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## What is Paradox salt-injection program's future?

Dennis Webb

### Find Out More

The public is invited to attend two meetings to learn more about the Bureau of Reclamation's Paradox Valley salinity-reduction alternatives, ask questions and provide comments:

- Jan. 14 in Paradox at the Paradox Valley Charter School, 21501 6 Mile Road, at 5 p.m.
- Jan. 15 in Montrose at the Holiday Inn Express & Suites, 1391 S. Townsend Ave., at 6 p.m.

The draft environmental impact statement reviewing the alternatives is available online at [www.usbr.gov/uc/progact/paradox/index.html](http://www.usbr.gov/uc/progact/paradox/index.html). A copy can be requested by contacting the Bureau of Reclamation.

It will consider comments on the draft document received by 11:59 p.m. Mountain Standard Time on Feb. 4. Comments may be emailed to [paradoxeis@usbr.gov](mailto:paradoxeis@usbr.gov) or mailed to Ed Warner, Area Manager, Bureau of Reclamation, 445 West Gunnison Ave, Suite 221, Grand Junction, CO 81501.

A federal agency is considering whether to continue an underground injection program in western Montrose County that has proven highly effective in reducing salt levels in the Colorado River Basin but also causes earthquakes.

The Bureau of Reclamation also is considering alternative salinity-control approaches including evaporation ponds or heat-driven crystallizers in the Paradox Valley some 50 miles southwest of Grand Junction and just east of the Utah border.

The Bureau of Reclamation is asking for public input on a draft environmental impact statement that analyzes its alternatives, which also include ending its salinity-control program in the valley.

Paradox Valley is laden with salt in groundwater, resulting in the Dolores River historically picking up more than 200,000 tons of salt a year as it passes through the valley. High salt levels in the Colorado River Basin harm water quality, agricultural production and wildlife habitat.

Since 1996, the Bureau of Reclamation's Paradox Valley Salinity Control Unit has extracted brine groundwater from shallow wells and injected it in a well 16,000 feet underground into a limestone formation. The agency says the project removes about 95,000 tons of salt a year from the Dolores and Colorado river basins, or about 7 percent of total salinity control that is occurring in the Colorado River Basin.

The federal government is obligated to control salt in the Colorado River to comply with the Colorado River Basin Salinity Control Act, the Clean Water Act and a 1944 treaty with Mexico, the Bureau of Reclamation says. The Paradox injection well the Bureau of Reclamation now uses is nearing the end of

its serviceable life. Over the years the pressure in the underground reservoir the well reaches has increased, and so has seismic activity induced from brine injection, forcing the Bureau of Reclamation to substantially reduce brine disposal rates.

According to the draft environmental impact statement, the natural rate of earthquakes in the Paradox Basin is quite low, but earthquakes were detected within about 1,000 feet of the injection well in July 1991, about four days after the start of the first injection test. More than 6,000 induced earthquakes have been recorded since the start of fluid injection, most too small to be felt by residents or cause damage. But at least 75 topped the magnitude 2.5 threshold at which quakes can be felt, and at least five topped magnitude 3.5 and were strongly felt. Only minor damages less than \$500 have been reported, the draft EIS says.

The draft EIS says induced earthquakes up to magnitude 5.0 to 5.2 are believed to be possible as a result of the injection operation. In March, a magnitude 4.1 quake was detected in the area of the operation.

Earthquakes related to the operation have been observed 12 miles away, and the draft EIS says the seismically active area may continue to expand for several years after injection ends before quakes gradually decline.

The Bureau of Reclamation is considering operating a new injection well at one of two possible locations in the valley. Those sites are expected to have lower potential for induced quakes near current residential areas. They would tap a much larger underground reservoir, and underground faults are expected to isolate populated areas from induced quakes, lessening the impact of ground shaking, the agency says.

The evaporation pond complex envisioned under another alternative would be located within 1,530 acres, with an actual footprint of 600 acres. The draft EIS points to visual impacts and impacts to migratory birds as being some of the drawbacks to that proposal.

It could keep up to 171,000 tons out of the Colorado River a year, however, versus up to 114,000 tons a year with a new injection well. The heat-driven crystallizer treatment plant also could remove 171,000 tons a year, but would require far more energy than the other methods, and a 14-mile natural gas line extension to the site would be required. It would cost an estimated \$94 a year per ton of salt removed, significantly more than the other methods.

Both the crystallizer facility and the evaporation ponds also would require a 60-acre salt landfill.

All of the alternatives would cost about \$100 million or more in construction costs, including engineering, environmental reviews and other expenses.

The environmental document estimates that doing nothing would result in more than \$23 million in annual economic damages in the Lower Colorado Basin, compared to \$27.7 million to \$41.7 million in annual economic benefits there from pursuing one of the other alternatives.

The alternatives would have various impacts on Bureau of Land Management land, something also part of the environmental review.

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**Dennis Webb**