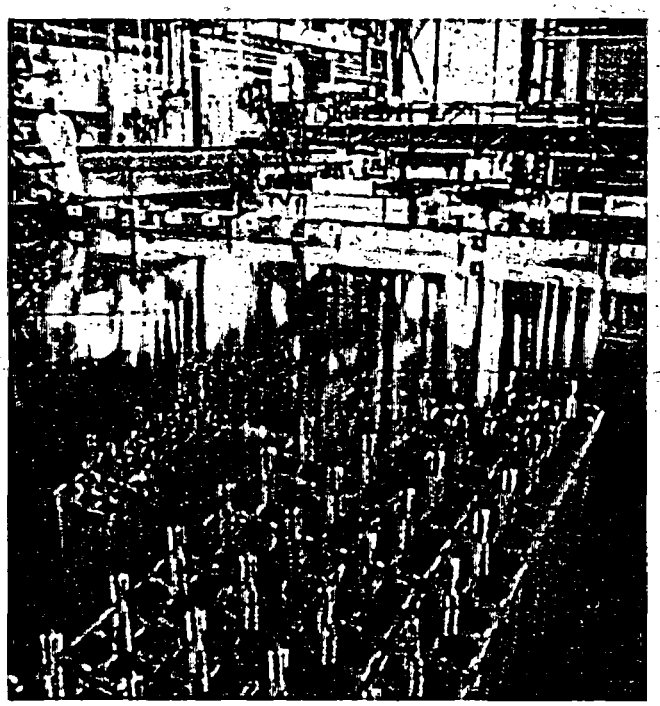
NEWSLETTER '85

WASHINGTON NUCLEAR WASTE BOARD · WASHINGTON NUCLEAR WASTE ADVISORY COUNCIL



Spent fuel is currently stored in pools at nuclear power plants.

SPENT FUEL — TEMPORARY STORAGE TODAY...

More than 80 nuclear power plants operating in the United States today are producing radioactive wastes. The wastes are currently in temporary storage at each power plant, awaiting permanent disposal.

Just how is this waste generated? Nuclear power plants use a process called "nuclear fission" to create electricity. Uranium fuel is loaded into the reactor and, as fission takes place, the fuel is gradually used up. Meanwhile, wastes are produced which make the process less efficient. After an average of about three years, the used fuel must be removed and replaced with fresh uranium. This "spent" fuel, however, continues to be radioactive — even more radioactive than fresh fuel. The U.S. currently stockpiles over 10,000 tons of spent fuel at various nuclear power plants throughout the country. Each power plant produces about 30 tons of these wastes annually.

Temporary storage of these highly radioactive wastes is not a new phenomenon. Nuclear power plants have been storing spent fuel onsite for more than 25 years. The spent fuel is stacked, or "racked," in steel-lined, water-filled concrete basins (see cover photo). The water cools the fuel and provides shielding against the radiation. As further protection to workers, the fuel is handled by remote-controlled devices.

Short-term storage of spent fuel at nuclear power plants has been judged by regulatory agencies to be safe. The U.S. Nuclear Regulatory Commission (NRC) dictates how much can be stored at each power plant, as well as the way in which it is stored. However, many storage facilities at power plants will reach capacity before the end of the century.

Originally, many utilities planned to reprocess commercial spent fuel to recover valuable plutonium and uranium. (Reprocessing produces liquid high-level waste, which must be solidified into glass before disposal.) Federal estimates suggest that reprocessing would reduce the annual commercial requirement for natural uranium by 35 percent. Some commercial reprocessing did take place before 1972, but was temporarily suspended because of regulatory problems and federal policies on nuclear non-proliferation. Although now supported by President Reagan, the process has not yet proven to be economically attractive to private industry. Without reprocessing, current onsite storage space is rapidly reaching capacity.

Congress concluded that to meet long-term safety and health requirements, deep geologic disposal of this waste would be the better storage method than leaving it in the storage pools. The NRC would continue to license and regulate spent fuel as it is disposed of in a high-level nuclear waste repository.

As an interim step, USDOE is planning to send commercial spent fuel to a "Monitored Retrievable Storage" site (MRS) for packaging and, perhaps, temporary storage. Spent fuel would then be shipped from the MRS site to a repository for permanent disposal. (For a more detailed discussion of the MRS system, refer to the June/July 1985 Newsletter).

