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Site Characterization Key Issues for Washington State

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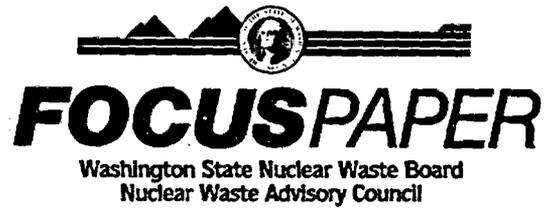
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**SITE CHARACTERIZATION:
KEY ISSUES FOR WASHINGTON STATE**

**OFFICE OF NUCLEAR WASTE MANAGEMENT
WASHINGTON DEPARTMENT OF ECOLOGY**

JULY 1987

ABSTRACT

The Washington State Nuclear Waste Board and Advisory Council have identified several key technical and programmatic issues which must be resolved as Hanford is characterized for a high level radioactive waste repository. The Office of Nuclear Waste Management has prepared a focus paper which discusses these issues, recommends actions the U.S. Department of Energy can take to resolve them, and describes how citizens can become involved. Particular technical concerns raised in the focus paper include: groundwater travel time, regional geologic features, miner safety, earthquake swarms, presence of natural resources, radionuclide and chemical contamination, retrievability, program and data management, and overall site characterization approach. An additional concern raised is the need for a longer review period for the 9,500 page Site Characterization Plan.

INTRODUCTION

On May 28, 1986, the President approved the U.S. Department of Energy's recommendation of Hanford in southeastern Washington state as one of three candidate sites for a repository for the nation's high-level nuclear waste. For more than 40 years, Hanford has been used for nuclear activities by the federal government. The site was originally developed as part of the Manhattan Project to produce plutonium for weapons used in World War II. Plutonium production has continued at Hanford to the present day.

The Nuclear Waste Policy Act (NWA) of 1982 set out a process and schedule to identify two deep geologic repositories for high-level nuclear waste. To determine whether or not Hanford can meet the requirements for deep geologic isolation of highly radioactive wastes for an extended period of time into the future, the U.S. Department of Energy (USDOE) has embarked on a five to six year, \$1.2 billion study program at Hanford. Under the NWA, this program of studies, referred to as "site characterization", must be described in a Site Characterization Plan (SCP). The NWA requires USDOE to provide the SCP for review by the U.S. Nuclear Regulatory Commission (USNRC), the affected

states and tribes, and the public before beginning to drill the exploratory shafts necessary for site characterization.

The SCP for Hanford (a 9,500 page document that cites 1,865 references) outlines and provides the rationale for the site characterization program, details the information required, and explains how data will be obtained to determine the suitability of the Hanford site. In addition, the SCP provides a detailed schedule and quality assurance plans.

The state of Washington has been closely tracking the repository site selection process and will continue to do so during site characterization. Reviewers have identified a number of technical issues and concerns related to the capabilities of the Hanford site to meet the isolation requirements for a high-level nuclear waste repository. The state also has numerous procedural concerns about the way in which USDOE conducted its selection process. It has several lawsuits pending in federal court to halt the siting process and to require USDOE to follow the procedures set forth in the NWA. Washington state will continue to insist that USDOE's plans must respond to these issues and concerns.

The purpose of this focus paper is to provide citizens with an overview of the state's issues related to site characterization. This is part of the goal of the state's public information and involvement program. The Washington State Nuclear Waste Board and Nuclear Waste Advisory Council will sponsor public information meetings about the SCP and the related issues, and provide an opportunity for citizens to express their views to state officials. Public comments and concerns will be considered in the state's review of the SCP. Citizens are also encouraged to participate in public meetings and the review process sponsored by USDOE.

In order to place the issues in perspective, this paper will explain:

- Why a repository is needed
- How Hanford was selected for site characterization

and describe:

- The USDOE approach and schedule

- The state of Washington's technical program and policy issues
- Specific opportunities for public involvement

Particular technical concerns identified by Washington State and described in the report include:

- Groundwater travel time
- Regional geologic features
- Mining conditions in deep basalt
- Earthquakes
- Presence of natural resources
- Radionuclide and chemical contamination
- Retrievability of wastes
- Program and data management
- Overall site characterization approach

BACKGROUND

Since the late 1950's, nuclear wastes in the form of spent nuclear fuel rods have been accumulating in temporary storage pools at commercial nuclear reactor sites throughout the country. Presently, spent fuel assemblies containing more than 12,000 metric tons of uranium are stored at 93 commercial nuclear power plants. These plants are adding about 2,000 tons each year. By the year 2000, the total amount of spent fuel is expected to reach nearly 40,000 tons.

These spent fuel rods are considered "high-level" wastes because they contain radioactive elements in such high concentrations that they must be handled remotely. Water circulating in storage ponds cools the fuel rods and blocks the intense radiation. All of the radioactive elements will decay to harmless levels eventually, but for some, the decay is so slow that they will remain dangerous for hundreds of thousands of years. Forty years of defense-related operations at Hanford have also generated large quantities of high-level nuclear wastes now temporarily stored on the site.

By the late 1950's, with the growth of the commercial nuclear power industry and the Cold War nuclear weapons buildup, it became clear that short-term solutions to nuclear waste disposal must give way to disposal methods which would provide long-term isolation from the environment. In a 1957

report to the Atomic Energy Commission, the National Academy of Sciences recommended disposal of nuclear wastes in stable geologic (rock) formations.

