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Bugs boost Cold War clean-up

Bacteria could scrub uranium from sites contaminated decades ago.

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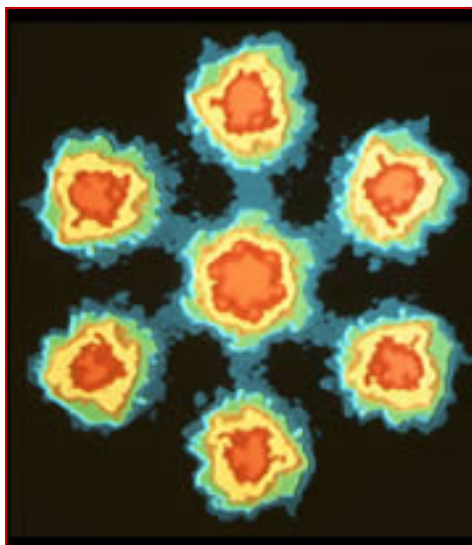
BETSY MASON

Uranium-contaminated groundwater can be cleaned up by resident microbes, say microbiologists¹.

Cold War-era uranium processing has left contaminated sites across the United States and the world. Traditional pump-and-treat methods can take decades and expose workers to toxic levels of uranium. Now a better solution is being proposed by Robert Anderson, of the University of Massachusetts Amherst, and his colleagues.

Anderson's team has found a way to encourage microbes called *Geobacter* to convert soluble uranium to insoluble uraninite. Uraninite stays put instead of mixing with water used for drinking or irrigation. "I think this is something we might be using in the near future," says Anderson.

"This is a major step," agrees Jonathan Istok of Oregon State



Traditional clean-up techniques can expose workers to toxic levels of radioactive uranium.

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University in Corvallis, who has had similar success in using microbes to mop up both uranium and another element, technetium. "We're pretty close to being able to apply this to the real world," he says.

Divide and rule

Geobacter are best known as iron-eaters, but in 1991 team member Derek Lovley, also at Amherst, proved that the bugs could metabolize uranium in the laboratory².

The bacteria turn up in sediments across the United States, but usually in small quantities. Anderson's team stimulated the bugs to multiply in a contaminated underground aquifer in Colorado by injecting acetate, a favourite nutrient.

Within days the Geobacter population boomed, and soluble uranium levels began to drop. After 50 days, 70% of the uranium had been converted into uraninite.

We're pretty close to being able to apply this to the real world

**Jonathan Istok
Oregon State University**

The site used in the study was contaminated by low levels of uranium from mining residue. The team hopes that the technique might eventually be used to clean heavily contaminated sites, such as those run by the US Department of Energy, which funded the research. "We know these organisms can grow in extremely high concentrations of uranium," says Lovley.

References

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2. Lovley, D. R., Phillips, E. J. P., Gorby, Y. A. & Landa, E. R. Microbial reduction of uranium. *Nature*, **350**, 413 - 416, doi: 10.1038/350413a0 (1991). | [Article](#) |

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