WHAT'S INSIDE???

AUGUST/SEPTEMBER 1985

VOLUME 2 - NUMBER 4

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STATE OF WASHINGTON

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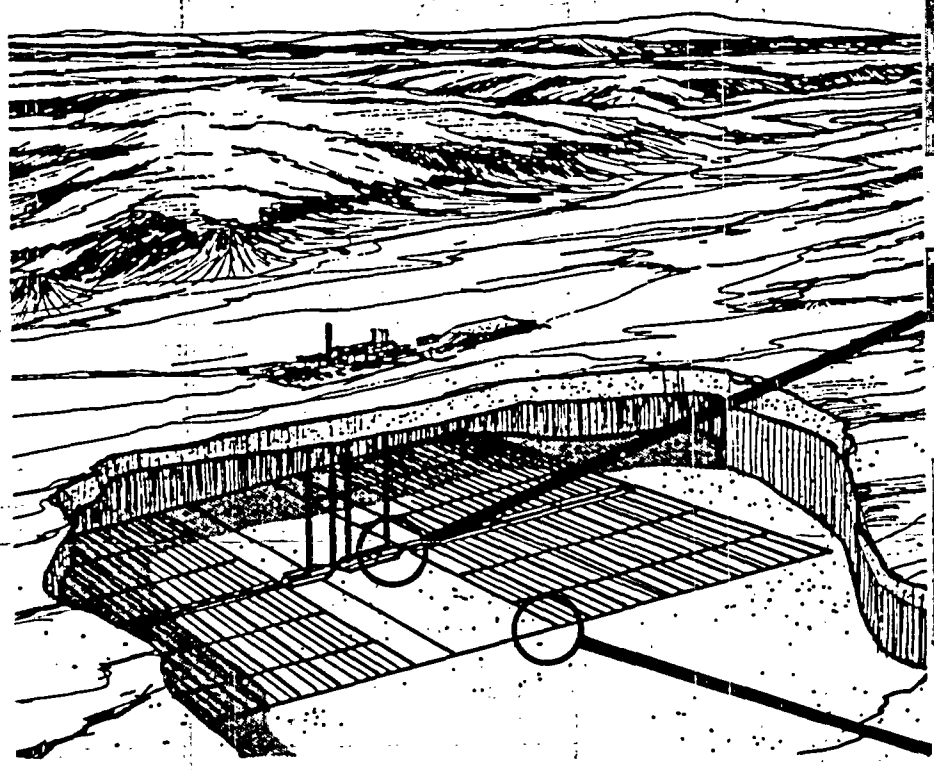
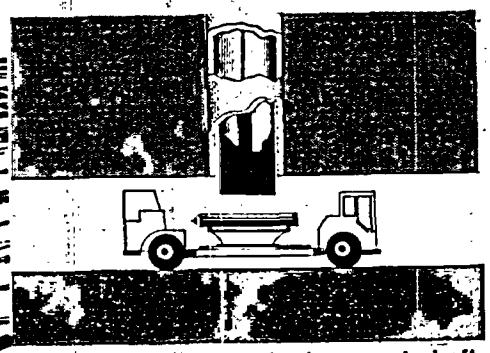
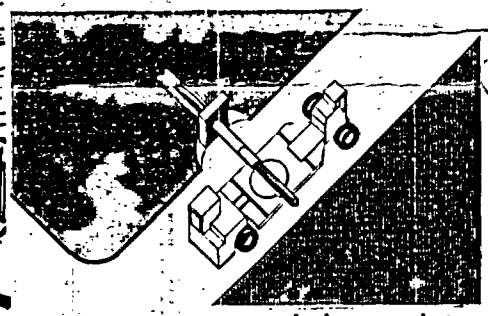




waste transport shaft

Artist's rendition of a geologic repository.



