

Partnering brings the Pit Viper to life at Hanford

Karin Nickola, FH

When the Pit Viper finally makes its debut at Tank Farms later this year, it will be thanks to the partnering efforts of Pacific Northwest National Laboratory, CH2M HILL Hanford Group, Numatec Hanford Corporation, the Tanks Focus Area, the Robotics Crosscut Program and the Volpentest HAMMER Training and Education Center.

PNNL and CHG developed the Pit Viper system, which consists of a robotic arm mounted on the end of a backhoe. The arm was manufactured in France by Cybernetix and shipped to the United States where testing and training could be performed at HAMMER. The backhoe was purchased from FERMEC of Spokane. CHG will train workers to use the new technology.

Controlled remotely by workers safe within the confines of a nearby control trailer, Pit Viper end effectors will perform work in valve pits where, previously, radiation exposure levels only allowed workers to perform tasks for short periods of time. This remoteness will reduce worker risk. The Pit Viper will also allow CHG employees to work remotely in pits where high levels of radiation make it impossible for people to enter. Among other things, Pit Viper end effectors can cut, grab, scrape, grind, lift and spray.



The Pit Viper is put through its paces at HAMMER's modified waste tank prop.

A pleasant discovery

Originally, the Pit Viper team planned to build a cold test facility; but when PNNL senior development engineer Carl Baker toured HAMMER with product line manager Det Wegener, Baker realized HAMMER's existing Waste Tank prop could be modified to precisely meet project requirements.

"Back in 1996, we designed our waste tank prop using 'as-built' drawings from the AW Tank Farm," said Wegener. "The more Carl and I examined the prop, the more we realized it could very easily be mocked-up for PNNL and CHG testing and training needs. HAMMER offered a clean site with support staff and services, and there was real potential for significant time and cost savings. So a memorandum of understanding was drawn up between the Pit Viper deployment team and HAMMER, and the project got under way."

Mock-up and simulation

To date, the Pit Viper project has made real progress. In January and February, concrete slabs were installed in the pit of the HAMMER waste tank prop; then plywood sheets with simulated valves were added. Later, a wooden model of the robotic arm was constructed and mounted on the end of a backhoe to gain a better understanding of the interaction of the backhoe and arm with the containment tent.

In March, the Pit Viper team moved its modified control trailer to HAMMER; and CHG Tank Farm workers erected a containment tent. In April, the robotic arm arrived from France, was unpacked and was mounted on the end of the backhoe. Next, the hydraulic power unit was filled with fluid and testing began of e-stops, arm operations, rotary joint operations and other functions. No problems were detected when testing the Pit Viper's manipulator.

Continued on page 11.

Partnering brings the Pit Viper to life at Hanford, cont.

Official cold testing of the Pit Viper system was successfully completed Friday, May 24, ahead of schedule. If all continues to go well, the Pit Viper system will soon be removing debris from a Tank Farms valve pit — a very important step in the pre-vitrification process.

Saving time, cost

Use of HAMMER has meant savings in cost and time, with the potential for more of the same when CHG takes over the training portion of the program this summer.

“We estimate use of HAMMER to have already saved the project from \$200,000 to \$250,000 and six months time,” said Sharon Bailey, PNNL Pit Viper Project manager. “Quite simply, this was accomplished by avoiding construction of a cold test facility elsewhere. And working at HAMMER has been a good experience. The staff is attentive and capable.”

Dale Allen, CHG senior vice president of Operations, said the Pit Viper is a reality because operating people in the Tank Farms recognized the need for it and encouraged its development. “That is the very essence of new technology success,” Allen said. “Someone wants it.”

CHG and its customer, the Department of Energy Office of River Protection, provided a trailer, a containment tent, and tooling to aid in the development and testing of the Pit Viper system.

PNNL and Fluor sign MOU

On a related note, Tuesday, June 5, during a demonstration of the Pit Viper system for local media, DOE Richland Operations Office Associate Manager of Science and Technology Paul Kruger extolled the virtues of the project and announced the signing of a new memorandum of understanding by PNNL and Fluor Hanford. The cooperative initiative was undertaken as a means to apply the skills and capabilities of both HAMMER and PNNL to better serve the DOE client base.

Both HAMMER and PNNL have a common interest in meeting national needs through service to DOE and other government clients. Both parties have strategic business interests that, while separate and distinct, can be served by cooperation and joint pursuit of some of those interests.

HAMMER and PNNL already engage in joint activities and continue to jointly serve some clients. Foreign border officials in PNNL’s Interdict/Radacad program train at HAMMER. HAMMER and PNNL work together to present Archaeological Resources Protection Act courses for law enforcement officers and cultural resources professionals at HAMMER’s Cultural Test Bed.

Among other things, increased partnering will avoid duplication of new facilities, increase use of existing facilities for training, and support testing and evaluation of developing technologies. ♦



PNNL senior development engineer Michael Catalan shows how workers can remotely control the Pit Viper end effectors to perform work in equipment pits where, previously, radiation levels limited the time they could be in the pits or prohibited entry altogether.