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Legislator's Nuclear Waste News

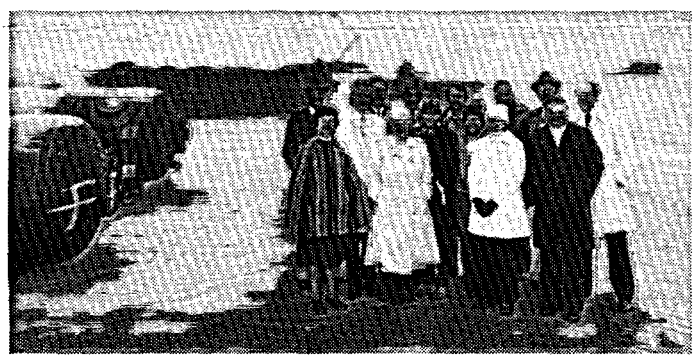
Volume 1, Number 3

JOINT LEGISLATIVE COMMITTEE ON SCIENCE & TECHNOLOGY

Joint Science and Technology Committee Meets at Richland; Tours Hanford

Meeting in Richland

Several technical concerns relating to the use of the Hanford site for a high level nuclear waste repository were discussed when the Joint S&T Committee met in Richland, December 10, 1984. Among these issues were long-term capability of the facility constructed in rock to contain the nuclear waste, determination of the travel speed and direction of groundwater movement, knowledge of the structure and uniformity of the basalt flow, knowledge of how the mined openings will react to rock stress and heat from the waste packages, and a more detailed design for the waste package. The Committee's senior research analyst, Ellen Caywood, said these key issues will be discussed in the Environmental Assessment (EA) which was released December 20. However, most cannot be satisfactorily answered unless and until detailed site characterization takes place. The issues of commingling of defense wastes and transportation also may not be addressed fully in the EA. Committee members also heard from representatives of several states, including Utah, Vermont, Texas, Rhode Island, South Carolina and Wisconsin, who were on hand for a meeting of the National Governors' Association Task Force on High Level Radioactive Waste Disposal. A very interesting and informative exchange of information followed as the Joint Committee solicited the viewpoint of the other states regarding the high level waste repository issue and especially the Consultation and Cooperation Agreement that the State of Washington is pursuing with the USDOE.



S&T Committee tours US Ecology low level waste site
Front row: Rep. Jean Marie Brough, Rep. Nancy Rust, Ellen Caywood, Lee Gronemyer
Middle row: Sen. Al Williams, Lane Nothman, Nancy Ellison
Back row: W.W. McIntosh, Fred Adair, Sen. Barney Goltz, Rep. Dean Sutherland, Rep. Dick Barnes, Max Power, Barry Bede

Tour of Hanford

Members of the Joint Committee visited the Hanford Reservation on December 11. USDOE officials briefed the committee on the Basalt Waste Isolation Project (BWIP). Rockwell officials (the major contractor to the project) led a tour of the exploratory shaft site. If the Hanford site is nominated to be "characterized," an exploratory shaft will be drilled approximately 3,400 feet vertically to allow mined exploration of the Cohassett basalt flow, the proposed repository horizon.

The Joint Committee also toured the rock mechanics laboratory. A portion of the laboratory is used to test the performance of the basalt under conditions of stress, pressure and temperature that might exist in the proposed repository. Behavior of the groundwater during various phases of the repository operation is also under study at the laboratory.

The Joint Committee visited the low-level radioactive waste disposal site, located within the Hanford Reservation. This site is currently operated by US Ecology, Inc. The Joint Committee is contracting for a survey of conditions at the 100-acre site and the surrounding 900 acres, which are leased from USDOE by the State of Washington.

Representatives Ray Isaacson and Shirley Hankins, whose districts include Richland, joined the Science and Technology Committee members for the meeting. Representative Nancy Rust, chair of the House Environmental Affairs Committee and member of the Nuclear Waste Board, joined the Committee members for the meeting and the tour.