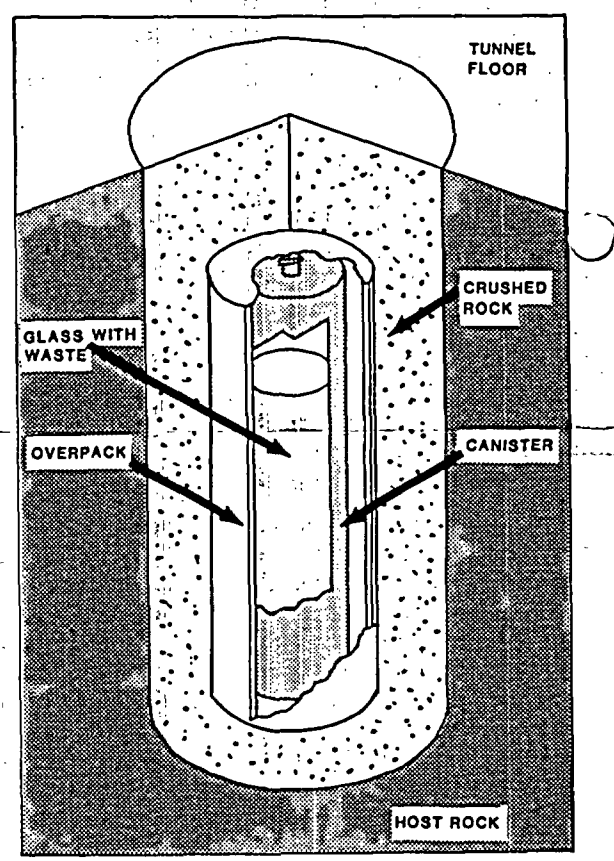
waste transporter.

...PERMANENT DISPOSAL TOMORROW

Nuclear scientists have considered a number of options for disposing of the high-level nuclear wastes we produce. The options range from deep sea disposal to launching waste containers into space. Current USDOE plans are for permanent disposal of high-level nuclear wastes in a deep geologic repository by the late 1990s. A second repository is planned to open just after the turn of the century. According to the federal Nuclear Waste Policy Act, several sites must be studied and evaluated for suitability — and Hanford is one of those sites.

Evaluation of a potential repository site at Hanford is progressing, although a final decision on whether the site is suitable for a repository will come much later. A general site description is easy to visualize. The federal government owns over 570 square miles of land at Hanford. The repository would be located near the center of the property and occupy about three-fourths of a square mile on the surface. Approximately 3,200 feet underground would be a maze of tunnels and shafts covering nearly two square miles. The shafts would be up to 12 feet in diameter and would be used to transport waste and workers, provide air intake, and vent exhaust. The tunnels would be divided into storage areas, each holding approximately 1,900 tons of spent fuel.

Keeping in mind that Monitored Retrievable Storage (MRS) may change some aspects of handling the wastes, let's look more closely at the shipping and disposal process. Solidified high-level waste and spent fuel would arrive in shipping casks by truck, train, or both from around the country. Estimates place the total number of shipments at 17 trucks or 2 railcar



Close-up of waste package.

loads per day. The shipping casks (see diagram) would be designed to protect the environment should an accident occur.

At the repository, the waste would be taken from the transportation casks. Fuel rods would be removed using remote-controlled devices and packed tightly in canisters of 3-inch thick steel (see diagram). Each canister would be about 15 feet long, weigh approximately 30 tons, and be designed to contain waste for at least 300 years. Once filled, the canister would be welded shut, then taken in a large elevator to one of the storage tunnels beneath the earth's surface. Workers dressed in protective clothing and riding in radiation-shielded vehicles would transfer the casks to "placement" holes. Using remote control, workers would place the casks into bored holes in the basalt rock (see diagram). The cask would then be covered with crushed basalt and bentonite clay.

Once the repository stopped receiving wastes, it would be monitored by both the state and federal governments. Although secure, it would remain unsealed for a number of years. Should reprocessing become economical, spent fuel could then be retrieved and reprocessed. After 50 years, the repository would be sealed and would rely on natural barriers such as layers of basalt to contain the wastes.

INTERVIEW WITH JACK W. LENTSCH, MANAGER OF NUCLEAR SAFETY AND REGULATION DEPARTMENT, PORTLAND GENERAL ELECTRIC

1. How do you store spent fuel at your Trojan nuclear power plant?

Spent fuel from operation of the Trojan plant is stored in racks in a water-filled pool on the Trojan site. Each spent fuel assembly has its own rack slot. The pool is approximately 40 feet long, 30 feet wide, and 40 feet deep. It is made of reinforced concrete and lined with stainless steel. The water cools the fuel and provides shielding from penetrating radiation given off by the fuel assemblies. The temperature of the water averages a little below 100° Fahrenheit, and can reach about 130°. The cooling effect of the water is very important.

