Fluor Your Information

In This Issue

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Decommissioning old wells is an important job at Hanford

The Site's Groundwater Remediation Project (GRP), managed by Fluor Hanford, is making good progress in identifying and decommissioning old wells that were drilled at Hanford over the years to monitor water levels or groundwater contamination, or to inject liquid waste. The work is important because many of the old wells can be pathways that allow contamination to reach groundwater.

Decommissioning a well essentially means sealing it, usually with special cement called grout, so it can no longer act as a conduit for contaminants. Where possible, the well casings are filled with cement grout as they are withdrawn from the ground. If the casings cannot be withdrawn, they must be perforated so that grout can be injected under pressure through the perforations (holes) and fill void spaces in the soil that have developed along the outside of the casings.

Sorting and identifying Hanford wells

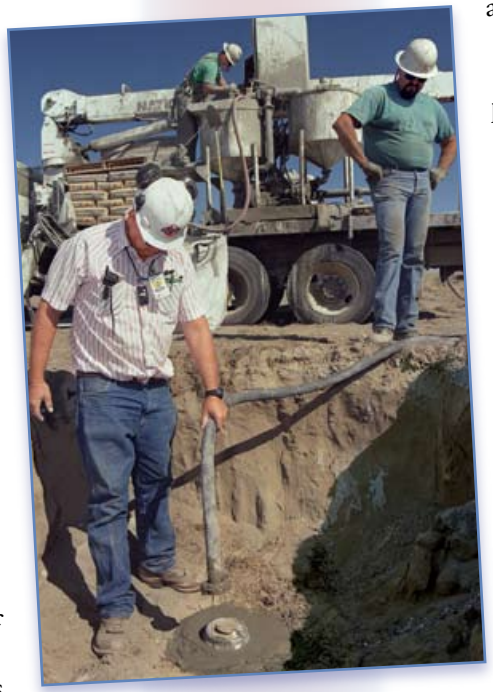
"The first task," explained GRP Well-Decommissioning Task Lead Jerry Davis, "has been to sort through various databases and identify which wells actually exist and are doing real damage, so that we can decommission them." Over decades, slightly more than 7,000 wells were drilled on the Hanford Site, most of them to monitor groundwater contaminants. However, they were catalogued in at least seven different databases, lending confusion to today's effort.

Beginning in 2003 when Fluor Hanford inherited the information, it led an effort to assess the current database for information needed for well decommissioning, and then initiated field inspections as needed. Fluor teams found many wells that already had been decommissioned, but for which the required decommissioning paperwork had not been filed. In addition, they determined which entries were for sample-tracking purposes, not related to conventionally drilled wells.

Once they winnowed down the number of actual Site wells (an ongoing process), the GRP teams sought out well "owners." Some wells were clearly in use, some were dormant but were owned by projects still planning to use them, and some were not candidates for the Site decommissioning program because they are located on Hanford land leased by Energy Northwest, U.S. Ecology, or Areva.

GRP

A well decommissioning crew and rig are set up in central Hanford.



A brass survey marker is placed at the top of each decommissioned well. The offical markers label the well's identification, position, and date of decommissioning.

Decommissioning criteria

According to the Washington State Administrative Code, decommissioning is required for "any well which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental, safety or public health hazard." In addition, the code also mandates decommissioning for "cased water wells that were not constructed in accordance with these regulations, or wells which are decommissioned to allow the placement of potential sources of contamination within one hundred feet of the well, or for which a drilling report, required under WAC 173-160-141, is missing."

After investigating and considering all of these factors, the well-decommissioning program today believes that only about 2,000 Hanford wells are potential candidates for decommissioning. Of those, perhaps only about 1,100 wells may need actual physical decommissioning.

Prioritizing wells

The question then becomes one of how to set priorities for which Hanford wells will be decommissioned first or quickly. Using a decision process developed in conjunction with the Department of Energy (DOE) and Washington State, the GRP sets priorities based on both risk and programmatic criteria. The wells with the highest risk are those closest to waste sites that penetrate the vadose zone and into the groundwater. Such wells can act as direct conduits for mobile contaminants. The highest priority, however, must be given to wells that are impacted by schedules for Site cleanup projects. Fortunately, many of the highest risk wells are located within expedited cleanup sites.