The Proposed Hanford Repository: The Next Phase

The U.S. Department of Energy (USDOE) released nine draft environmental assessments (EA) on December 20, 1984. Each of the draft EAs evaluates the suitability of one of nine sites in six states for a deep geologic high level nuclear waste repository. One of those sites is located on the USDOE's Hanford reservation near Richland, Washington. It is referred to as the Basalt Waste Isolation Project (BWIP).

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USDOE ISSUES DRAFT ENVIRONMENTAL ASSESSMENT

The U.S. Department of Energy (USDOE) released the Draft Environmental Assessment Reference Repository Location, Hanford Site, Washington (EA) on December 20, 1984, along with EAs for eight other proposed repository sites. The end of the public review and comment period will be March 20, 1985. Copies of the EA may be obtained by calling 800-858-1600. Written requests can be directed to:

Environmental Assessment
U.S. Department of Energy
ATTN: Environmental Assessment
1000 Independence Avenue S.W.
Washington, DC 20585

Requests can be made for the Hanford EA, any of the other eight EAs, or for the executive summaries of any of the documents. Written comments can be directed to the address below during the public review period.

Comments - EA
U.S. Department of Energy
ATTN: Comments - EA
1000 Independence Avenue S.W.
Washington, DC 20585

Documents and reports cited in the EA will be made available by the USDOE through a microfiche system at the following locations:

High-Level Nuclear Waste
Public Reference Center
826 Pacific Avenue
Lacey, WA 98504
(206) 459-6670

Joint Legislative Committee on
Science and Technology
Room B-14, Institutions Building
Olympia, WA 98504
(206) 786-7285

U.S. Department of Energy
Reading Room
825 Jadwin Avenue
Richland, WA
(509) 376-8584

In addition, several public libraries around the state will have the information available for public review.

The USDOE held a series of interactive briefings with various groups including local and state governments and affected Indian tribes. Public hearings at which testimony will be accepted will be held at the following locations:

Richland—March 5 (2:00 p.m. - 5:00 p.m. and
7:00 p.m. - 10:00 p.m.)
Federal Building Auditorium
825 Jadwin Avenue

Olympia—March 7 (2:00 p.m. - 5:00 p.m. and
7:00 p.m. - 10:00 p.m.)
State of Washington
Department of Social and Health Services
Office Building #2 - Hearing Room
12th and Franklin

For more information concerning the schedule of meetings, contact Judy Tokarz, USDOE Office of External Affairs, Richland, Washington at (509) 376- 7378.

New Office for S&T

The Joint Legislative Committee on Science and Technology is moving to a new office. By the time the 1985 legislative session begins, the committee staff will be comfortably housed in Room B-14, Institutions Building. The new office includes room for conferences, as well as space for a microfiche reader-printer to provide access to documents and reports cited in the U.S. Department of Energy's Environmental Assessment of the Hanford site which is being considered for disposal of high-level nuclear waste.

The Committee's new telephone number is 786-7285.

Fran Barkan has joined the staff of the Joint Committee on Science and Technology as associate research analyst. Barkan's special skills are in proposal writing, fund raising, newsletter production, and research. Her responsibilities include preparation of the bi-monthly **Nuclear Waste News**, writing and editing reports on committee activities, managing the day-to-day operations of the office and staff, and seeking funds from private and federal agencies for committee projects.

The Next Phase continued . . .

The Environmental Assessments will provide the principal basis to determine the suitability of the sites for more detailed site characterization. Three of the nine sites will eventually be recommended to the President for site characterization. Chapter 7, common to all of the draft EAs, indicates a relative ranking of the suitability of the sites. The top three sites are Deaf Smith County, Texas; Yucca Montain, Nevada; and Hanford, Washington. These may or may not be the three sites actually selected, depending upon the outcome of the final Environmental Assessment. At this time it appears likely that the Hanford site may proceed to the next phase of detailed site characterization.