2. How radioactive is the spent fuel?

When spent fuel is removed from the reactor core, it is extremely radioactive. You could compare it to the intensity of a chest x-ray machine that's left on continuously. The radioactivity level of spent fuel varies according to how long it was in the reactor and how long since it was removed from the core. After one year, the radiation level of the spent fuel is greatly reduced. The radioactive intensity of the spent fuel then continues to "decay" or decline more slowly.

3. How do you protect your workers around the spent fuel pool?

Workers are protected in several ways. Storing the spent fuel in 20 feet of water provides shielding from the radiation. Anyone working in the spent fuel area also wears anti-contamination clothing at all times. This consists of a hooded yellow suit made of tightly woven cotton, rubber gloves with a cotton insert, and plastic boots with rubber boots over them, similar to galoshes. We also conduct continuous personnel radiation detection and environmental monitoring.

4. How much spent fuel do you have in storage?

We currently have 340 spent fuel assemblies in the pool. This is all the spent fuel that Trojan has generated since it began operating in 1976; no spent fuel has been shipped away.

5. How do you create more space — by reracking?

The Trojan plant was originally built to store 258 spent fuel assemblies. In 1978 it was expanded to hold 651 assemblies by reracking. Reracking means simply to replace the old racks with new racks, allowing the spent fuel to be placed closer together. In 1984, the pool was reracked to store 1,408 assemblies, and as I said earlier, we currently have 340 on hand.

NEW PUBLICATIONS IN REFERENCE CENTER

Argonne National Laboratory. 1984. Laboratory studies of a breached nuclear waste repository in basalt. For U.S. Nuclear Regulatory Commission. 133 pp. (NUREG/CR-3710).

Envirosphere Company. 1985. High-level nuclear waste issue tracking system for the Washington State Department of Ecology High-Level Nuclear Waste Management Office. Bellevue, WA.

Pacific Northwest Laboratory. 1985. Environmental Monitoring at Hanford for 1984. K.R. Price et al. For U.S. Department of Energy. Richland, WA. 64 pp. plus appendices. (PNL-5407).

U.S. Department of the Interior (U.S. Geological Survey). 1985. Comments on draft environmental assessment for a nuclear waste repository at the Hanford site. Washington, D.C. (Letter from Bruce Blanchard, Director Environmental Project Review, USDOI to U.S. Dept. of Energy).

Waste Management '85; Waste Isolation in the U.S., Technical Programs and Public Education. Proceedings of the Symposium on Waste Management. Tucson, AZ. May 24-28, 1985. Roy G. Post, ed. 3 vols. Vol. 1: High-Level Waste. Vol. 2: Low-Level Waste. Vol. 3: General Interest. Sponsored by American Nuclear Society, American Society of Mechanical Engineers, Electric Power Research Institute, The University of Arizona College of Engineering, and U.S. Department of Energy.

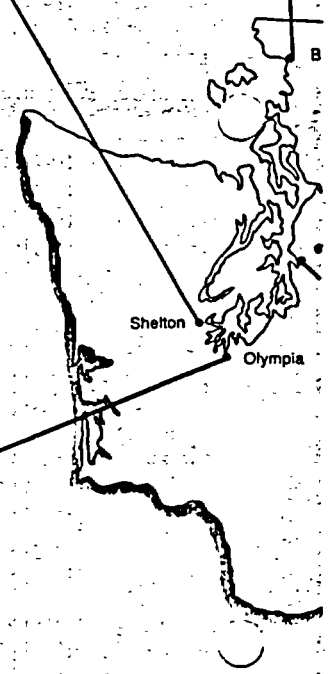
Warren Bishop
Chair, Nuclear Waste Board.
Management consultant and former state budget director. Former vice president of Washington State University.
206/459-6670

Senator H.A.
President Pro
Democrat from
Former univer
WWU. Vice pr
ment consultir
206/786-7682

WHO'S WHO: A GUIDE TO THE NUCLEAR WASTE BOARD

The Washington State Nuclear Waste Board develops the high-level nuclear waste management policies for our state. One of its primary missions is to protect our state's environment, and public health and safety. To accomplish this task, it reviews, monitors, and makes recommendations on nuclear waste activities affecting our state, particularly the investigation of a high-level nuclear waste repository at Hanford. Negotiations between our state and the federal government on high-level waste issues are the responsibility of the Board. Currently, the Board is reviewing USDOE studies on the Hanford site and encouraging public review of the site selection process. Ultimately, the Board will recommend to the governor and state legislature whether Hanford should be approved by our state as a repository for nuclear waste.

