

## **A TRIBAL ASSESSMENT OF ENVIRONMENTAL TECHNOLOGIES: THE NEZ PERCE TRIBE EXPERIENCE AT THE HANFORD SITE**

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### **ABSTRACT**

The Nez Perce Tribe is involved with the U.S. Department of Energy and its environmental management activities at the Hanford Site in south-central Washington through the legal doctrine of trust responsibility by virtue of the Treaty of 1855, signed by the Nez Perce Tribe and the federal government. Under a cooperative agreement between the U.S. Department of Energy and the Nez Perce Tribe, the Tribe is actively participating in issues regarding the clean up of radioactive and chemical contaminants that resulted from nuclear weapons production since the 1940's. Such involvement focused on six major areas, namely; Waste Management and Environmental Restoration, Cultural Resources, Human Resource Development, Technology Development, Public Education and Information, and Health and Emergency Response. Furthermore, the Nez Perce Tribe has also participated in various environmental activities nationwide, in particular those activities at the major USDOE sites. In addition to the various issues, any activities associated with Hanford's diverse mission in environmental restoration, waste management and science and technology have to be assessed with tribal implication categories. Using the assessments allowed the tribe to develop positions that oppose or advocate such activity. The implications are then used as a decision-making tool. Areas or categories in which tribal assessment on implications are: regulatory status, emergency response, economic opportunity, education and research, treaty rights, and cultural resource and religious freedom. Some concerns and issues like risk assessment, and technical/management capabilities are incorporated in any of the areas of implications.

### **INTRODUCTION**

The Nez Perce Tribe specifically retained customary usage rights to the mid-Columbia River basin and its tributaries when the Tribe ceded over 11 million acres to the Federal Government in the Treaty of 1855. By entering into The Treaty of 1855 and subsequent treaties, the Federal Government has acknowledged that Tribal Rights preceded the U.S. Constitution and such rights are retained with regard to these rivers and tributaries, particularly the Columbia River. The disposal of more than 100 million curies of radioactivity into the Columbia River, since Hanford operations began, has diminished the value of their retained rights without consultation or compensation. As defined by the 1982 Nuclear Waste Policy Act, the Nez Perce Tribe was considered "affected" in 1983. Since then, the Tribe started to get involved at Hanford. In 1987, the Tribe was involved with the Basalt Waste Isolation Project (BWIP), a deep geologic repository project. BWIP was pulled out overnight, and funding for the Nez Perce involvement also stopped. DOE created Environmental Restoration and Waste Management (ERWM, later changed to EM) in 1990, and the affected status of the Nez Perce Tribe was re-affirmed a year later. In 1991, the Nez Perce Tribe applied for a planning participation grant, which was funded in 1992, thus creating its ERWM Department. Since then, ERWM staff and its technical consultants

provided technical and cultural comments and recommendations to many documents and activities that have been requested by DOE-RL.

## **ERWM TECHNICAL INVOLVEMENT**

The Nez Perce Tribe's Department of Environmental Restoration and Waste Management (ERWM), formed in 1992, is involved in reviewing regulatory documents and suggesting implementation strategies in a number of areas under various regulatory authorities and Departmental orders. This involvement in major sites' cleanup activities, Hanford in particular, is a way for the Tribe to keep tribal members informed and to build technical expertise in remediation and restoration procedures. Nez Perce involvement at Hanford is also the way by which treaty rights and cultural and natural resources are protected. The Tribe's primary focus at Hanford is stopping further contamination to the groundwater and the Columbia River. The Tribe is also concerned about protecting native shrub-steppe habitat. There are over 1,500 contaminated sites at Hanford that have been grouped into 78 operable units according to contaminants and location.

Cleanup procedures are driven and guided by three regulatory programs, namely, the National Environmental Policy Act (NEPA), the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), and the Resource Conservation and Recovery Act (RCRA). The guidelines indicated by NEPA, CERCLA, and RCRA set the framework for clean-up procedures and include similar stages such as data gathering for environmental risk characterization, remedial action and design plans, and monitoring and surveillance activities. DOE's federal trust responsibilities require that the Nez Perce Tribe is included in all aspects of this work before comments about remedial actions are accepted from the public.

Originally, the Nez Perce Tribe's monitoring of and participation in clean-up activities focuses on six primary areas: 1) Waste Management and Environmental Restoration, 2) Cultural Resources, 3) Human Resource Development, 4) Technology Development, 5) Public Education and Information, and 6) Health and Emergency Response. The technical staff are active participants on several DOE and Hanford related advisory committees, Hanford Advisory Board (HAB), Columbia River Comprehensive Impact Assessment Management Team (CRCIA), Community Leaders Network (CLN), Office of Science and Technology (OST) Focus Areas, Groundwater/Vadose Zone (GW/VZ) Integration Project, Innovative Technology and Remediation Demonstration (ITRD), Hanford Tanks Initiative (HTI), Site Technology Coordination Group (STCG), and Natural Resource Trustee Council (NRTC).