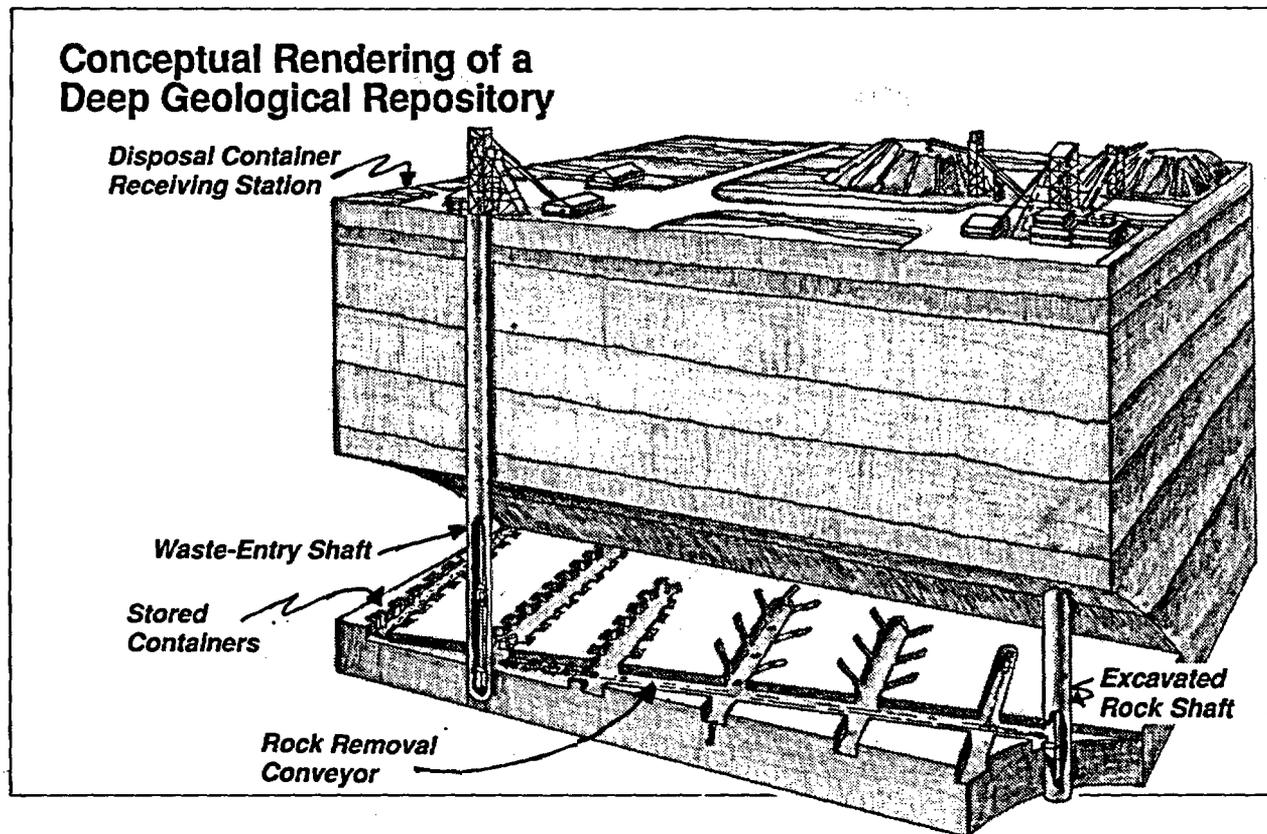
What Would a Repository at Hanford Look Like?

The search for stable rock formations in the continental United States has included the basalts under Hanford. A geologic repository would look much like a large mining operation. Surface facilities to handle the nuclear waste would occupy about 400 acres. About five separate shafts would be constructed to depths of 3,200 feet for personnel and equipment, wastes, and ventilation. Tunnels in which the wastes would be buried would extend horizontally from the bottom of the shafts to occupy an area of roughly two square miles. The repository would be in operation for about 25 to 30 years. At least 50 years after the first wastes are buried, the repository would be closed and sealed. The period of operation during active transportation and burial of wastes is termed the "preclosure period." The final closure and sealing of the wastes would mark the beginning of what is termed the "postclosure period," a planning period in excess of 100,000 years.

An important part of the repository would be the "engineered barriers." These would include the metal canister that contains the spent fuel rods, a second metal burial container, and a crushed rock and clay mixture that would fill the space between the metal waste container and the surrounding rock wall. This container and mineral combination is called the "waste package." This package must meet U.S. Environmental Protection Agency (USEPA) and U.S. Nuclear Regulatory Commission (USNRC) requirements that the waste package provide complete containment for a minimum of 300 years. The final engineered barrier would be the repository seals, which would involve backfilling and sealing the shafts and tunnels.

How Was Hanford Selected for Site Characterization?

The Nuclear Waste Policy Act (NWPA) passed by Congress in 1982 directs USDOE to select sites for two permanent high-level nuclear waste reposi-



positories in the United States. In April 1983, the USDOE identified nine potentially acceptable sites for permanent disposal in stable geologic formations. Draft Environmental Assessments (EAs) for the nine sites were prepared and issued in December 1984 by USDOE. The Secretary of Energy nominated five of the nine sites as suitable for site characterization.

A decision-aiding methodology was developed by USDOE to assist in determining the preferred ranking of the five nominated sites. The ranking methodology involved evaluations of a number of preclosure and postclosure siting objectives. Four major performance objectives were identified for preclosure: (1) minimize adverse impacts on health and safety before closure, (2) minimize adverse environmental impacts, (3) minimize adverse socioeconomic impacts, and (4) minimize economic costs.