The Board was created in 1983 and consists of 15 members. The chair is a citizen appointed by the governor, a position presently held by Warren Bishop. Five state agencies are represented on the Board, including the Washington Department of Ecology, the State Energy Office, the Department of Social and Health Services, the Energy Facility Site Evaluation Council, and the Department of Natural Resources. The director of the Washington Water Research Center and eight ex officio legislators also serve on the Board.



Brian Boyle
Washington State Commissioner of Public Lands
Degrees in engineering and business administration. Experience in metal industries for 14 years and in public service since 1974.
206/753-5317

Andrea Beatty Riniker
Director, Washington State Department of Ecology
Graduate, Univ. of Delaware. Former Bellevue city manager and assistant city manager in Austin, Texas.
206/459-6168

A. N. "Bud" Shinpoch
Secretary, Washington State Dept. of Social and Heath Services.
Dept. of Social and Health Services. Former State Dept. of Revenue Director, state legislator and manager at Boeing.
206/753-3395

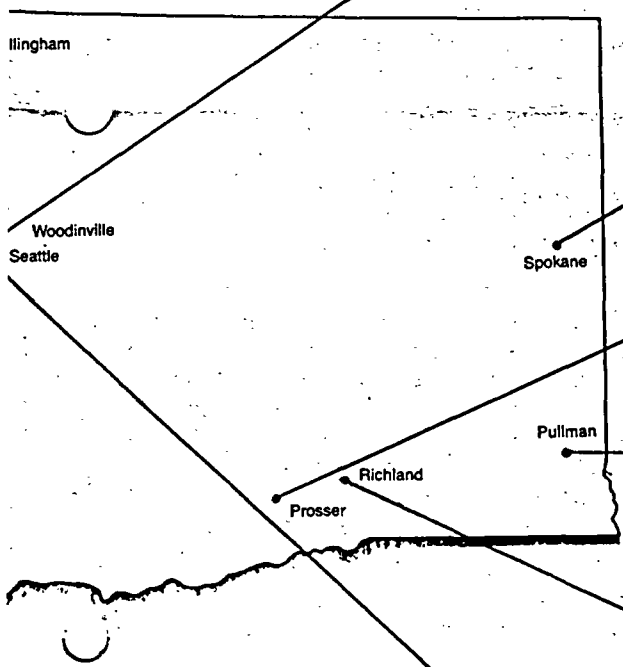
Curt Eschels
Chair, Energy Facility Site Evaluation Council (EFSEC)
University of Wisconsin graduate in physics. Policy analyst and former staff coordinator of Senate Energy Committee.
206/459-6490

Richard H. Watson
Director, Washington State Energy Office
Graduate degree in aeronautical and astronautical engineering. Former senior research analyst for Washington Senate Energy and Utilities Committee.
206/754-0701

'Barney" Goltz
Tempore
the 42nd District.
ty planning director at
sident of a manage-
) firm.

Representative Louise Miller
Republican from District 45.
Washington State Arts Commission board member. Music degree with teaching credentials from San Jose State University. Former Woodinville Water Dist. Commissioner, 7 yrs.
206/786-7822

Senator Sam Guess
Republican from the 6th District.
Degrees in engineering from Washington State University and University of Mississippi. Registered professional engineer. Now serving his 6th term.
206/786-7610



Senator Max Benitz
Republican from District 8.
Self-employed in agricultural business. Former chair of Senate Energy Committee. Past president of Washington Farm Bureau Federation and former chair of House and Senate Higher Education Committees.
206/786-7614

Dr. William Funk
Director, Washington Water Research Center
Doctorate in limnology Major research in water quality and lake restoration
President, North American Lake Management Society.
509/335-5531

Representative Nancy Rust
Democrat from the 1st District.
Mathematics degree from University of Iowa. Member, League of Women Voters. Chair, House Environmental Affairs Committee.
206/786-7880

Representative Shirley Hankins
Republican from District 8.
Member of American Nuclear Society - Richland Section, Tri-City Technical Council, Pennsylvania Power and Light Advisory Board, Business and Professional Women's Club. Employed by UNC Nuclear Industries.
206/786-7986

