensitive plastic scintillating fibers coupled to long-length standard optical fibers
- Evaluating system stability, temperature sensitivity, and initial sensitivity tests
- Developing a modeling and simulation framework using the Monte Carlo N-Particle Transport code to support benchmark test validation.

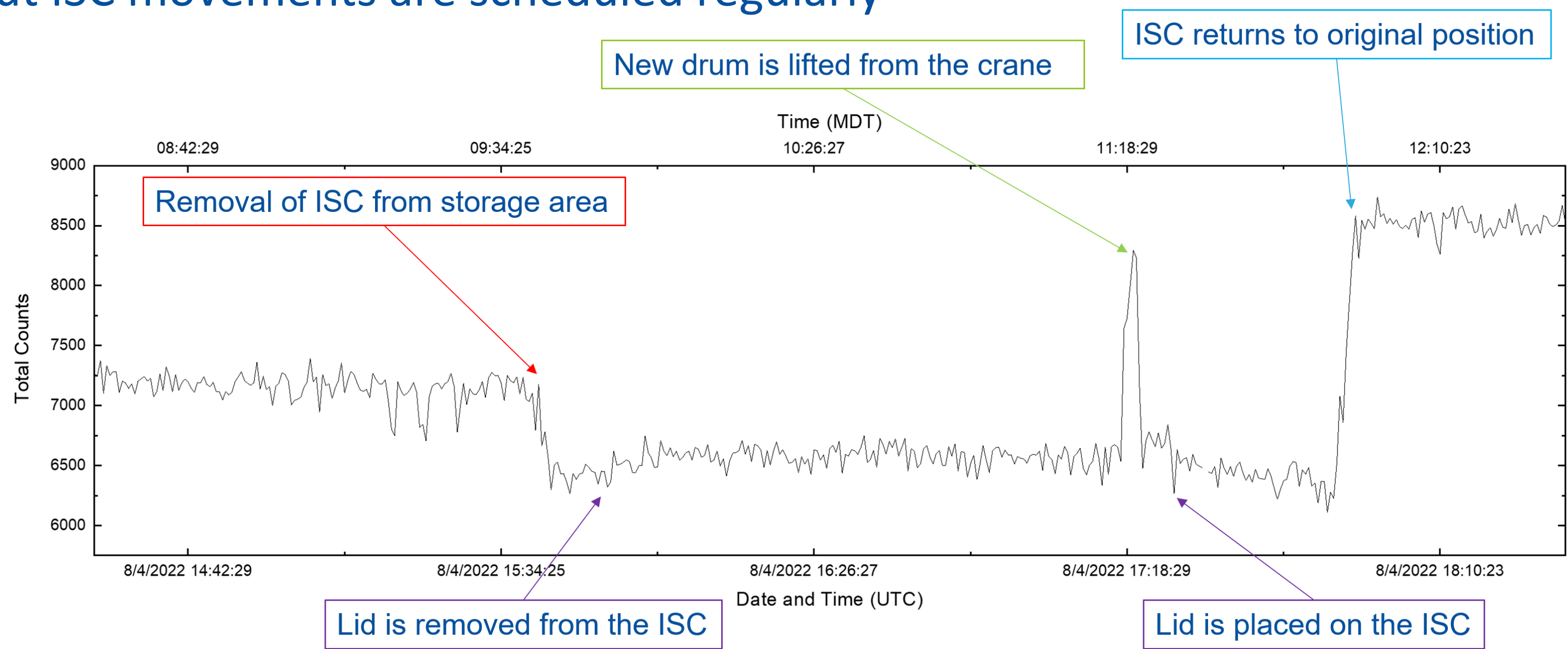
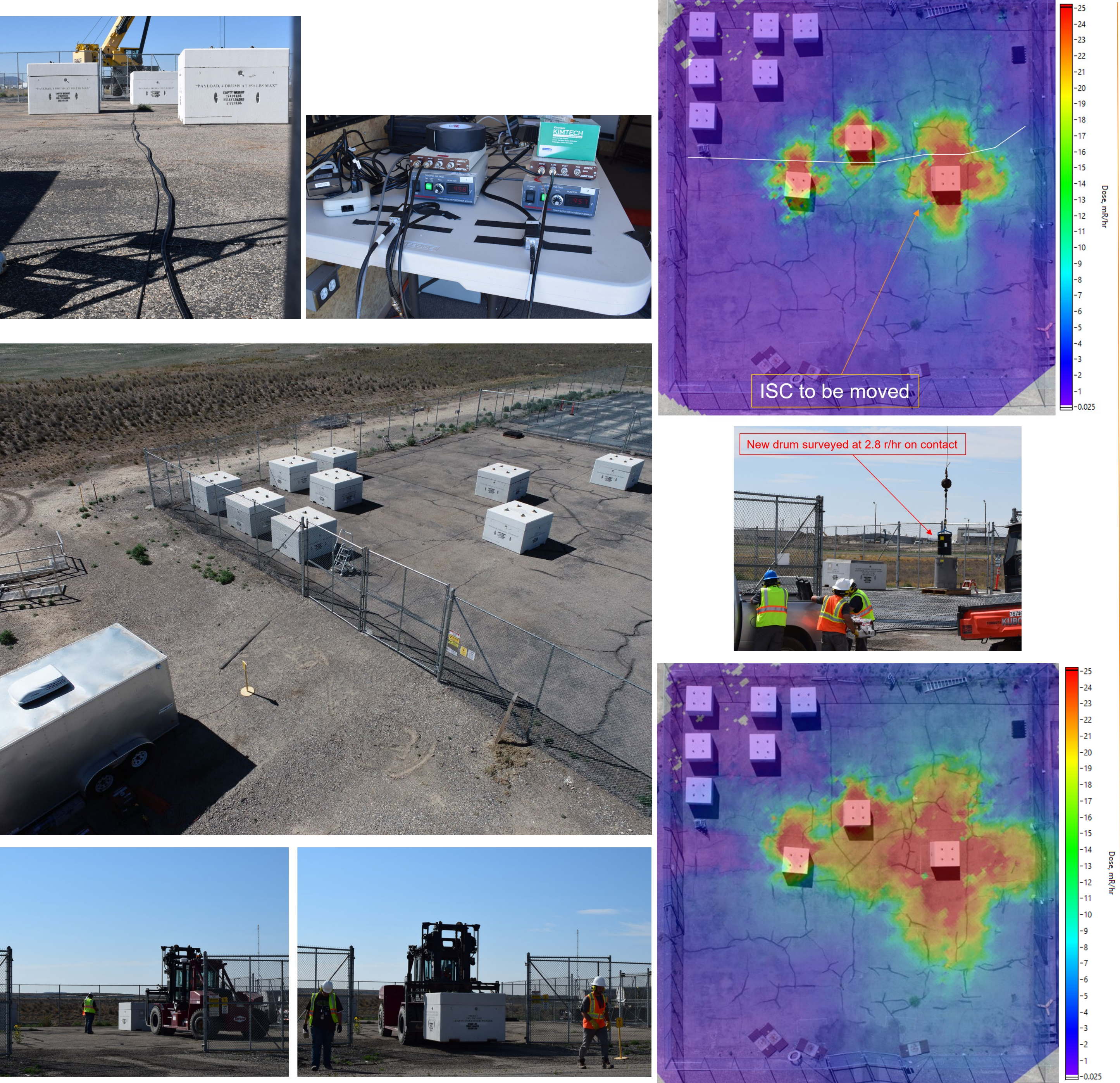