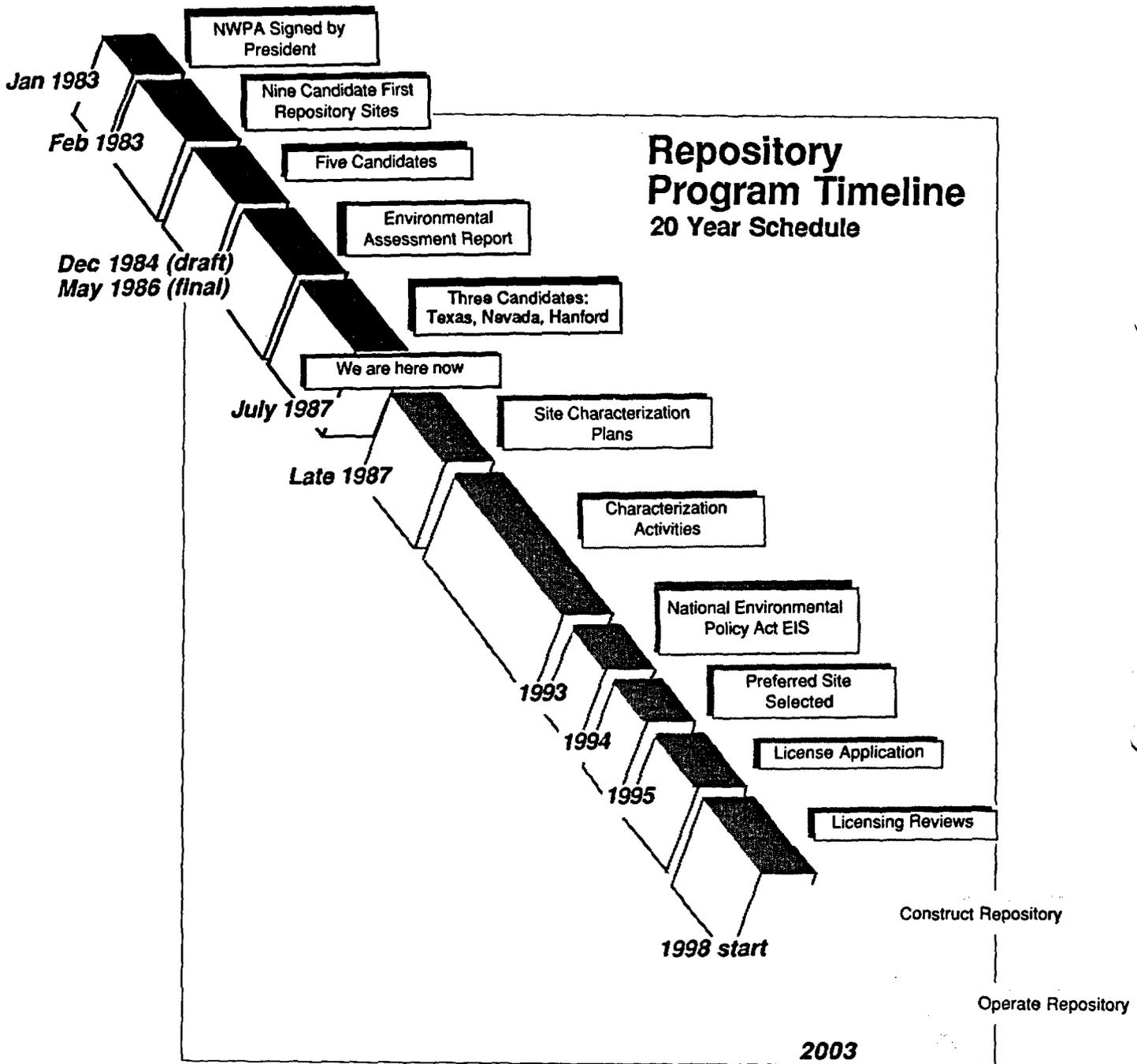
Overall, the Hanford site ranked as least suitable in these preclosure objectives. The Yucca Mountain site in Nevada ranked most suitable. On individual objectives, Hanford was the least suitable site based on health and safety impacts and economic costs and the most suitable based on en-

vironmental and socioeconomic impacts. According to USDOE, if economic costs are not considered, Hanford ranks as the most suitable overall site in the preclosure period followed by Yucca Mountain.

USDOE identified two postclosure objectives related to the isolation of the high-level wastes from the accessible environment: (1) minimize adverse health effects attributable to the repository during the first 10,000 years after closure, and (2) minimize adverse health effects attributable to the repository during the period 10,000 to 100,000 years after closure.

Hanford ranked last on postclosure and overall, being the least safe and most expensive of the five sites. For both time periods, the Hanford site would produce significantly greater cumulative releases of radioactive elements to the accessible environment than other sites. However, USDOE estimated these releases to be much lower than the EPA limits and judged that there was little practical advantage of one site over another site with respect to postclosure performance.

On May 27, 1986, the Secretary of USDOE



issued the final EAs on the five sites, and recommended three sites to the President as suitable for site characterization: the Yucca Mountain site in Nevada, the Deaf Smith site in Texas, and the Hanford site in Washington. The following day, May 28, 1986, President Reagan approved the recommendation. The President's approval formally initiated the characterization of the Hanford site as a candidate for the nation's first nuclear waste repository. In the Secretary's report documenting the recommendation, maximum diversity of geologic setting and rock type were stressed as major factors in the final decision. Other factors which influenced the recommendation of the Hanford site included federal ownership of the land and its control by USDOE.

What Is Site Characterization?

The NWSA defines site characterization as "activities whether in the laboratory or in the field, undertaken to establish the geologic condition and the ranges of parameters of a candidate site..., needed to evaluate the suitability of a candidate site for the location of a repository." Site characterization consists of laboratory tests, tests conducted using drilled boreholes, geologic studies which can be conducted at the surface, such as geologic mapping and seismic surveys, and studies in the host rock at the proposed depth of the repository. The information gathered as a result of these activities will be used by USDOE in recommending one of the three candidate sites as the nation's first nuclear waste repository.

Major site characterization studies at the Hanford site under the Basalt Waste Isolation Project (BWIP) began in 1978 with the construction of the Near Surface Test Facility. By 1982, a site on the Hanford Reservation was selected as the Reference Repository Location (RRL) and a Site Characterization Report was issued. Later, a large drill rig was brought on site to drill the first exploratory shaft. Because the NWSA requires USDOE to submit a Site Characterization Plan (SCP) and make it available to the public, affected states and Indian tribes before proceeding to drill major exploratory shafts, USDOE has been limited to surface-based investigations since 1983.

