

INTERNATIONAL ENVIRONMENTAL INSTITUTE

R.R. DiSibio
Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352

ABSTRACT

The International Environmental Institute is being established at the Hanford Site to provide training and education in environmental restoration and waste management technologies and to serve as an interface for exchange of information among government laboratories, regional and federal governments, universities, and U.S. industries. Recognized as the flagship of the nation's environmental management effort, the Hanford Site provides a unique living environmental laboratory that represents the most extensive, complex, and diverse cleanup challenges anywhere. An Environmental Institute director has been selected, the organizational structure has been established, and the initial phases of operation have begun. The combined resources of the Hanford Site and the Environmental Institute offer unprecedented technological capabilities for dealing with the nation's environmental issues.

INTERNATIONAL ENVIRONMENTAL INSTITUTE

Westinghouse Hanford Company is in the process of establishing an International Environmental Institute at the U.S. Department of Energy (DOE) Hanford Site in Washington State. When fully realized, this training center will supply national and international demands for development and dissemination of ecosystem restoration technologies using opportunities provided by the unique living environmental laboratory that is Hanford. Field work will be combined with classroom instruction and specific case studies to optimize those opportunities.

Environmental restoration and waste management constitutes a new Hanford Site mission that follows nearly fifty years of plutonium production. Defense production operations left the Hanford Site with about 440,000 cubic meters (117 million gallons) of highly radioactive waste in underground tanks, an estimated 1,400 individual contaminated sites, and about 80 contaminated surplus facilities. It is estimated that the cleanup mission will require tens of billions of dollars and at least 30 years to complete. The Hanford "environmental laboratory" occupies about 1,450 hectares (560 square miles) and contains virtually every known type of waste constituent and waste site. Included are high- and low-level radioactive wastes, transuranic materials, hazardous (chemical) wastes, and mixed (hazardous and radioactive) wastes. These wastes exist in a variety of forms and places including liquids and solids in underground storage tanks, buried solids, contaminated soils, groundwater, and buildings.

A map of the Hanford Site is shown in Fig. 1. The old production reactors are located along the Columbia River in the 100 Areas. The major chemical separations plants are in the central regions known as the 200 Areas, as are the primary waste burial grounds and the underground storage tanks. Figure 2 shows the construction of several large, double-shell storage tanks that can each hold up to 3,800 cubic meters (one million gallons) of high-level mixed wastes. Current plans call for recovery of the high-level constituents from the liquid wastes being held in the underground tanks, and stabilizing them in a fused borosilicate glass for permanent disposal. The low-level fraction of the tank waste will be used in the formation of a "grout" material for long-term storage in vaults such as that illustrated in Fig. 3. Clearly, selecting the most effective

remediation method for a contaminated site or facility first requires a careful characterization. A typical site characterization effort is shown in Fig. 4. An example of a contaminated soil site before and after restoration is shown in Fig. 5.

The Site mission encompasses a variety of activities associated with both waste management and site restoration. Included are efforts to minimize generation of new wastes; characterization of existing wastes, waste sites and contaminated regions; in-situ stabilization or retrieval of stored materials; processing or treatment of wastes; and ultimate disposal or alternative use of waste and scrap materials. Students of the

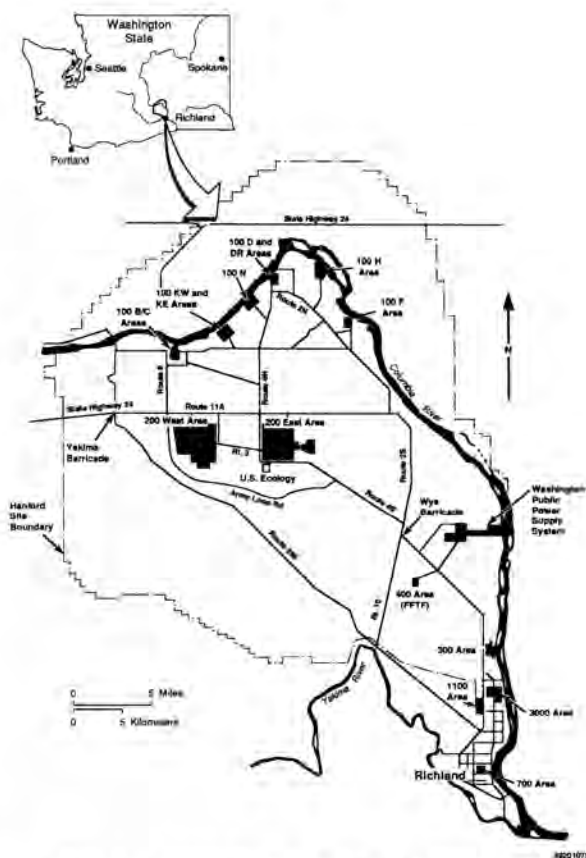


Fig. 1. A map of the DOE Hanford Site.



Fig. 2. Double-shell waste storage tanks under construction. Today, only the access ports are visible above the ground.

