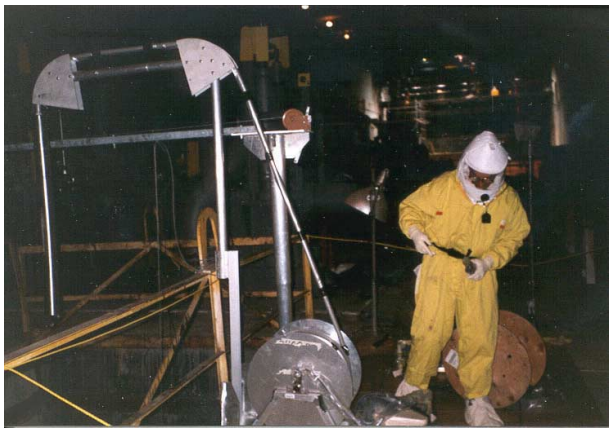
Technology Deployment Fact Sheet
Overview Video System (OVS)



SUMMARY

Surplus video inspection systems and equipment were identified for use and were successfully deployed in support of the Canyon Disposition Initiative (CDI), resulting in significant cost and schedule savings.

The *Sampling and Analysis Plan for 221-U Facility* (DOE/RL-97-68) (SAP) defines the objectives for examination of the 221-U Facility drain line. Characterization data to be collected include: a visual record for assessment of the structural integrity of the pipe and where liquid may be draining from; a scale or sludge sample to obtain the isotopic distribution of radiological contaminants of potential concern (COPCs) and the inventory of nonradiological COPCs; and a radiological survey of the pipe using gamma energy analysis to correlate with the isotopic distribution obtained from the scale/sludge sample.

An initial visual examination and evaluation (Phase I) was needed in order to asses the present configuration of the drain line outfall into cell #10. This information will support the design and development of suitable methods for satisfaction of the SAP requirements.

An existing technology, the Overview Video System (OVS), was selected to collect Phase I characterization data. The OVS was slightly modified for use in the 221-U Facility.

INNOVATIVE TECHNOLOGY DESCRIPTION

The OVS is a completely enclosed, remote, color camera system that was originally designed for and deployed in underground waste storage tanks at the Hanford Site. It was built under the EM-50 Light Duty Utility Arm Program. Its primary function was to provide a second, independent view of in-tank operations being completed by other pieces of equipment.

The OVS is mounted on a hand-truck and is man-portable. A cable reel mounted to the hand-truck holds roughly 50 ft of umbilical cord, allowing the camera head to be deployed nearly 50 ft below the level at which the hand-truck is parked. The OVS is powered by 110 VAC. The video head, which descends via the umbilical cord, is about 3.9 in. in diameter and 48 in. long. The camera points straight down from the bottom of the unit, and a first-surface polished aluminum mirror below the camera is used to aim the camera view sideways. A motor in the head provides a panning degree of freedom, and lights in the side of the video head provide off-axis lighting.

The OVS includes the camera and lights, deployment mechanism, and control electronics in two control consoles.

Modifications to the system that were completed for use at the 221-U Facility include:

- Changed the mounting of the wheels on the hand-truck to use locking pins. This was done to allow removal of the wheels so the hand-truck would fit through the 20.5-in. doorway entrance to the canyon deck. The wheels were then mounted on the hand-truck on the canyon deck.
- Used a powered air-purifying respirator hood connected to the containment bag around the hand-truck control hardware to allow continued use of the air purge system.
- Covered the umbilical cord in plastic to prevent contamination.
- Cut the deployment platform boom and extended it 40 in. so the camera could

swing over the guardrail.

- Added counterweight to hand-truck to account for the additional weight of the boom extension.

BASELINE DESCRIPTION

The traditional baseline methods for obtaining visual data equivalent to that obtained by the OVS would include physical entry into the cell and/or deployment of remote-viewing equipment. Physical entry into cell #10 was not practical due to the unknown nature of the cell's contents. Such an entry would require extraordinary efforts to ensure acceptable personnel safety and would include the development of detailed special-purpose work procedures, the erection of scaffolding and fall protection, rigorous characterization, and possible removal of cell #10 contents.

Remote viewing equipment available in the 221-U Facility canyon is limited to optical and video equipment installed on the overhead bridge crane. The existing remote-viewing equipment does not provide acceptable fields of view and/or resolution necessary for evaluation of the mechanical arrangement of equipment and components in the vicinity of the drain line outfalls.

DEPLOYMENT DESCRIPTION

The OVS was deployed from the canyon deck to obtain a video record of the drain line outfalls into the canyon sump.

Entry into the canyon deck and operating gallery areas was accomplished in a routine manner and within normal radiological monitoring and survey requirements. Deployment of the OVS was preceded by radiological survey and smear collection by normally assigned radiological control technicians, which is within the normal entry and generic work requirement parameters.

Deployment of the OVS was accomplished through the support of the Deactivation and Decommissioning Focus Area, which is managed by the National Energy Technology Laboratory. This work was conducted as part of the 221-U Facility characterization in support of the CDI Project. Characterization information is being obtained to support a Record of Decision for the 221-U Facility. The Record of Decision will establish regulatory and technical precedence for future disposition of the other chemical processing facilities (i.e., canyons).

DETAILS OF BENEFITS

Capital costs for deployment of the OVS were minimal because the OVS was an existing system originally designed for alternate uses. Use of the OVS also requires significantly less design and planning compared to alternative methods, and may typically be accomplished using routine work procedures

The use of the OVS for initial examination of the drain line outfalls eliminated the need for personnel entry into cell #10. Risks to workers performing remote below-deck examinations are also reduced when using the OVS. Potential risks include the following:

- Exposure to unknown or unsafe air space in the equipment under examination
- Contact with unknown materials (contents)
- Exposure to potentially pressurized piping or equipment
- Fall hazards associated with working from scaffolding
- Heat stress concerns from much greater physical exertion
- Radiological exposure dose to personnel due to closer proximity and extended contact with the equipment subject to examination.

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