Scientists’ E-mails Add to Yucca Mountain Woes

Yucca Mountain, the U.S. Department of Energy’s (DOE) targeted site for the nation’s high-level radioactive waste dump, has been the subject of controversy and scrutiny for more than a decade. Recently disclosed e-mails indicate research results may have been compromised, adding fuel to the controversy. DOE is tasked with demonstrating that waste buried in the repository will not reach the accessible environment – where anyone could be affected by it – for at least 10,000 years. This means they have to demonstrate that the geologic setting, in combination with the design of the waste containers, will isolate the radioactive waste, also taking into account any possible climate change that could occur in that time period. The opposition, led by the state of Nevada, is skeptical that such demonstrations can be made.

To carry out the complex investigations necessary in a way that would stand up to the considerable scrutiny of all involved, DOE implemented quality assurance/quality control (QA/QC) procedures designed to provide detailed documentation for all work performed. U.S. Geological Survey scientists have performed much of the research on Yucca Mountain. In March, e-mails were uncovered by U.S. Department of Interior officials that proved that certain QA/QC procedures had not been consistently followed. Three USGS scientists’ communications obtained from 1998 to 2000 revealed, for example, that the date a computer code was installed was faked when a QA/QC audit requested the information and the modeler did not have it. Nevada officials pointed out that while that infraction might not be terribly serious, the revelation of that type of deception made them question everything else.

The e-mails concerned infiltration and climate models the scientists were developing. Infiltration is a key aspect of the Yucca Mountain demonstration: if too much water were to leak into the repository, the containers could rust and leak and contamination could seep out of the repository. And while the climate at Yucca Mountain is currently arid, under certain climate change scenarios it could be wetter, at which point knowing the hydrologic properties of the material above the repository would become even more essential.

The e-mails reflected an atmosphere of high pressure for the scientists to get accurate predictions as quickly as possible with minimal budget and support staff. They also indicated the researchers understood that their resulting numbers were extremely critical to the project, and that they were working long hours, often on their own time, to produce results. Finally, in the e-
mails the scientists indicated extreme frustration with QA/QC requirements, and acknowledged that they were not always following DOE procedures. Comments such as “delete this memo after you’ve read it” were sprinkled throughout.

The e-mails were released on the Web site of the House Government Reform Subcommittee on the Federal Work Force and Agency Organization. All names and some other details have been blacked out. The House subcommittee, chaired by Nevada Rep. Jon Porter, has been leading the investigation and conducting hearings. Porter has hired a full-time investigator to focus on Yucca Mountain.

In June, the Las Vegas Review-Journal reported that DOE had tentatively concluded that the scientific results were technically sound in spite of the QA/QC issues, but that the House subcommittee had made little progress.

Visit reform.house.gov/FWAO/.

**Impacts of Recreation on Lake Powell’s Water Quality Studied**

A recently released U.S. Geological Survey report describes levels of organic and inorganic constituents in water and sediment from two side canyons of Lake Powell during 2001 and 2002. The study evaluated the effects of visitor use on the water quality of the three canyons when visitation was low (winter) and high (summer). Volatile organic compounds, including benzene, toluene, ethylbenzene, xylene, and a fuel additive, MTBE, were present in water samples from Forgotten and Moqui canyons, where visitor use was greatest. Trace amounts of 33 organic wastewater compounds, including cholesterol, estriol, coprostanol, DEET, and EDTA also were present. Nearly all organic and inorganic constituent concentrations were orders of magnitude below U.S. EPA Maximum Contaminant Levels, however one sample from Moqui Canyon contained 3.1 microgram per liter (µg/L) of benzene, only slightly below the MCL of 5 µg/L. Bacterial samples were collected in areas where visitors congregated for recreational boating and camping. *E. coli* counts in some samples from Moqui Canyon beach areas exceeded the EPA-recommended limit. Organic and inorganic constituents in beach sediments generally were below detection levels. Concentrations of selenium, uranium, and arsenic, which are not associated with visitor use, were higher in Forgotten and Moqui canyons than in most fresh waters in the United States, averaging 1.5 µg/L, 4.7 µg/L, and 1.4 µg/L, respectively.

A third side canyon, Knowles, was used as a control canyon and was closed to boat traffic for the duration of the study. Except for minor concentrations of some volatile organic compounds and cholesterol, contamination from visitor use in Knowles Canyon was not detected.

Side canyons of Lake Powell, of which there are over 90, are the most popular recreation areas of the Glen Canyon National Recreation Area in Arizona and Utah. Millions of people visit Lake Powell each year for fishing, boating, camping, and day-use activities. Emissions from houseboats, personal watercraft, and speedboats, plus nonboating
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activities introduce contaminants to the lake and to beach areas.


**Kennecott to Begin Massive Utah Water Cleanup**

What may be the biggest water cleanup project in the nation’s history began this spring when Kennecott Utah Copper Corporation handed out the first construction contract. The project is expected to turn an environmental mess into billions of gallons of clean drinking water for four Salt Lake Valley cities, according to a news release from Kennecott.

The contamination came from 100 years of mining activity in Bingham Canyon of the Oquirrh Mountains. Two huge plumes of salt- and sulfate-contaminated groundwater are moving slowly far below 50 square miles of the Salt Lake Valley. Much of the problem predates Kennecott. But at a meeting of the Jordan Valley Water Conservancy District (JVWCD), Kennecott acknowledged the root cause of the pollution. Said Louis Cononelos of Kennecott, “Many times, as well-intentioned as past generations of miners were, the controls they put in place simply were not adequate by today’s standards.”

Kennecott has already spent hundreds of millions of dollars controlling the pollution, and will pay most of the cost of the groundwater cleanup. The Salt Lake Tribune reported that the company paid $37 million into a natural resources damage trust fund in 1995, now worth $62 million. The JVWCD will pay for “normal water development and treatment costs” during the remediation, according to the Tribune.

Richard Bay of the water district noted that “Kennecott shoulders the burden of the cleanup, and the district and the public share only the burden of conventional water treatment.

A contract was awarded to drill the first four of numerous wells that will tap the deep aquifer. A network of pipelines will carry the contaminated water to two reverse-osmosis treatment plants that will filter out most of the salts and sulfates. Together the plants are expected to convert 80 percent of the contaminated water to drinking-quality water that will be delivered to the cities of Herriman, Riverton, West Jordan, and South Jordan.

The original plan was to dump the waste from the filtration process right into the Jordan River. That idea met with so much criticism that the project was derailed for several years. The latest plan spares the Jordan River and puts the waste in Kennecott’s tailings impoundment. Later, it may be dumped directly into the Great Salt Lake, a possibility that could lead to future battles.

Kennecott expects the treatment project to take about four years to get fully underway.