In addition to the technical staff, and in recognition for the need to build its own culturally responsible and technically credible infrastructure, the Nez Perce Tribe ERWM has an active internship program which provides Nez Perce students with educational opportunities and access to job training. Student interns have helped conduct research on DOE policies, proposal development, health issues, publications of handbooks/books on Hanford wildlife fish, and waste reduction, botanical collecting and revegetation, pollution prevention, and cultural resources issues. The interns rotate through the six

aforementioned primary areas with projects designed to maximize their exposure to professionals outside of the Tribe while maintaining strong cultural ties and participating in cultural activities.

Following are selected projects and process that the Nez Perce ERWM has been involved with. The list was chosen to reflect tribal assessment and involvement utilizing the areas of implications related to development and application of environmental technologies.

## **1. Cultural and Natural Resources**

Another Hanford restoration project where the Nez Perce have been active participants concerns the restoration and revegetation of the former Environmental and Molecular Sciences Laboratory (EMSL) site. Human remains, believed to be those of Indians were discovered during preliminary construction activities in 1994. As required by law, all construction on the project was postponed for 30 days during which time representatives from the four affected tribes developed recommendations on how to proceed. The Nez Perce Tribe ERWM agreed with the other tribes that the tribal members should be left where they were originally interred. As a result of these findings the EMSL site was moved to another location. The former EMSL site was recontoured and a native revegetation effort was undertaken. With funding from DOE, the affected tribes and the Wanapum Indian Band established a native seed bank and nursery in 1994. Native plants such as sagebrush, rabbitbrush, buckwheat, Indian rice grass, and needle and thread grass have been successfully reintroduced on some areas of the EMSL site. At the old EMSL site, revegetation activities are planned to continue until 1998. Moreover, under ERWM's management, the inter-tribal restoration team has revegetated 10 acres of the North Slope of the Hanford Site, and plans are underway to revegetate a fire destroyed area at the HAMMER facility. The Tribe has sub-contracted with Bechtel Hanford, Inc. (BHI) to continue revegetation efforts, to include native plant identification by elders and production/propagation of native plant stock.

The Nez Perce advocates inclusion of the costs and plans for habitat restoration in the budgetted cleanup activities. Restoration activities include site characterization, revegetation, mitigation, and monitoring plans. The Nez Perce Tribe and other affected tribes have had direct involvement in restoration activities of the Environmental Restoration Disposal Facility (ERDF), a Hanford project. The ERDF is an inland disposal facility that will eventually be filled with contaminated material that is being removed from waste sites along the Columbia River. Native plants were salvaged prior to construction of the ERDF and transplanted to areas on the north slope of the Columbia River that had been disturbed as a result of cleanup activities. Since the ERDF site was constructed on undisturbed sagebrush habitat, the Nez Perce Tribe is also actively involved in providing input to the ERDF Mitigation Action Plan.

ERWM was highly involved with the Hanford Remedial Action Environmental Impact Statement (EIS). It provided an alternative that reflects tribal interests (Alternative Two). The alternative was mainly preservation of cultural and natural resources of the Hanford Site. The Final EIS was renamed Hanford Comprehensive Land-Use EIS (November 1999). Currently, with Hanford NRTC, ERWM is helping

prepare the Biological Resource Management Plan, which will be integrated with any other DOE land-use review procedures.

## 2. Technology Demonstration and Applications

The ERWM technical staff have reviewed and assessed technologies that were demonstrated or in current use at the Hanford site. Two technologies resulted to two serious technical concerns. One of them is a sonic drilling method which is a relatively new technology used in FY 95. Wells drilled in FY95 used this method but the technology failed to meet the design criteria as substantial formation damage occurred during drilling and/or completion. Problems encountered when using this method includes: 1) Formation damage; 2) Inability to collect samples with a representative grain-size distribution; 3) Inability to collect undisturbed cores; 4) Possible formation damage increase with increasing hole-size; and 5) The drilling method may not produce waste minimization a valid claim beneath the water table. The second technology was *In Situ* Redox. In both technologies, serious technical concerns were voiced to DOE-RL but were not responded, so we requested USDOE Headquarters for independent peer reviews of the aforesaid technologies. Requests for national reviews have been granted by the Deputy Assistant Secretary for Science and Technology. The peer review process on sonic drilling was considered unacceptable since most of the experts/reviewers were not really independent, as they were handpicked by the principal investigator, hence, showed conflicts of interest on their part. The demonstration continued after the review, but was pulled out later because drilling performance was unsatisfactory. Assessment of the review process for the *In Situ* Redox was truly independent, and ERWM has accepted the recommendations of the experts. DOE delegated the American Society of Mechanical Engineers (ASME) International Section to choose the experts. Demonstration of *In situ* Redox continued after the review, but was modified to accommodate the recommendations of the expert.