SITE CHARACTERIZATION PLAN AND ACTIVITIES

USDOE expects to have the SCP for Hanford available by late 1987. When the SCP is released, there will be a 90-day comment period on sections related to the exploratory shaft drilling. The site characterization program is expected to narrow the range of uncertainties, eliminate alternative interpretations, and confirm or revise assumptions made in the final environmental assessment (EA) used in selecting Hanford as a candidate site. Similar studies will be undertaken at the Deaf Smith site in Texas and the Yucca Mountain site in Nevada. An environmental impact statement will compare sites after characterization is completed.

The SCP is divided into two principal parts. The first part describes the Hanford site, the waste package, and the repository. It will present existing information pertaining to the geology, geoengineering, hydrology, geochemistry, climatology, and meteorology of the site. The second part will be the major portion of the SCP and presents the site characterization program. It will present:

- The rationale for the planned site characterization program
- Issues to be resolved and information required during site characterization
- Planned tests, analyses and studies
- Planned site preparation activities
- Milestones, schedules, and decision points
- Quality assurance plans
- The decontamination and decommissioning activities related to the repository

Although not expressly stated in USDOE's outline, the NWSA requires the SCP to include plans for:

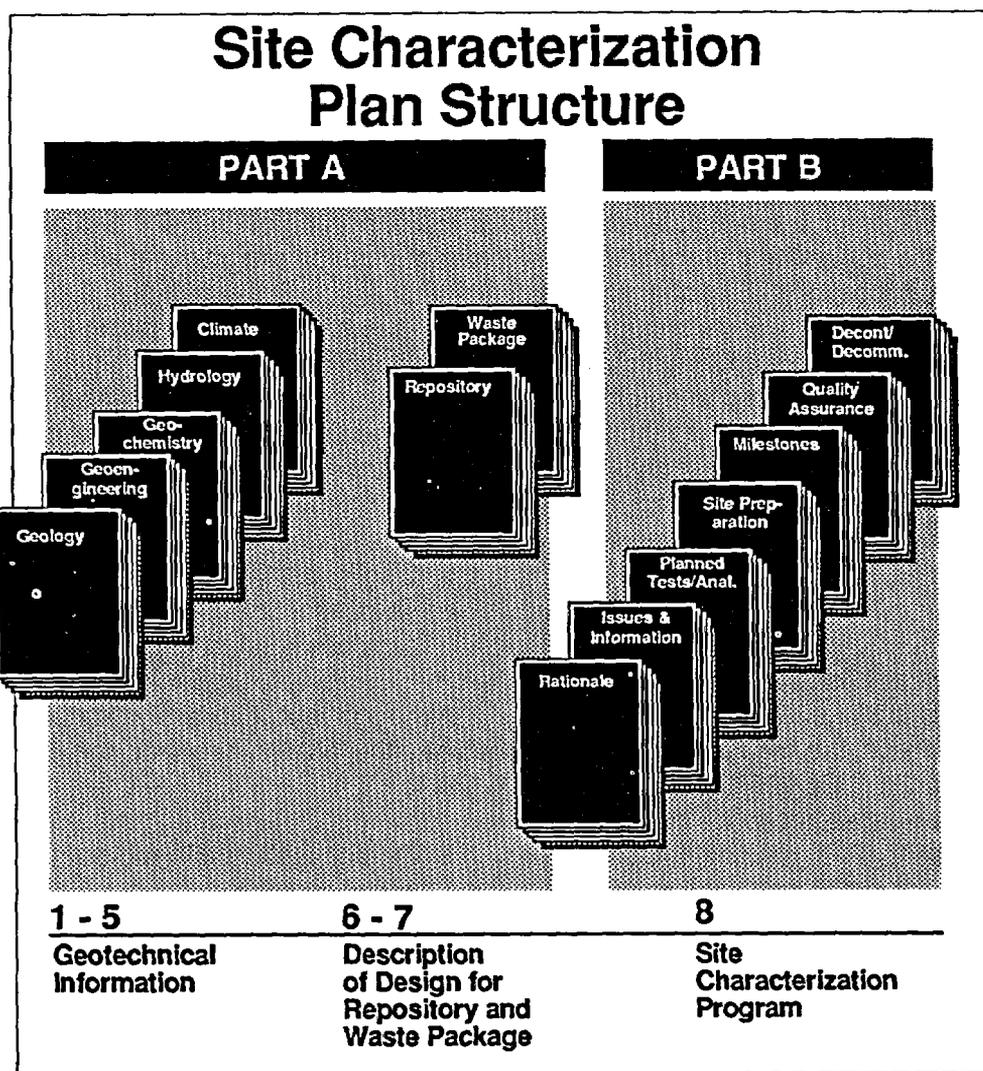
- On-site testing with radioactive or nonradioactive materials
- Activities that may affect capability of the site to isolate the nuclear waste
- Control of safety related impacts for site characterization activities
- Criteria to be used to determine the suitability of the Hanford site as the location of the repository

- The mitigation of any significant adverse environmental impacts caused by site characterization if the site is determined to be unsuitable as a repository

During site characterization, the NWPA requires USDOE to report at least every six months to the USNRC, the governor, the legislature, and the affected Indian tribes on the nature and extent of site characterization. Governor Gardner requested information from USDOE about ongoing and planned activities in October, 1986. USDOE's response outlining ongoing and planned activities included:

Hydrology. Program activities include the development of a conceptual model of the groundwater system beneath the Hanford site to determine the direction and rate of groundwater flow. Boreholes are being monitored to determine hydrologic parameters.

Geology. These activities support development of the stratigraphic and tectonic models of the Hanford site. These include seismic surveillance and data collection to determine the stability and structure of the site, and boreholes to determine the rock structure. Important structures would include faults and fractures in the rock.



