

# TECHNOLOGY @ ROCKY FLATS

## Demonstration & Deployment Summary

### *New pumping and centrifuge systems successfully remove tank sludge*

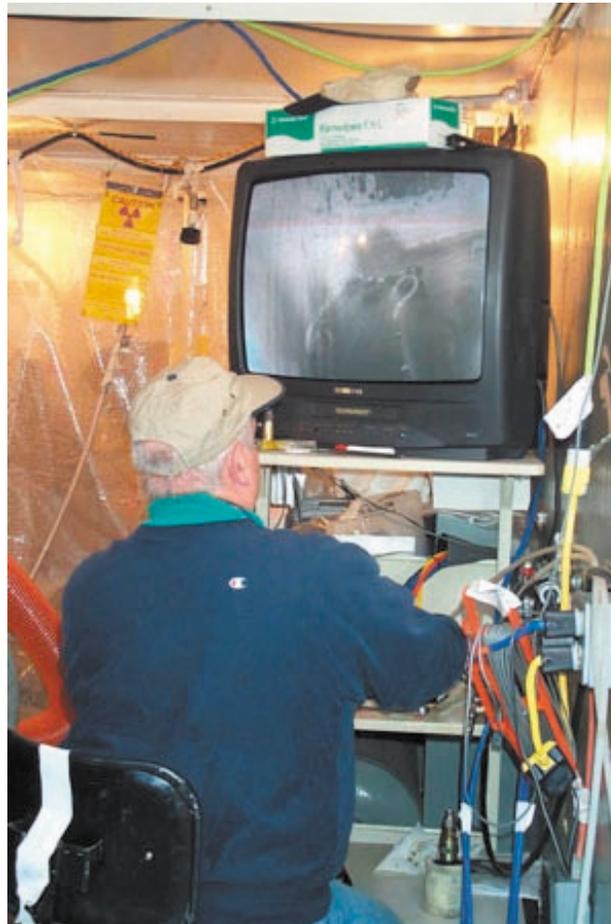
#### Summary

DOE's Office of Science and Technology provided assistance in the development of two technologies that were used to empty two huge waste tanks at Rocky Flats. Tanks 231A and 231B, located outside of Building 374, contained more than one million gallons of low-level mixed waste containing large quantities of sludge. To empty these tanks safely and efficiently, a specialized, remote-controlled pumping system was developed. To reduce volume, a centrifuge system was developed for separating solids from liquids.

#### The Need

For years, the 231A and 231B tanks served as collection points for site waste water awaiting treatment in B374. Over a 20-year period, a large quantity of sludge and water slurry developed in the bottom of the tanks. Removing the slurry posed tremendous challenges. "It was like trying to suck a Slurpee® through a straw," said one engineer. "You constantly have to move the straw."

In addition, a method was sought to attempt to significantly reduce waste volumes by separating solids from liquids in the tank waste.



A worker watches a monitor while remotely maneuvering a track vehicle as it sucks sludge from the inside of tank 231B at Rocky Flats. The system significantly reduces radiation exposure to workers.

#### The Technology

When it was ultimately determined that conventional pumping methods would be ineffective to remove the tank sludge-water slurry, Kaiser-Hill, working with D3 Technical Services, employed the services of TMR to develop and build the proposed pumping system that would both pump the slurry and use centrifugal force to separate solids from liquids for disposal.

TMR designed and built a unique, remote-controlled track vehicle attached to a vacuum hose. The hose sucked sludge as the vehicle was remotely maneuvered inside the tank. Removing the sludge using the vehicle greatly reduced worker radiation exposure.

When the system was used to empty the first tank, 231B, a problem developed. A bloom of algae turned the slurry into an inseparable mass, severely complicating removal efforts. TMR quickly solved the problem by designing an auger into the front of the vehicle to break up the sludge and provide a steady feed. Instead of packaging an estimated 200 55-gallon drums of sludge, the team had to package more than 800 drums.

With tank 231A, the second tank to be emptied, algae was not a problem. Of the 17,000 gallons of sludge in the tank, 39 standard waste boxes of sludge were produced and sent to a low-level mixed waste receiving site for disposal. The remaining 8,000 gallons of liquids were dispositioned through the Site's aqueous waste treatment system project set up to collect wastewater on site that contains RCRA constituents and or Plutonium. The water is collected in the T231B tank and then shipped to an offsite facility for treatment.

### Benefits

The cost benefits of the two technologies used to empty the 231A and 231B tanks at Rocky Flats were negligible. This is because of the surprise appearance of an algae bloom while processing waste from the first tank and less solids produced than anticipated from the second tank. However, the two technologies were proven successful and could have a significant positive cost impact if used on larger jobs that may exist at other DOE sites. For Rocky Flats, the most significant benefit was worker safety. In addition, the system allowed workers to meet a State of Colorado milestone for radioactive waste treatment.

(Photo, above, right), workers introduce the remote-controlled track vehicle that will suck sludge from a waste tank at Rocky Flats. The sludge removal operation was conducted using a trailer co-located to the tank (photo right).



## Technology Supporting the Path to Closure

For more information about Technology at Rocky Flats, contact David Maloney, Kaiser-Hill Company, (303) 966-7566, or Gary Huffman, DOE, Rocky Flats Field Office, (303) 966-7490