The end of the public review and comment period for the draft environmental assessment is March 20, 1985. (See related story). The USDOE plans to issue the final environmental assessment by June 1985, at which time the Secretary of Energy will nominate five of the sites. Three of those five sites will be then recommended to the President. The President has 60 days (with an allowable 6-month extension) to approve or disapprove each candidate site. If approved, the site will proceed to the characterization phase.

NUCLEAR WASTE — WHAT CAN WE DO WITH IT?

by
W.W. McInstosh, ASME Legislative Fellow

The management of nuclear waste is a topic that will be actively discussed in future issues of this newsletter. To provide some background to our readers, a brief description of alternative disposal methods is presented. A more detailed discussion is contained in the paper "Radioactive Waste Disposal History and Current Status" by W. W. McIntosh, Washington's ASME Legislative Fellow. Copies are available from the S&T office, B-14 Institutions Building (786-7285)

LOW LEVEL NUCLEAR WASTE

Low level nuclear waste is radioactive at a level above natural background but below the level of high level nuclear waste. Low level waste includes radioactively contaminated packaging material, protective clothing, cooling water, process and cleaning solutions, process off-gasses, ventilation exhausts, filtering and adsorptive media, zeolites, and tools and equipment. Discussed below are some methods used for low level waste management.

Low Level Waste Management Methods

Pre-Release Conditioning

Many kinds of low level nuclear waste can, after suitable conditioning, be safely released to the environment. Some low level gaseous and liquid wastes are composed of very short-lived radionuclides. These wastes can be retained in tanks or vessels until the radioactivity dies away and then be released to the environment, with or without dilution as required.

Very low level gaseous or liquid waste can be safely released to the atmosphere or to waterways if it is diluted to established limits before release or released in such a manner that it becomes sufficiently dilute before moving away from the release point.

Both liquid and gaseous low level wastes may be treated to remove particulate matter by precipitation or filtration. Gasses may be scrubbed by solutions to remove certain radioactive substances, or passed through adsorptive beds to remove radioactive halogens. Liquids may be passed through zeolite beds or distillation processes to remove a variety of radioactive contaminants. The radioactive materials removed, along with the filter media, adsorptives, zeolites, and scrubbing solutions are then disposed of as solid or liquid waste.

Shallow Ground Burial

Solid low level waste is most commonly disposed of by shallow earth burial in trenches. To reduce the volume, solid waste may be compacted or incinerated. The incineration process may include filtration, scrubbing or adsorption of the exhaust gas generated. The ash, contaminated filters, and adsorptive media are then packaged for burial. Low level liquid waste may be solidified by mixing with portland cement or bentonite in drums for burial. No waste may be placed in a shallow ground burial site in liquid form.

A suitable shallow burial site must effectively isolate the waste from human contact, from animals that might scatter the material, from plants that could absorb it through their roots and from groundwater.

After burial, the packaged solid waste is covered by filling the trenches with soil to a depth of a meter or more.

Sea Burial

Low level solid wastes can be disposed of by packaging in concrete or metal containers and depositing on the sea bed in preselected areas. This method has been little used in the United States.

HIGH LEVEL NUCLEAR WASTE

High level nuclear waste consists primarily of spent nuclear reactor fuel or the radioactive residue from spent fuel reprocessing. It consists of relatively short-lived fission products such as strontium and cesium, and long-lived but less radioactive transuranics such as neptunium and plutonium.

High Level Waste Management Methods

Retrievable Surface Storage

Most spent fuel discharged from commercial power reactors is presently stored on an interim basis in storage basins adjacent to the reactor. As these interim storage facilities are being filled, alternatives such as reracking to increase storage capacity or the planning of an away-from-reactor (AFR) storage facility may need to be considered.

Defense high level waste in liquid, slurry, or solid form has been stored in buried tanks. Leaks have occurred at various locations from the original single wall tanks, but monitoring has shown little migration and no present danger to health and safety. All high level waste storage tanks for defense wastes built since 1956 have been of double wall construction, from which no waste has escaped, to date.