Scintillating Fiber Fabrication and Testing

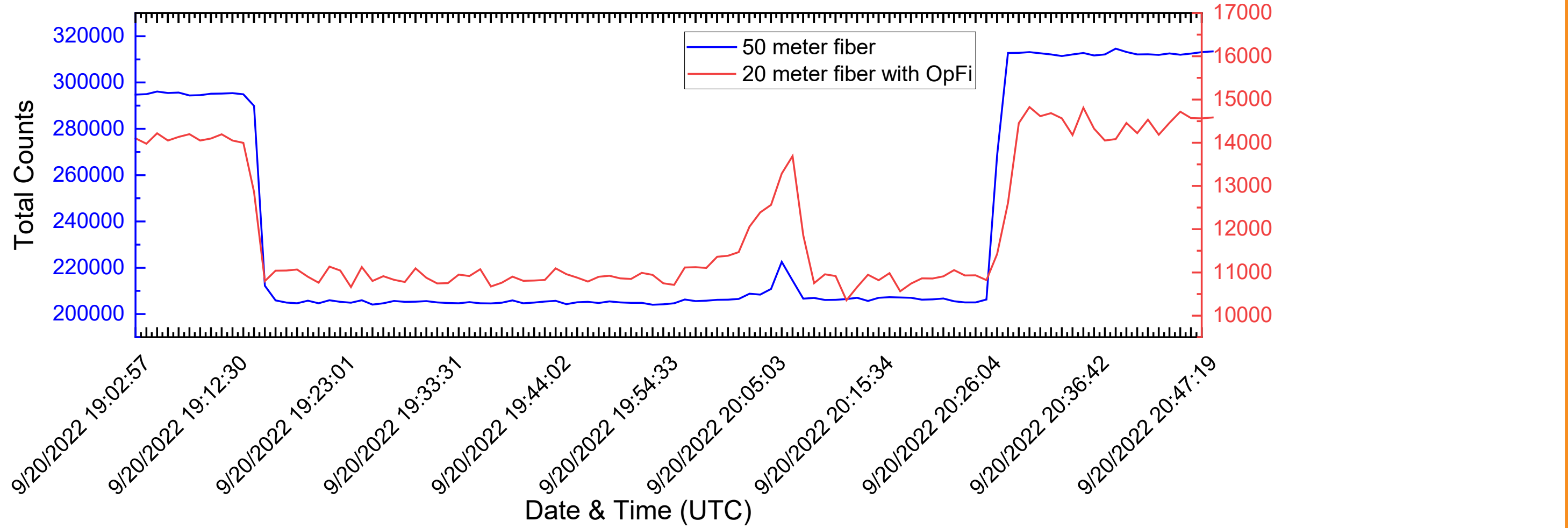


Field Testing at a Static Storage Facility

- The Radioactive Scrap Waste Facility contains several interim storage containers (ISC)
- ISCs measure 2 x 2 x 1.5 meters and have several 50-gallon drums filled with radioactive waste ranging from spent fuel to laboratory waste
- The configuration of the facility remains intact for several weeks, but ISC movements are scheduled regularly



- Long-distance and long-length detector concepts based on the coupling of scintillating fibers to optical fibers were successfully demonstrated
- The deployment, field testing, and results shown demonstrate the capability of the technology for monitoring nuclear waste



Acknowledgements

This research was supported by the Office of Defense Nuclear Nonproliferation Research and Development in the National Nuclear Security Administration, U.S. Department of Energy. INL is operated for the U.S. Department of Energy by Battelle Energy Alliance under DOE contract DE-AC07-05-ID14517.

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