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# Information Report On the Basalt Waste Isolation Project for High-level Nuclear Waste Disposal at Hanford, Washington

City Club of Portland (Portland, Or.)

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## Information Report On

THE BASALT WASTE ISOLATION PROJECT FOR HIGH-LEVEL NUCLEAR  
WASTE DISPOSAL AT HANFORD, WASHINGTON

The Nuclear Waste Policy Act of 1982 mandated a schedule for the construction of at least two final storage repositories for high-level nuclear waste. The steps delineated by the statute are: 1) The Secretary of the U.S. Department of Energy (DOE) recommends three sites for the first repository and three additional sites for the second; 2) The President approves or disapproves further study for each site; 3) The Secretary prepares site characterization studies; 4) The Secretary recommends one or more sites to the President complete with a final environmental impact statement; 5) The President recommends sites to Congress which are effective unless disapproved; 6) The host state may disapprove; 7) Congress may override state disapproval by a majority vote of both houses; and 8) The Nuclear Regulatory Commission (NRC) approves a construction license.

The process mandated by the Act was to be completed by January 1, 1989 for the first repository site but it now appears that this deadline will be delayed by at least two years. Current plans call for the first repository site to be ready to begin receiving wastes about 1998.

High-level wastes consist of high radiation by-products of nuclear reactions in the fuel of both commercial and defense reactors. Such waste must be isolated for 10,000 years to assure no significant threat to the environment. High-level nuclear waste currently is being stored temporarily in water-filled pools near nuclear power plants and in double-walled steel tanks on federal reservations. Current temporary stored wastes far exceed the capacity of the planned first permanent repository site. Further, some leakage into groundwater has occurred from temporary storage facilities.

Originally, nine areas were under consideration by DOE for the first permanent high-level waste site: the basalt beneath the Hanford site near Richland, Washington; tuff rock underlying the Nevada Test site; and both salt domes and bedded salt formations in Utah, Mississippi, Louisiana and Texas. In December 1984, DOE narrowed its proposed choices to the Hanford site, the Nevada Test site, and one embedded salt formation in Texas. Ten site performance standards are being used by DOE, including geohydrology (circulation of water in underlying rock), geology, tectonic environment (folds and faults) and environmental, social and economic impacts.

When screening for sites began in 1976, two categories of sites were selected: (1) salt formations, which were thought to have the likely ability to support waste isolation, and (2) federal government sites already dedicated to nuclear activities. Hanford, underlain with basalt rock, was selected under the second category. The 570-square-mile Hanford site has been used for nuclear activities since 1943.

The basalt rock underlying an 18-square-mile area near the center of the Hanford reservation, approximately four miles from the Columbia River, is being evaluated for suitability by the Basalt Waste Isolation Project operated since 1976 by Rockwell Hanford Operations, a component of Rockwell International, for DOE. Rockwell's activities include a near-surface test facility, designed to examine how basalt is affected by heat and radiation-induced stress, waste packaging testing to discover the best

combination of natural and man-made barriers to contain waste in basalt, and a 3,000-foot exploratory shaft to test which of the actual basalt layers are best suited for an isolation project.

Basalt is a dense, fine-grained volcanic rock that occurs in sheet-like flows. The Hanford basalt formation is 10,000 feet thick. It also is known, however, to house fractures, some hazard of seismic and geothermal activity, and some degree of vertical, and horizontal, groundwater flow. Because the site is near the Columbia River, groundwater flow is a crucial concern. The U.S. Geological Survey, the U.S. Environmental Protection Agency, and the NRC all have expressed concern that Hanford may not be suitable because unpredictable groundwater flows may carry nuclear waste to the Columbia River.

The Nuclear Waste Policy Act provides potential host states with eligibility for federal grants to study having a high-level waste dump located within their boundaries. These states may also submit a "notice of disapproval" which effectively acts as a veto that can be overturned only by a two-house vote of Congress. No such right is afforded adjacent states.

Yet, because Hanford is near the Columbia River and Oregon, and because a large percentage of Oregon's population is downstream, a repository at Hanford conceivably could have more impact on Portland and Oregon than on Washington. Specific concerns for the economy and environment of Portland and Oregon include: 1) Transportation of waste to the site through or near the Portland area, possibly by truck, rail, or barge; 2) Contamination of the Columbia River that may result from either groundwater flow or barge accident; 3) Atmospheric contamination or radiation; and 4) The effect of the existence of the site in the Northwest on the actual and perceived attractiveness of this area, both in terms of economic development and livability.

Environmental, business, and local and federal government bodies are exploring methods for Oregon to have input into the site selection process by sharing information and coordinating efforts with representatives of the State of Washington.

Respectfully submitted,

Waste Subcommittee, Energy & Environment Standing Committee

Approved by the Research Board on April 25, 1985 and by the Board of Governors on April 29, 1985 for publication and distribution to the membership. Because this report carries no conclusions or recommendations, no official action is required of the membership.

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