Davis said such a case recently occurred when wells in the vicinity of U Plant were decommissioned as part of a larger program to decommission U Plant and its associated liquid-waste disposal areas. Wells that will be under the footprints of water-infiltration covers that are planned for contaminated soil sites must be decommissioned before the covers can be constructed.

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"Managing the multiple interfaces and intricate coordination requirements of this program are almost more difficult than decommissioning the wells themselves," said Davis. "Our field personnel have done a bang-up job with the detailed coordination needed to do the decommissioning. We don't want to interfere with any other projects, and we want to respect facility boundaries and keep all personnel safe. We also have to look at relative costs and try to manage our well-decommissioning work to achieve contracting efficiencies. Some wells are a lot more difficult to decommission than others, so we look at all of these factors. Then we write a 'Decommissioning Profile' for each well set we select, and negotiate its approval by the Washington Department of Ecology."

Multiple-cased wells are most difficult

Decommissioning a well with a double or even triple casing is the most challenging, because explosive devices must be lowered inside the well to perforate all the casings. A technique called "jet shot" perforation is used in multiple-cased Hanford wells, and requires extensive analysis and assistance from a variety of Site workers – safety professionals, industrial hygienists, radiation control personnel, facility managers, security personnel, and others. Notification of the planned detonation must be communicated to everyone within 1,000 feet of the well, and to some facilities further away that might be affected. The Laser Interferometer Gravitational Observatory (LIGO) just northwest of Hanford's 400 Area has asked to be notified about every shot, because it has instrumentation very sensitive to shocks. Seventy wells have been decommissioned successfully by the GRP at Hanford this year using jet-shot techniques. For more about using the jet-shot technique, see *FYI* Aug. 8, 2005, http://www2.rl.gov/rapidweb/phmc/phmc-web/index.cfm?PageNum=64.

GRP

A mechanical perforator is ready to be lowered into a single-casing well for decommissioning.

A close-up shows the cutting wheel on a mechanical perforator.

Many, but not all, multiple-cased wells at Hanford are so-called "Webster Wells," named for an engineer on the Basalt Waste Isolation Project in the 1980s. Tasked with sealing several wells, he perforated the single casing, and then ran a smaller-diameter casing down the well and injected grout into the annulus between the two casings. His technique counted on hydrostatic pressure to move the grout through the holes to fill the entire borehole and the void spaces on the outside of the wells. However, significant void spaces were not filled, and the wells are now considered a high priority for decommissioning.

Important progress

Fluor Hanford is also making good progress toward decommissioning 45 single-cased wells this fiscal year (FY), using mechanical perforation methods. Along with 146 wells successfully decommissioned in FY 2003 and 2004, the program is on track to decommission a total of 261 wells by the end of FY 2005. In addition, almost 1,200 previously plugged wells have been administratively decommissioned since January 2003, with the concurrence of the Washington Department of Ecology.

It is clear that Hanford well-decommissioning work will be a long-term endeavor, possibly lasting for more than 10 years. However, according to Davis, it is satisfying work. "It's ironic that we have so many holes in the ground at the Hanford Site that were put there for the purpose of water-resource protection by monitoring contamination in the groundwater. Now, they actually may be contributing to the contamination of groundwater," he said. "It's important and it feels right that we are going after these wells and sealing them as one more step in protecting the groundwater."

Michele Gerber, Communications

Pigs do fly at Hanford

This summer, the GRP is using a mortar-lining process to fix leaky water lines in the 200 West Area near U-Plant. Re-lining water lines is needed to eliminate leaks that drive contaminants downward to the water table.

While the mortar-lining technique has been used before, and has even won awards at Hanford, crews under the direction of Brian Harmon are now trying a different method of scraping out the old piping before re-lining the pipe. They open a port into a pipe and insert a device shaped somewhat like a rounded torpedo or an extra-large bullet. This device is called a "pig." They then seal the port in the pipe, and force the pig through the pipe with pressurized water. As it travels through the pipe, the pig scrapes out encrusted material on the inner surface and flies out the far end of the pipe.

Propelled by water pressure, a hard foam rubber "pig" emerges after scraping out the inside of an old water pipe near U Plant in the 200 West Area.

Pipe "pigging" proved successful earlier this month in cleaning aging water lines in the U-Plant area, prompting jests about "when pigs fly at Hanford."

The web site of the company that is providing the "pigs" has posted a video that shows the pipe pigging process and its effectiveness: http://www.pipepigs.com/.