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Information for Contributors appears on pages 93–94 of the 5 January 1996 issue. Editorial correspondence, including requests for permission to reprint and reprint orders, should be sent to 1333 H Street, NW, Washington, DC 20005.

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LETTERS

Heat and light

A comparison of models of heat flow and relative humidity in a proposed “hot, dry repository” for the storage of nuclear waste at Yucca Mountain, Nevada (right); responses to a statement about genetics, race, and IQ; a recollection of a shootout in Tombstone, Arizona, in 1881; and a dissenting opinion about greenhouse warming are among the items in this week’s letters.



Keeping Radioactive Waste Dry?

At the heart of geophysicist Thomas Buscheck and colleagues’ “new twists” to answer the question “Can nuclear waste keep Yucca Mountain dry—and safe?” (Research News, 15 Dec., p. 1761) is their use of “customized computer models, based on known properties of water and heat flow in porous, fractured media such as the Yucca Mountain rock. . . .” The idea, as reported by news writer Wade Roush, is to use heat from the radioactive waste “to boil corrosive moisture out of the surrounding rock.”

The validity of the water and heat flow models will continue to plague the credibility of the “hot, dry repository” approach as a means to defer waste package corrosion and failure. The U.S. Department of Energy’s prime contractor for the Yucca Mountain Project is undoubtedly aware of the sensitivity of the models to differing assumptions. Their recent performance assessment for Yucca Mountain (1) points out that their and Thomas Buscheck *et al.*’s (2) thermal-hydrologic models predict very different waste emplacement drift environments in terms of temperature and relative humidity (1, pp. 4–12).

According to the contractor model, the calculated time for return to high-humidity conditions conducive to waste package corrosion is up to a few thousand years, while Buscheck’s model predicts tens of thousands of years. This significant discrepancy will not be resolved by the planned *in situ* heater tests alone, as it is in large part due to uncertainties in modeling unsaturated zone flow at full Yucca Mountain site scale.

As the U.S. Nuclear Regulatory Commission’s Advisory Committee on Nuclear Waste recently noted (3)

There is little experience or understanding of governing processes and the behavior of fluids in

fractures and faults [in the unsaturated zone at Yucca Mountain], and few field demonstrations or standardized methodologies for obtaining parameter values necessary for modeling.

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References

1. R. A. Andrews *et al.*, in “Total System Performance Assessment—1995: An Evaluation of the Potential Yucca Mountain Repository” (B00000000-01717-2200-00136, Civilian Radioactive Waste Management System Management and Operating Contractor, Las Vegas, NV, 1995).
2. T. A. Buscheck, J. J. Nitao, L. D. Ramspott, “Localized dryout: An approach for managing the thermal-hydrological effects of decay heat at Yucca Mountain” (UCRL-JC-121232, preprint, Lawrence Livermore National Laboratory, Livermore, CA, 1995) (available by e-mail from buscheck1@lnl.gov).
3. Letter to Shirley Ann Jackson, Chairman, U.S. Nuclear Regulatory Commission, from Paul W. Pomeroy, Chairman, U.S. Nuclear Regulatory Commission Advisory Committee on Nuclear Waste, November 6, 1995.

Genetics and Race

“The Bell Curve: A Statement” (Letters, 5 Jan., p. 13) did not mention that *The Bell Curve* (1) reported the results of a 12-year longitudinal study of 11,878 youths (3022 of whom were African American), in which most 17-year-olds with high scores on the Armed Forces Qualification Test (black as well as white) went on to occupational success, whereas many of those with low scores went on to crime and welfare dependency.

Whatever the causes of poverty and black underachievement (the flashpoint of discussion), they go well beyond U.S. particulars. Evolutionary (and hence genetic)