Geochemistry. This program covers three main areas. Site geochemistry concentrates on characterization of groundwater chemistry and the transport of radioactive elements in the groundwater between the repository and the accessible environment. Rock geochemistry evaluates the types and chemical stability of mineral phases in the RRL. Engineered barriers geochemistry supports the development of geochemical models of the waste package and performance assessment of the waste package.

Geomechanics. This program measures engineering parameters which describe the mechanical, thermal, and thermomechanical behavior of the host rock at the Hanford site. Geomechanical studies will determine the amount and type of stress the deep rock formations are under at the Hanford site. This is important since drilling the large shafts and tunnels may release internal rock stress destroying the structural integrity of the rock. Thermal studies are important because at the proposed repository depth, natural geothermal temperatures are over 120 degrees Fahrenheit. The waste containers would also generate heat, which would add to the thermal stress in the host rock.

Waste package. The studies will test the performance of materials, design a waste package, and predict its long-term performance. The studies will include the effects of radiation on the waste package-groundwater-basalt isolation system to determine the durability of materials exposed to long-term radiation, and the transport and release of radioactive elements from the waste package.

Repository seals. These studies will assist in the design and development of the postclosure repository seals which must meet the USNRC and USEPA standards for waste isolation. These studies include water movement through the seals at various temperatures and mechanical properties of the material used for the seals.

A key part of the site characterization program at Hanford would be the construction of the Exploratory Shaft Test Facility (ESTF). This would allow testing of the host rock at the depth of the repository (approximately 3,200 feet). One of the largest drilling rigs in the world would drill two

exploratory shafts. The shafts would be lined with watertight steel casing that would be sealed in place with a cement grout. Once at depth, rooms and tunnels would be constructed to conduct tests on the host rock. Plans call for underground tunnels to be as much as 3,400 feet long. The drilling of the shafts and construction of the test facility would take about five years. However, drilling at Hanford cannot begin until public hearings are held on the SCP and USDOE has consulted with the state, affected tribes, and USNRC.

KEY ISSUES AND CONCERNS FOR WASHINGTON STATE

Both the state and USNRC, in their reviews of the final EA for the Hanford site, considered the evaluations and conclusions regarding site conditions made by USDOE to be overly optimistic. These concerns will have to be addressed in the site characterization studies. These concerns are summarized below.

Groundwater Travel Time

Groundwater investigations are critical to determining the performance of the Hanford site as a repository because, after repository closure, groundwater is the primary route for radionuclides to reach the human environment. These investigations are especially critical to the Hanford site because it is the only saturated (wet) site under consideration, groundwater travel times quoted in earlier USDOE reports have been over-optimistic, and many experts believe USDOE may have seriously misinterpreted Hanford geology and hydrology.

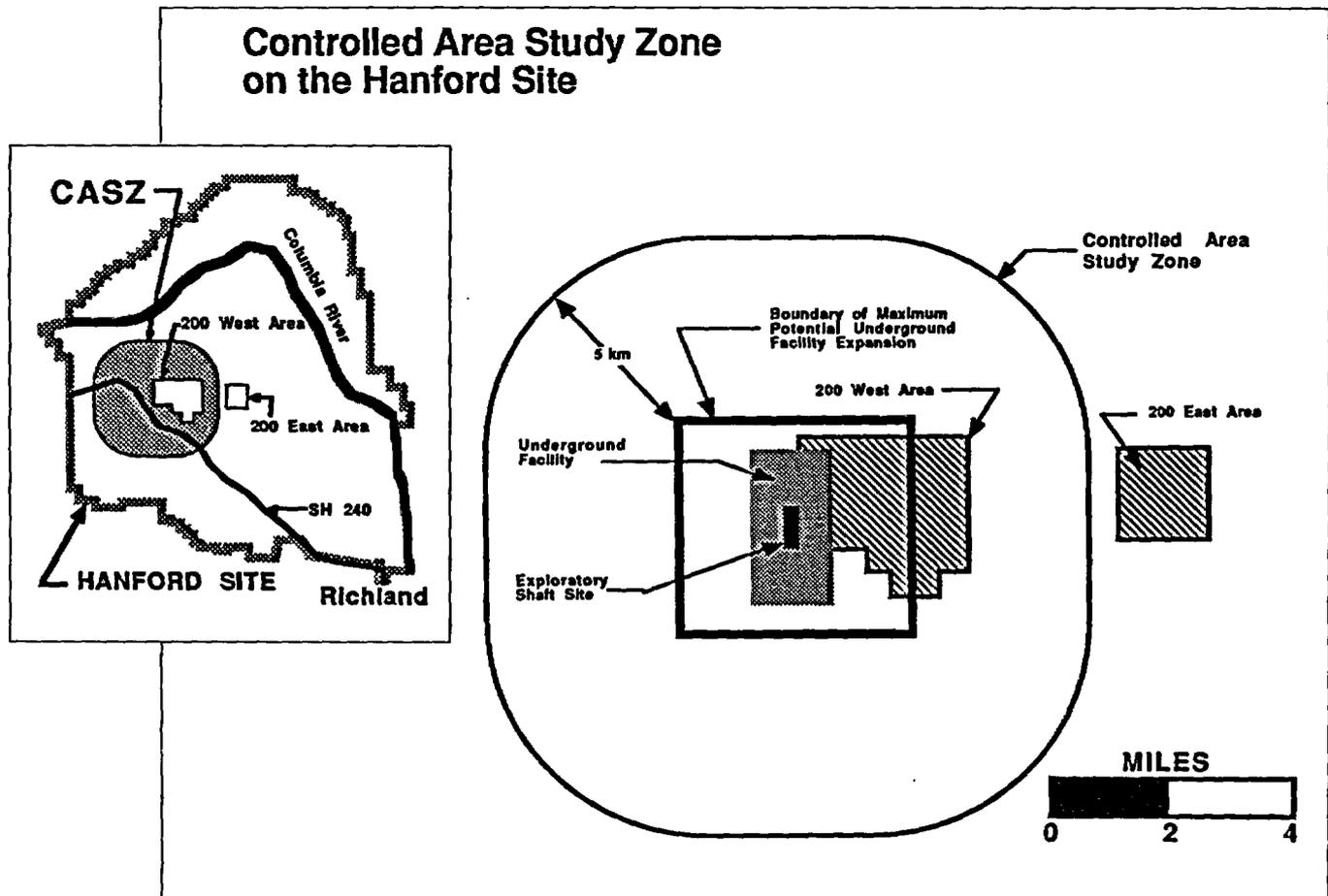
A case in point is a disagreement over how much confidence scientists can place in calculations made before pre-exploratory shaft studies are completed. USDOE believes current information on geohydrologic conditions suggests, with high probability, that groundwater travel times will exceed 1,000 years (USNRC's minimum requirement). The state of Washington and a USNRC consultant believe that calculations using current USDOE hydrologic data and a range of values for effective porosity will indicate that Hanford groundwater travel times will be faster than USNRC permits. The state's position is that a "fatal flaw