Representative Dick Nelson
Democrat from the 32nd District.
Chairs Energy and Utilities Committee.
Now serving his 5th term. A Seattle native with engineering degrees from the University of Washington and MIT.
206/786-7826

Senator Al Williams
32nd District Democrat.
Chairs Senate Energy and Utilities Committee. Past chair of Joint Science and Technology Committee.
An architect and graduate of University of Washington.
206/786-7662

STUDYING HANFORD MORE CLOSELY — SITE CHARACTERIZATION MAY BE NEXT STEP

According to the USDOE timeline, the final decision on whether or not to locate a high-level nuclear waste repository at Hanford is a long way off. First, final environmental assessments must be published and USDOE plans to issue them late this fall (1985). The draft assessment issued in December 1984 named the Hanford site as one of the top three locations for further consideration. The Nuclear Waste Board anticipates that the final document may still show the Hanford Site on the list for further study.

If this is so, a step called "site characterization" comes next. It fits into the USDOE's overall site selection process: at each step fewer potential sites remain under consideration, but each is examined more closely than before. A federal decision to "characterize" the Hanford site still does not mean a repository will be built there. Along with at least two other locations around the country, the site would undergo extensive geologic and hydrologic studies. Environmental conditions and other potential impacts also would be studied at the same time.

These 3 to 5 year studies will provide information for an environmental impact statement (EIS) to be written for each site. The EIS will then be used to select one site for licensing, and ultimately, construction.

What is "site characterization?" Two large shafts will be drilled deep into the earth for underground exploration and tests. At the 3,200 foot level where the repository would be built, shafts and underground rooms will be constructed. These rooms will allow scientists and engineers to study the underlying basalt: how it is layered, fractured, connected, and the types of minerals in the rocks. To know whether a repository could safely contain high-level wastes for thousands of years, USDOE must understand the rock structures and their potential for cracking, moving, and earthquakes. USDOE must also evaluate the flow of groundwater, both speed and direction, and how the chemistry of the groundwater might affect the movement of radioactive materials.

While the underground "picture" is being drawn, site characterization will also consider potential impacts that repository construction and operation may have on the local area. Environmental researchers will look closely at plants and animals, the weather, and cultural or archeological features. Socioeconomic studies will focus on predicting impacts of the repository on population, economic and social conditions, community services such as schools and roads, the local government and tax structures.

Site characterization itself may cause impacts, even if no repository is built at Hanford. As workers drill exploratory shafts and perform the detailed studies, USDOE expects some effects on surface water and groundwater, and disturbance of the land surface. Drilling and construction would increase dust and pollutant levels, and cause noise which may affect wildlife. Added population during construction may create some socioeconomic impacts, and the USDOE also predicted some safety problems with underground mining.

A detailed plan for site characterization and for mitigating negative impacts will be issued by USDOE in 1986 if the Hanford site is selected for characterization. The state Nuclear Waste Board will carefully review and monitor federal siting acitivities and may conduct independent studies.

LIABILITY — WASHINGTON WANTS A COMMITMENT!

Governor Booth Gardner recently transmitted testimony (June 25) to the U.S. Senate Sub-committee on Energy Research and Development. The testimony explained the state's position on liability involving nuclear waste management. For some time, Washington State has asserted that the federal government should take full responsibility for risks of managing high-level nuclear wastes. The state has maintained that no federal law exists to adequately address the issue of who is liable in case of possible accidents involving nuclear waste.

In testimony prepared for the sub-committee, the Governor reasserted the state's position points:

1. Strict and absolute federal liability, without regard to fault, should be fundamental to federal policy.
2. Full compensation should be provided, regardless of fault, to all victims of any nuclear incident arising under the Nuclear Waste Policy Act's (NWPA) program.
3. A program should be established to provide victims with compensation for losses expeditiously and without any undue burdens.
4. States and other entities should be held harmless from any liabilities that they might otherwise incur through any incidental role they may have in the Nuclear Waste Policy Act's implementation.

Congress presently is considering several bills to affirm federal liability policy on nuclear issues. Each Congressional proposal builds upon the 1957 Price-Anderson Act. The federal Price-Anderson Act deals with liability involving commercial nuclear reactors. Governor Gardner stressed in the testimony that Congress should examine all legal and financial aspects of a liability program tailored especially for potential accidents that may occur involving the nuclear waste management program.