A mechanism to provide safe, extended storage of spent high level waste would be available in a Monitored Retrievable Storage (MRS) system. This system could provide a viable, temporary repository pending availability of permanent, nonretrievable storage. High level waste could be packaged in shielded casks that would be stored in a facility designed for protection from natural hazards and human intrusion. Monitored retrievable storage could safeguard high level waste at reasonable cost. Such storage will require continuing human attention to provide protection and to maintain the storage in safe condition, monitoring for any potential threat to cask integrity.

Permanent Geologic Disposal

For permanent disposal of high level waste, a mined geologic repository is generally regarded as the best option. Basalt, granite, tuff, clay, and salt formations have been studied in the United States and elsewhere. The U.S. Nuclear Waste Policy Act of 1982 provides for selection of the first U.S. mined geologic repository from one of the basalt, salt or tuff formations at nine different sites.

The Act assumes that a mined geologic repository can be properly selected and designed, using existing technology, to contain the waste with the required level of assurance. Such storage would be suitable for any foreseeable level of activity in the nuclear industry. The storage facility can be monitored for many decades and would be accessible for

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Nuclear Waste continued . . .

corrective action if required. Once the repository is permanently sealed, no further surveillance should be required.

Other permanent geologic disposal methods include deposition of canistered solid waste in deep drilled holes. This technique should provide adequate containment; however, there would be no opportunity for corrective action.

Other Permanent Disposal Methods

— **Rockmelt.** An ingenious scheme for high level waste disposal has been suggested in which a deep basalt chamber would be filled with liquid high level waste which would be permitted to increase in temperature to the melting point of the basalt, providing a fluid basalt seal around the chamber. After the radioactive heat was spent, the waste and the basalt would cool to solid form to provide containment. This scheme has a number of flaws: containment could not be assured by the solidified basalt because of probable contraction cracking. No possibility would exist for corrective action, and long-term surveillance would be required to monitor the heating and cooling cycle.

— **Seabed Disposal.** Additional permanent disposal methods that have been proposed include the deposition of high level waste in the sediments or other formations under the sea either by projectiles, by drilled holes or in excavated trenches. This disposal method could provide required containment, and cost would be comparable with mined geologic disposal. However, U.S. law currently prohibits sea disposal of high level waste.

— **Ice Sheet Disposal.** Properly prepared and canistered high level waste could be placed on the Greenland or Antarctic ice sheets and be allowed to melt its way to the underlying earth surface. This method has raised both environmental and political questions.

— **Space Ejection.** Space ejection of high level waste using the shuttle and a second phase vehicle would be possible. However, 100 to 250 flights per year could be required by year 2000, making costs very high. Although once placed in solar orbit the waste would be contained, a failure of the system between take-off and orbit placement would be very difficult or impossible to correct.

Nuclear Waste Glossary

Uranium - A toxic heavy metal occurring in nature. It is 99.3 percent U238 and 0.7 percent U235.

Enriched Uranium - Uranium with an increased percentage of U235 for use as fuel in light water reactors. Higher enrichments are required for weapons and may be used for other purposes. The U235 is increased from a naturally occurring 0.7 percent to 2 percent to 4 percent.

Plutomium - A very toxic heavy metal used in nuclear weapons or as a nuclear fuel. This material is produced in fission reactors through neutron bombardment of uranium atoms.

Basalt - A crystalline rock of volcanic origin.

Tuff - A geologic formation consisting of consolidated volcanic ash.

Bedded Salt - A geologic formation of salt deposited in layers.

Salt Dome - A geologic formation in which there is a central equidimensional or dome shaped salt plug.

Nuclear Waste Policy Act of 1982 -Public Laws 97-425 passed by Congress in 1982 and signed by the President January 7, 1983, established a step-by-step process for siting, construction, and operation of a high level nuclear waste repository.

Environmental Impact Statement (EIS) - A report of the potential effect of plans for land use in terms of the environmental, engineering, esthetic, and economic aspects of a proposed objective.

Environmental Assessment (EA) - A report prepared prior to undertaking an EIS but addressing similar issues. An EA generally is used in preliminary screening of sites.

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