warning flag" is already flying and the USDOE testing program must be designed accordingly.

Groundwater investigations are the most critical element of the site characterization program for Hanford. Critical portions of the investigations must precede the drilling of exploratory shafts which will disturb the deep groundwater system and destroy valuable "perishable" data. The pre-exploratory shaft groundwater investigations must be completed and reviewed before start-up of the exploratory shaft drill rig. Start-up of the drill rig may require postponement if pre-exploratory shaft studies do not reduce the current range of uncertainties associated with Hanford groundwater travel time calculations.

The state of Washington's review of the hydrology portion of USDOE's SCP will focus on pre-exploratory shaft testing. Such testing should provide the following:

- Appropriate data to determine if the range of uncertainties currently associated with groundwater travel times can be reduced. Emphasis should be placed on collection of effective porosity and vertical conductivity data
- Adequate data to explain subsurface geologic irregularities (anomalies), such as the so-called Cold Creek flow impediment
- Information to determine if USDOE's conceptual model adequately explains Hanford's complicated fracture flow groundwater system
- Information to determine source and concentrations of methane and radionuclides in groundwater



Regional Geologic Features

Surveys used to support USNRC licensing of a nuclear power plant on the Hanford Reservation, together with data from other sources, identify a bounding fault pattern in the vicinity of the proposed Hanford repository. This information should be used to locate high priority target areas where deep faults may provide a pathway for groundwater movement. Plans for site characterization should include specific plans to drill in the priority area specifically for the purpose of finding faults and other "fatal flaws" with the potential for site disqualification. Early drilling is also needed in the vicinity of geologic anomalies such as the Cold Creek flow impediment in order to provide critical information about these geologic features.

Miner Safety

The deep Hanford basalt flows are under great stress from natural forces, and these forces are unequal. When confining forces are removed, as would happen if construction begins, the strong but brittle rock often fractures spontaneously. Such fractures could provide a pathway for radionuclides to reach the accessible environment. Therefore, the in situ (in-place) stress level is a critical element in site characterization activities. Slight in situ stress increases mean that waste packages must be spaced further apart, resulting in increased cost. Rockbursts, which are associated with high in situ stresses, can cause worker injuries and fatalities.

USDOE is proposing a very deep and large mine which would be both dangerous and debilitating to workers. The natural rock has a temperature of 120 degrees Fahrenheit. Temperatures in work areas would increase with waste emplacement. In comparison with other proposed repository sites or commercial mines, massive ventilation and rock stabilization efforts must be undertaken. Hanford mining conditions would be inherently more dangerous than other underground mining operations. Even though actual work hours would be constrained, miners under constant physical stress are prone to errors in judgment. Adverse working conditions and the resulting constrained working hours would add to the costs for the BWIP project.

USDOE's early SCP studies should be oriented toward finding out if the risks to Hanford workers and the environment are reasonable.

Methane is especially dangerous at depth because it poses threats of asphyxiation and/or explosion if not continuously removed. USDOE recently concluded that "gassy mine" conditions would exist at depth. This means that USDOE must factor this condition into the design basis for ventilating the exploratory shaft and underground workings.

The state of Washington review of those portions of the SCP relating to mining and geology will focus on the following:

- Ensure that USDOE collects adequate information concerning the full range of in situ stress values in the controlled area study zone (CASZ)
- Gain a better understanding of the possible effects (fracturing, rockbursts, rock sloughing) of mining in deep basalts
- Gather information derived early in site characterization which could be used to assess the stability of unlined shafts or work areas
- Develop descriptions of special equipment or procedures needed to protect workers from rockbursts, high water pressures and methane
- Evaluate areas within the CASZ with lower in situ stresses that might provide safer rock for exploration
- USDOE descriptions of how methane concentrations in air will be maintained at safe levels in both the ventilated and unventilated portions of the proposed underground workings
- USDOE provisions to ensure adequate safety in case of a loss of power and/or ventilation

Earthquakes

Compared to areas west of the Cascades, large earthquakes pose a minor risk to a Hanford repository. However, many small earthquake swarms may occur in a specific area with no large single event. Events of this type are indicative of stress release. The distribution of the swarms gives an indication of where fracturing is occurring in the basalt flows and gives some indication of possible groundwater pathways through the fractures to the environment.

The state of Washington review of the earthquakes (tectonics) portion of the SCP will include:

- Ensure that USDOE data collected during site characterization is accurate enough to detect and precisely locate all shallow earthquake swarms in and near the Hanford site
- Use data to correlate the swarms with mapped or suspected structures

Presence of Natural Resources

USDOE siting regulations automatically disqualify any site if it is found that previous exploration, mining, or extraction activities of commercial importance have created significant pathways between the underground facility and the accessible environment. These regulations also apply if ongoing or future activities to recover presently valuable mineral resources may be expected to lead to inadvertent loss of waste isolation. USDOE has acknowledged that many companies have requested to lease USDOE land on the Hanford site for exploratory oil and gas drilling. USDOE also acknowledges that Hanford's deep groundwaters contain high concentrations of methane (natural gas). Methane and warm groundwater could attract future exploration activities.