GROUT VAULT UNDER CONSTRUCTION

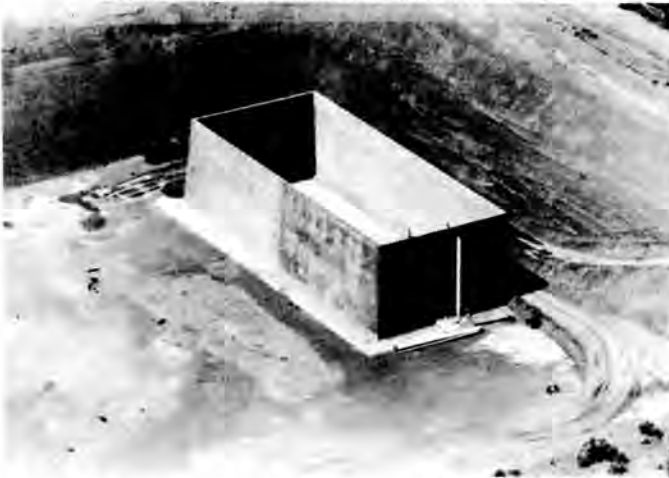


Fig. 3. A grout vault under construction. The vault is sealed and buried after being filled with the concrete-like grout. Each vault has a capacity of over 3,800 cubic meters (one million gallons) of grout.

Environmental Institute will participate in all of these activities to ensure hands-on experience to augment classroom instruction.

The invaluable knowledge and experience base that exists at the Hanford Site will undoubtedly lay the foundation for the Environmental Institute. The knowledge and experience of the Site's highly educated and trained workforce includes many years of operating major onsite production facilities followed by nearly twenty years of decommissioning and custody of those facilities. In addition, that experience encompasses increasing interaction with state and federal regulatory bodies and the public in support of the goal of site restoration. The *Hanford Federal Facility Agreement and Consent Order*, commonly known as the Tri-Party Agreement (1), has required frequent interaction among the Washington State Department of Ecology, the U.S. Environmental Protection Agency, and the U.S. Department of Energy. A strong public awareness and increased understanding of Hanford has re-



Fig. 4. A large area surface radioactive contamination monitor. This vehicle has five sensors mounted in the front to detect and map any radioactive contamination that may be present in the soil. This information is needed to determine what remediation activities should be conducted.

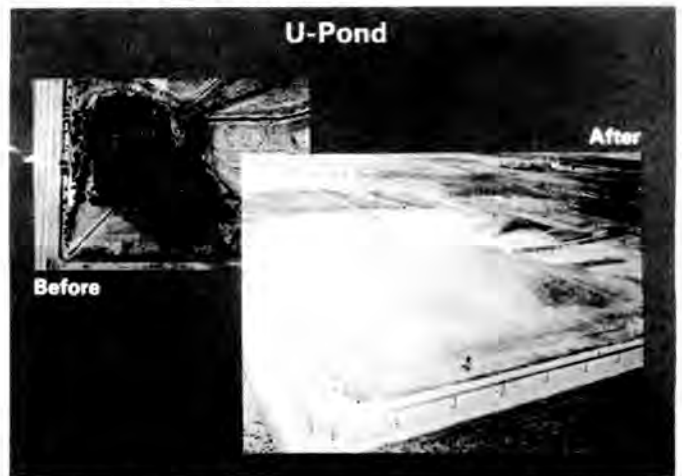


Fig. 5. A typical waste-water pond before and after decontamination and site restoration.

sulted from several years of debate over such issues as the Basalt Waste Isolation Project and operation of the N Reactor and the underground storage tanks. These interactions have helped develop a successful process for obtaining consensus among the public, the Hanford Site, and its regulators, exemplified by completion of the *Final Environmental Impact Statement - Disposal of Hanford Defense High-Level, Transuranic, and Tank Waste* (2). Other existing strengths important to the Institute are links to major Northwest educational institutions, an active technology transfer program, a technical training structure, a Native American program, extensive technology development activities, and strong ties to DOE's national laboratories and the DOE complex.

Westinghouse Hanford Company has participated in efforts to transfer the benefits of Hanford Site experience to other DOE sites for the purpose of saving time and resources. The Westinghouse Electric Corporation's Government Operations Business Unit instituted a "Savings Through Sharing" campaign to encourage such activities. Examples of ways to share include temporary exchanges of personnel, transfer of certified data to obviate duplicate testing, and development of a Conduct of Operations manual that can be used at all sites.

As an outreach adjunct of the Hanford Site, the flagship of U.S. environmental management, the Institute offers an invaluable mechanism for sharing unique technologies and knowledge with a vastly expanded infrastructure throughout the U.S.

The vision for the Environmental Institute is an educational center dedicated to training, formal education, basic research, and information exchange that takes maximal advantage of the unique Hanford Site environmental laboratory. That laboratory offers unequaled educational resources in the form of facilities, skilled personnel, and diversity of challenges. The vision can be realized as effective partnerships are established with regional and national governments, private sector industry, colleges and universities, international environmental organizations, and the general public to foster the flow of information based on demonstrated successes.

