Pit Viper Project
Tanks Focus Area
Robotics Crosscut Program
Pacific Northwest National Laboratory

PNNL-SA-34860

Problem

- Pit refurbishment is the most dose-intensive work under Hanford's River Protection Program (RPP). There are over 600 pits at Hanford. Pits must be cleaned for regulatory compliance, and prior to any waste transfer to the immobilization contractor.
- Hanford STCG Need RL-WT021: "Cleaning, Decontaminating, and Upgrading Hanford Pits"

Baseline Approach

- Baseline activities include the following:
  - remote viewing by mirrors,
  - hand signals and radios;
  - use of ropes and poles to guide tools being deployed by the crane; and
  - personnel work behind shield blankets.
- Real example: the dose in the 241-C-106 pits was 40 R/hr. After investing $2M and 5 months, the dose had been reduced to only 20 R/hr. During the pit operations, 25 person-rems were accumulated.

Current Baseline Methods with Poles, Mirrors, and Shielding

Actual Hanford Pit Requiring Refurbishment

Pit Viper Program Strategy

- Develop a remotely operated system to enhance Hanford Tank Farm pit operations.
  - System is to improve safety, and reduce cost and schedule.
- Provide a simple, turn-key system based on commercially available components that is able to perform multiple functions.

Proposed Solution

Pit Viper System Components:

- FERMEC 860SB backhoe
- Cybernetix SAMM hydraulic manipulator
- Cameras and viewing equipment
- Operator console

Pit Viper System Functions:

- In-pit size reduction
- Debris removal
- Decontamination/fixative application
- Paint preparation and painting
- Concrete repair (cracks)
- Pit riser plug/drain plug removal
- Radiation mapping and characterization

Pit Viper System at HAMMER Test Facility

User Requirements

User Requirements are Documented in Three Publications:

- Remote Pit Operation Enhancement System: Concept Selection Method and Evaluation Criteria (PNNL-130406)
- Technical Specification, Manipulator And Gripper For Pit RAM System (RPP-6439)
- Technical Specification, Backhoe For Pit RAM System

Each document prepared for, and reviewed by the users (Project W-314 and Tank Farm operations)

Points of Contact

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