The state of Washington SCP review will focus on:

- An independent, state-of-the-art seismic survey to investigate the potential for geologic structures conducive to natural gas

accumulation. The survey would also yield information concerning suspected faulting in or near the CASZ. Field work for the survey should be completed and the results evaluated by the affected parties before exploratory shaft construction

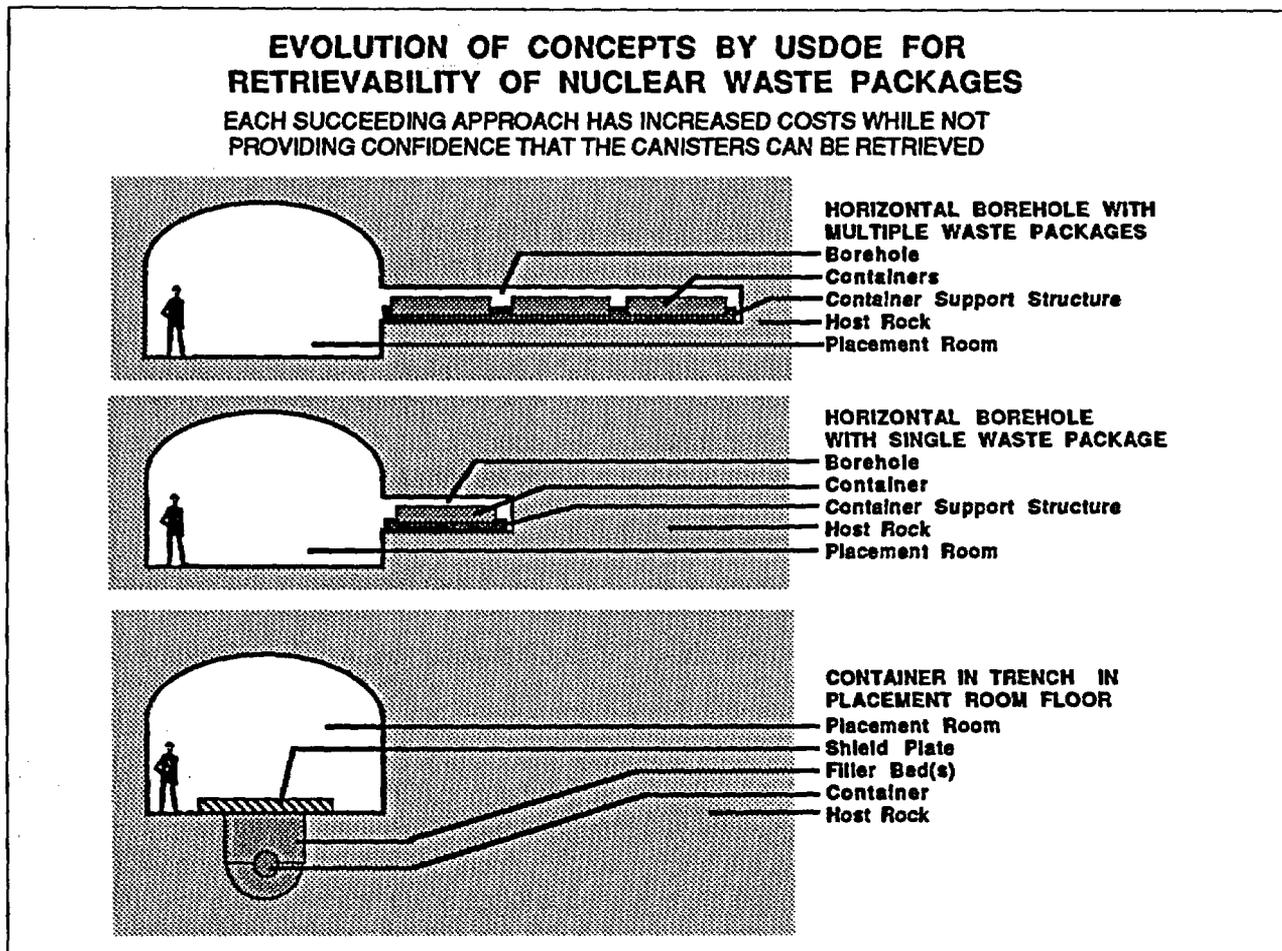
Radionuclide and Chemical Contamination

The BWIP Controlled Area Study Zone is located in an area of the Hanford Reservation which is already heavily contaminated with chemicals and radionuclides. Site characterization activities should be designed to minimize the spread of contaminants and affected parties must have enough information to do an adequate environmental review of each activity.

Recently USDOE has released historic documents which strongly indicate that contamination from early defense activities may have already spread to both shallow and deep groundwaters, both on and off the reservation. If this is true, this may be another reason for early disqualification of the site. The fast migration of radionuclides to deep groundwater (40 years) would suggest a relatively direct connection between deeper groundwater and the environment. It would also suggest that large water discharges from current Hanford defense activities may affect how quickly contamination moves downward. At a very early stage of site characterization, USDOE must provide maps and documents which clearly identify the locations and quantities of contaminants within the CASZ. Non-USDOE experts should conduct an independent evaluation on how defense wastes have reached deep groundwaters on and off the reservation.

Retrievability

The Nuclear Waste Policy Act requires that high-level nuclear waste packages must be retrievable after emplacement. Retrieval of the packages could be necessary for recovery of increasingly valuable materials, or in the event of a repository failure. USDOE has recognized that retrieving waste packages from Hanford's deep basalts will be difficult. The high in situ stresses may cause rockbursts and rock sloughing, which could lock canisters in boreholes. At each stage of the



program, USDOE has developed an engineering "fix" to remedy newly emerging retrievability problems. At an early stage of the program, the plan was to place multiple canisters in long boreholes. USDOE is now considering a shallow trench approach. Each succeeding approach has significantly increased costs while not providing greater confidence that canisters could be retrieved as required by the NWPA.