The Institute is being created with existing resources and will grow as funding, directives, challenges, and expanding missions dictate. Dr. Gordon Bopp, who was the Executive Director of the Spokane (Washington) Intercollegiate Research and Technology Institute (SIRTI), has been selected as the founding director of the Environmental Institute. As Executive Director of SIRTI, Dr. Bopp was responsible for establishing a regional resource center to foster collaborative efforts between industry and the Northwest's institutions of higher learning. Dr. Bopp brings with him a combination of chemical engineering expertise, experience in commercializing and transferring technology, and established nationwide working relationships with colleges and universities. An independent advisory board will represent external Institute users, and a board of directors will be formed from those organizations providing services. In addition, a steering board will comprise representatives of the nationwide participating organizations. The organizational structure within the Westinghouse Hanford Company is shown in Figure 6. The director will report to the Westinghouse Hanford Company President's Office. The Institute will be made up of four departments: Hanford Training, External Education and Training, Information and Technology Transfer, and Business and Community Development.

The Hanford Training Department will produce well-educated, highly-skilled scientific and technical personnel capable of implementing safe, efficient, and compliant environmental and waste management programs. It will comprise four functions: Operations Training, Site General Train-

ing, Vocational Training, and Site Training Services. Activities within these functions will include training in tank farms operations, solid waste operations, environmental and process improvement, instrumentation and control maintenance, and instruction techniques.

The External Education and Training Department will provide unparalleled hands-on training opportunities while contributing to the ongoing Hanford Site tasks. This department will consist of five functions. The Environmental Managers function will provide training through the Westinghouse Hanford/DOE School of Environmental Excellence, actual experience in project management, and training in environmental regulations, permit preparation, and waste minimization/pollution prevention. The Technician Qualification function will provide training through classroom and field studies in sampling procedures, monitoring equipment, and in the future, operations techniques. Education Support will provide cooperative programs, aid to universities, K-12 teacher and administrator programs, and field studies for university-level environmental studies students. University/Institute Partnerships will provide for technical exchange and collaboration between the Institute and universities, serve as the focal point for the Historically Black Colleges consortium and the Southern University Engineering Advisory Council, and provide a link to the Northwest College/University Association Program, and the Institute for Science and Society/Central Washington University. In the future, this function will also afford a bridge to all entities involved in environmental studies and will assist in establishing educational and training standards for environmental curricula. The Center for Advanced Learning will help develop degree programs for identified future needs, special courses, and symposia as needed.

The Information and Technology Transfer Department will facilitate the flow of information on environmental technologies, processes, and programs among private and public interests. It will develop and maintain public reading rooms, provide technology transfer and privatization links to the community, and conduct annual environmental restoration conferences. It will also provide network and resource sharing on the Hanford CRAY computer, links among libraries, and communications with environmental laboratories and information centers. Future activities may include technology expositions, consultation support, mechanisms for public policy input, cooperative agreements, methods of conflict resolution, and case study development.

The Business and Community Development Department will coordinate activities required to establish, maintain, and expand the Institute operations. Within this department will be the Native American programs and the interface with such economic development groups as the Tri-City Industrial Development Council, Forward Washington, and the Association of Washington Businesses. Also included in this department will be promotional activities and responsibility for maintaining funding sources. Future activities may include an exposition center construction coordination committee, a science center with video-conference capability, a museum, and a science and technology park.

In summary, the Hanford Site, recognized as the flagship of the nation's environmental management effort, provides a unique living environmental laboratory that represents the most extensive, complex, and diverse cleanup challenges

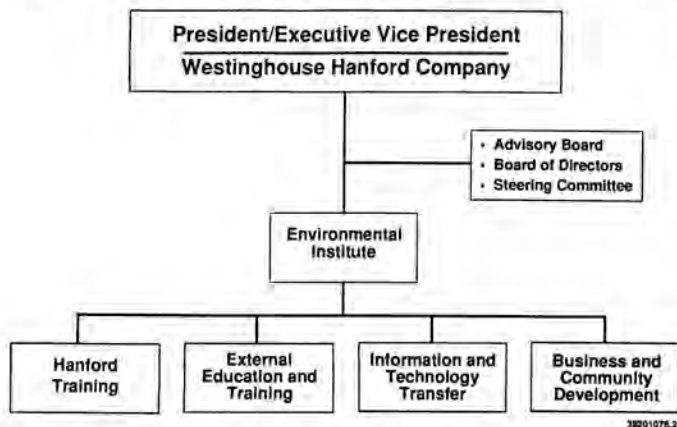


Fig. 6. Environmental Institute Organization within the Westinghouse Hanford Company.

anywhere. An Environmental Institute director has been selected, the organizational structure has been established, and the initial phases of operation have begun. The Environmental Institute being established at Hanford offers the potential for unparalleled exchanges of environmentally significant technologies and information between U.S. Government laboratories and the private sector.

REFERENCES

1. Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, 2 vols, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.
2. DOE, 1987, *Final Environmental Impact Statement - Disposal of Hanford Defense High-Level, Transuranic, and Tank Waste*, Vols. 1-5, DOE/EIS-0113, U.S. Department of Energy, Washington, D.C.