

## Oak Ridge Enhanced Technology & Training Center – the latest in a long line of training successes, Part 2

(As published in The Oak Ridger's Historically Speaking column the week of January 30, 2023)

This is the second and final part of the series on the history of training in Oak Ridge and the most recent enhanced training capability brought by the Y-12 National Security Complex's Oak Ridge Enhanced Technology & Training Center.

At Oak Ridge National Laboratory, training is provided by developers and experts, with courses such as: nuclear criticality safety; light water reactor and advanced reactor modeling; reactor safety analysis; radiation shielding; spent nuclear fuel characterization for transportation/storage package designs, decommissioning and disposition; verification, validation, and uncertainty quantification; nuclear safeguards and security applications; and nuclear data processing and libraries generation.

At Y-12 National Security Complex, specialized training in manufacturing skills, engineering applications in uranium processing, nuclear nonproliferation, and many other generalized skills are routine. Because of unique applications of special nuclear materials at Y-12, the on-site training is highly specialized.

This documentation of a few of the more significant training programs over the years in Oak Ridge does not include the training provided by the University of Tennessee or Roane State Community College, both of which have several highly successful and specialized training programs. Nor does it include the Oak Ridge Schools where much basic education is provided.

Throughout Y-12's history, the complex manufacturing mission required a large skilled workforce that could keep pace with technological advances on the manufacturing floor. Y12's apprentice programs have evolved with technologies over the centuries. They taught maintenance crafts to fix uniquely designed pumps, tools, switchgears, and motors. The introduction of computers required training on increasingly more complex digital machines without reduction in quality. In recent years, the focus has been on training the next generation of workforce as many of the cold war era workforce began to retire.

As threats across the world change, Y-12 is there to train those expected to respond. Advanced in nuclear medicine and radiation therapy saves lives, but also places such materials in "open environments" such as universities and hospitals. In 2007, the *Alarm Response Training Academy*, the precursor to ORETTTC, opened at Y-12 to train safety and security professionals, and law-enforcement officers to respond well in emergency scenarios to protect and secure the material. Since opening, over 6,000 professionals have been trained from every state in the Union as well as participants from more than 20 countries.

With this background of some of the history of training programs in Oak Ridge, it is surely obvious that excellence in training programs is a valued Oak Ridge tradition. The Oak Ridge Enhanced Technology & Training Center is one in a long list of effective training programs in Oak Ridge, TN!

Now for the most recent example of the continuing exceptional Oak Ridge training tradition.

The COVID pandemic forced many to adapt to a new way of work and training at Y-12 was no exception. Safety and security professionals could no longer travel to Y-12 for Alarm Response Training, so Y-12 developed distance learning platforms to continue this vital mission. A green screen production studio allowed Y-12 instructors to recreate radiological source theft scenarios as short video clips to help participants visualize their response strategy at a distance. This technology was just the beginning. Tabletop exercises are a vital part of challenging the fundamentals being taught in training classes.

The Y-12 team developed an augmented reality tool using the latest game design engines allowing instructors and trainees to interact in the same scenarios despite great distances between them. Augmented reality headsets are sent to a university or hospital where participants join the scenario to find Y-12 instructors waiting for them online. In this live training, each participant role—radiological security officer, law-enforcement, site security—plays their part as the instructor steps through the simulation.

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Participants get to see how well their tactics work as the simulation proceeds. Beyond the advantage of bringing training participants together at a distance, they can see in real time how well their decisions and actions worked in the scenario and then it can be reset to practice again.

ORETTC continues to develop and deploy training technologies to provide the most effective, immersive training into the future. The new facility includes advanced video production tools including an LED wall more likely to be found on a Hollywood movie set.

"The LED wall allows us to extend the simulated environment much further so that the participant is fully immersed into the scenario. This makes a high consequence emergency training scenario feel real without exposing the trainee to hazardous situations," described Director Stowe. The center will soon combine these technologies to create a mixed reality training experience where trainees can reach out and touch virtual objects, communicate with other trainees and with digital game characters.

The campus will also bring trainees back to real life with emergency response drills utilizing the campus itself. Each of the buildings and structures on campus can be adapted such that trainees must defend, protect, or respond to a variety of emergency response situations.

The grand opening of ORETTC well-positions Oak Ridge to build upon its tradition of providing the United States and her allies with best-in-class training, leveraging its unique expertise born through the Manhattan Project and continuing through enduring missions at the Y-12 National Security Complex.

The history of excellent training provided by the various Oak Ridge facilities is a demonstration of the dedicated professionals who have over the years risen to the occasion of the nation's needs for skills development and enhanced experiential learning. As one of the leading scientific and engineering centers in the nation, and the world, Oak Ridge continues to be among the very best in advanced technological training and development.

From its origin in the Manhattan Project where first of a kind technology was used to help end World War II to more than 80 years of helping deter global conflict and protect our nation's freedom to the future being pursued through introducing advanced nuclear reactors, continued scientific discoveries, and enhanced training, Oak Ridge proudly serves our nation and the world. Undoubtedly the future will see even more such efforts coming out of Oak Ridge, TN.

Thanks to the Y-12 National Security Complex staff for assistance with this series.

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The online training concept was created to support the needed training during the COVID pandemic and is continuing to be provided to assist those who may need refresher training or cannot travel to Oak Ridge



The LED wall can be reconfigured quickly to simulate various facility conditions enabling more realistic training experiences