The Governor stressed that the State of Washington was commited to participate actively in the federal repository siting program, yet emphasized that the state will not accept the siting of a repository here unless it is convinced that Hanford is the safest, best site and acceptable to the state's citizens.

Washington State asserted that the U.S. must take full responsibility, absolutely, without regard to fault, for all injuries and damages arising from radioactive releases that may occur during implementation of the NWPA. As a result of USDOE selecting the Hanford site as potentially one of the top three repository sites to be studied further, the Governor stressed it is imperative that all the state's citizens are fully protected as each phase of the NWPA process develops.

USDOE ANNOUNCES REVISED PLAN

The U.S. Department of Energy just released its revised Mission Plan for the Civilian Radioactive Waste Management Program. This plan describes how the federal government is planning to dispose of spent nuclear fuel and high-level waste. It responds to over 2,500 comments received from states, Indian Tribes, government agencies and the public on a previous draft issued in April 1984.

Key items in the revised Mission Plan include:

- *USDOE's commitment to accept waste from utilities by 1998;*
- *USDOE's preference to use Monitored Retrievable Storage in combination with a geologic repository;*
- *Detailed discussion of waste transportation issues;*
- *Commingling of defense and commercial wastes;*
- *USDOE's plan to drill two exploratory shafts; and*
- *USDOE's plan to select three candidate sites for a repository before, rather than after, site characterization is complete.*

The High-Level Nuclear Waste Management Office has copies of the document available for your review in the resource center. You may also request a copy from USDOE by calling Ginger King at 202/252-2835, or writing to:

Mission Plan Request Services
Technical Information Center
U.S. Department of Energy
P.O. Box 62
Oak Ridge, Tenn. 37831

If you wish to schedule a group presentation by one of our staff members, want to receive any of the newsletters or fact sheets, visit the reference center, or just have a question you want answered, call or write:

The High-Level Nuclear Waste Management Office
Department of Ecology, PV-11
Olympia, Washington 98504
206/459-6670

WRITE TO KNOW

We receive many questions and comments from our readers and are happy to respond. Many of you have some of the same questions. This edition of the newsletter initiates a section called "Write to Know." Questions frequently asked will be addressed here to help you better understand the issues surrounding a potential repository at Hanford.

Q Why not put high-level waste in containers and monitor it above ground?

A In 1982, Congress passed the Nuclear Waste Policy Act, which stated that high-level nuclear waste must be permanently stored in deep geologic repositories. The primary concern was protecting human health, safety, and the environment in the long term. Above ground storage was studied, but was considered inadequate for such long-term protection because of the potential for natural hazards, such as erosion, and human contact.

Q Won't the liquid waste seep quickly into the groundwater?

A High-level waste disposed of at the repository or MRS will not be in liquid form. The spent fuel rods are solid and will be stored in sealed canisters. Liquid high-level wastes will be solidified into glass before shipment to and disposal into a repository.

UPCOMING EVENTS

Nuclear Waste Board (1:30 pm)
Advisory Council (9:30 am)

MEETINGS

- September 20, 1985
- October 18, 1985

Meetings are held in:

The Energy Facility Site Evaluation Council
EFSEC Hearings Room
4224 6th Avenue S.E.
Building 1
Lacey, Washington

The U.S. Department of Energy (USDOE) has a toll-free number for you to find out more about its programs and activities. Call 1-800-368-2235.

The U.S. Nuclear Regulatory Commission (NRC) also provides a number for information about meetings. Call 1-415-943-3825.

This newsletter is issued by the High-Level Nuclear Waste Management Office under direction of the Nuclear Waste Advisory Council. It is funded in part through a federal grant from the U.S. Department of Energy.

STAMP

High-Level Nuclear Waste Management Office
Department of Ecology PV-11
Olympia, WA 98504

We Want to Hear From You....

I'd Like a Fact Sheet on:

1. [ ] Overview: High-Level Nuclear Waste Management in Washington
2. [ ] What is High-Level Nuclear Waste?
3. [ ] Finding a Repository Site - Step by Step
4. [ ] Repository Concept: Deep Geologic Disposal
5. [ ] Transportation
6. [ ] Geology/Hydrology at the Hanford Site

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WASHINGTON, DC 20555

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