If mining conditions are going to be at the limits of tolerability for workers and equipment at the beginning of underground operations, mining experience indicates that later operations would be so difficult, dangerous, and expensive that recovery of thousands of individual waste containers would be practically impossible. If spent fuel is placed in the rock system, enormous amounts of "new" heat will affect the already hot, inherently unstable Hanford geologic environment. In real mines, workings are kept open only for a matter of months, then aban-

doned to collapse and admit groundwater. There is no underground job more feared than dewatering an old, wet, deep mine. The state of Washington plans to closely review all characterization plans affecting retrievability.

Program and Data Management

USDOE's high-level waste management program has been plagued by serious program and data management problems. The overall USDOE approach has been based on competition among projects which were "grandfathered" into the Act. The following is a direct quote from a USDOE fact sheet titled, "Management Changes in the Geologic Repository Program."

"The Nuclear Waste Policy Act (NWPA) caused a fundamental change in the character of the Geologic Repository Program. Prior to the NWPA, the Geologic Repository

Program had many of the characteristics of a competition among three distinct projects, where each was managed by a different project office located under a different DOE operations office. The program's strategy was that the repository would be built by the project office that first produced a satisfactory site."

It is important to note that this fast track strategy of selecting an adequate rather than superior site was used to nominate Hanford for characterization. USDOE is now planning to contract for a Systems Engineering Development and Management (SEDM) contractor to manage the overall program. This is probably an improved approach, but the SEDM contract will not be in place for at least two years. Clearly, substantial site characterization should not occur until the new management philosophy is operational.

The national nuclear waste program, in general, has had serious problems in ensuring the quality of data. Specifically, BWIP field work at Hanford was stopped because of very serious quality assurance problems. The SCP and data collected during site characterization must meet the rigid quality requirements required for licensing a repository. Data collected under earlier inadequate quality assurance programs should not be used in repository licensing.

The immense volume of data will soon create other serious problems. The Site Characterization Plan alone will contain approximately 9,500 pages and will reference 1,865 documents. The enormous amounts of data and the many reports resulting from this plan will have to be stored and then be easily retrievable to all interested parties when needed. The fact-finding process for repository licensing could take years if there is not an effective data management system. USDOE and USNRC are now in the beginning stages of developing procedures and hardware required for a multi-million dollar Licensing Support System (LSS). Current estimates indicate that the system will not be in place for two or three years. Substantial site characterization should not occur until an adequate LSS is in place.

Overall Site Characterization Approach

USDOE must abandon its current fast-track approach to select a merely adequate site and develop a new approach that emphasizes:

- The need for a superior site which the public could accept
- An early and continuing search for fatal flaws which might lead to identification of disqualifying conditions. Early identification of such conditions would save hundreds of millions of dollars that could be better spent on superior sites. In addition, program credibility would be enhanced if program decisions are dictated by objective, scientific factors.

Site Characterization Plan Review

USDOE plans to provide 90 days for review of the Site Characterization Plan by affected parties and the public. Concerns have been raised that this time period is too little for technical review of the SCP, which cites 1,865 references and is 9,500 pages long. State reviewers believe that at least six months should be provided for review of the SCP.

PUBLIC INVOLVEMENT

During the Hanford site characterization process, the state of Washington will continue to review results of the site characterization studies and will provide information to citizens of the state about the process and opportunities for Washington citizens to participate in the state's review. The Nuclear Waste Board and Nuclear Waste Advisory Council will hold public meetings on the SCP to provide information and to hear public concerns and comments on the SCP. This input will be considered in the state's responses on the SCP. Information about the state's key site characterization issues will be useful in citizens' input to USDOE's public participation program.

Before a final repository site is recommended to the President, there will be at least two formal opportunities for public comment on the site characterization activities and results. The first comment

opportunity will be when the Site Characterization Plan (SCP) is issued. The USDOE must submit the SCP to the USNRC, the governor and the legislature of the state, the affected Indian tribes, and the public for review and comment. When the SCP is released in late 1987, there will be a public comment period, and public hearings will be held by USDOE. The public review period will be at least 90 days for portions of the SCP related to the exploratory shaft, and may be longer for other sections of the SCP. Washington citizens are encouraged to provide comments on the SCP at the public hearings or in writing to USDOE.

The second formal public comment opportunity will be when the Draft Environmental Impact Statement (DEIS) on the site selected by USDOE for the repository is issued. The DEIS will use the site characterization testing results to address the suitability of the selected site for development as a repository. The DEIS review will be the last major point in the formal site selection process in which the general public can be directly involved. It is scheduled for release in the last quarter of 1993. Washington citizens will have an opportunity to make comments on the DEIS at public hearings and/or in writing.

Referendum 40, approved by state voters in 1986, may provide an additional opportunity for public comment if Hanford were selected by USDOE. The citizens of the state of Washington would have an opportunity to register a vote of disapproval unless the Governor or legislature disapproved the site selection first. A majority vote of both houses of the U.S. Congress overriding the disapproval would be required to permit the USDOE to pursue construction of the repository.

OTHER RELEVANT MATERIALS

The Washington Department of Ecology Office of Nuclear Waste Management has a variety of informational materials related to the repository siting process. These materials include slide shows (some available in VHS videotape format), fact sheets, and focus papers. The Office prepares a quarterly newsletter that is mailed to over 14,000 recipients.

Speakers are also available from the Office and meetings and workshops are held periodically throughout the state.

If you would like to receive the newsletter or other information related to nuclear waste management issues in Washington State, contact:

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1-800-262-SITE**