Since 1993 until it was disbanded in 1997, ERWM was also actively involved with the Community Leaders Network (CLN), an unofficial advisory group to USDOE Office of Science and Technology (EM-50). Since the inception of CLN, the Nez Perce Tribe representative has volunteered in many activities that CLN is involved with most particularly Focus Area activities. The ERWM is also active in the STCG Management Council and Subgroups at Hanford, the Hanford Tanks Initiative (HTI), Spent Fuel Project, Innovative Technology and Remediation Demonstration (ITRD).

In 1995, ERWM was one of the 13 awardees to work on environmentally friendly technologies. The project was funded under the 1992 Energy Policy Act Title XXVI, (or the Indian Energy Resources Program). ERWM piloted the production of biodiesel from used cooking oil. The fuel was demonstrated in various old and new engines (e.g., Dodge Ram 2500, Chevy Suburban, Ford tractor, and lawn mower/snowblower). The vehicles were used in attending DOE meetings. The project was pulled out in 1997 and fuel production was almost 3,000 gallons, one vehicle ran for 36,000 miles, and the other 7,500 miles, and 750 gallons were utilized for the upkeep of park's grounds.

### 3. Waste Management and Environmental Restoration

What has been the fate of the 100 million curies discharged to the Columbia River? Most of that radioactivity was very short lived and rapidly decayed away. Studies based on random sampling of locations along the Columbia River from Hanford to the coast are cited by DOE-RL to indicate that radionuclides do not pose a significant human health risk. However, random sampling of locations along the river ignores hydrodynamic characteristics of the river and the particle size of radionuclides discharged into the Columbia River. There are areas along the river where radionuclides will preferentially settle out. Declassified documents suggest, that during Hanford Operations, 98% of particles associated with fuel rod ruptures were less than 30 microns in size. Water velocity, river bottom roughness, particle density, shape, and size dictate sediment deposition. This suggests that radionuclides could preferentially concentrate in sediment deposits in the silt-size range.

Any shoreline activities affecting the flow of the Columbia River risk the remobilization of contaminants entombed within river sediments. For example, erosion is now occurring on Locke Island caused by a change of flow within the river. This change may be due to landslides in the White Bluffs, which result from irrigation tail-water. Even today, it is possible for the public to come into direct contact with neutron-activated particles (cobalt-60) in the river sediment. On June 7, 1995, employees of the U.S. Department of Energy and its contractors, EPA, Washington State Departments of Health and Ecology met to decide on protocol to determine the risk associated with cobalt-60 particles known to be on D Island in the river. The Nez Perce Tribe is concerned that contaminants left in place at depth in the soil column after the Hanford Site's remediation will result in further degradation of the Columbia River. If irrigation occurs on lands north of Gable Mountain and Gable Butte, the subsequent rise of the water table under the 100 areas could potentially remobilize contaminants and provide a pathway for contaminants to reach the Columbia River. A "Wild and Scenic Designation" of the Hanford Reach may help to protect public health and the environment by preventing the remobilization of contaminants entombed within the river's sediment and the shoreline's soil column.

Chromium polluted groundwater at levels toxic (greater than 11 parts per billion of hexavalent chromium) to salmon redds (salmon nests) is entering the Columbia River. The pore-water sampling program confirms that hexavalent chromium is present in the gravel beneath the Columbia River. Salmon redds are present in these gravel areas. Sediments in areas near D reactor and H reactor have been sampled and have been shown to contain levels greater than 11 ppb of hexavalent chromium. Chromium is mutagenic, carcinogenic and teratogenic. The Nez Perce Tribe ERWM has proposed that DOE consider pumping groundwater from the areas of highest hexavalent chromium concentration, treating this ground water, and then injecting this treated groundwater in well bores along the bank of the Columbia where toxic groundwater is entering the river. The injection of treated groundwater in the bank of the river could create a hydraulic barrier which may prevent contaminated groundwater from reaching the Columbia River. Nez Perce ERWM staff also is concerned about the chromium plume associated with N reactor.

#### **4. International, National and Tribal Forums**

ERWM has actively participated in forums that have international, national, and tribal implications. In the later part of 1995, one of the staff was invited as one of the respondent panelist on the first international Plutonium Roundtable. Months later, as an off-shoot of the Pu Roundtable, the Nez Perce Tribe with the League of Women Voters and the Physician for Social Responsibility hosted the first National Tribal Plutonium Forum. The forum focused on the disposition and long-term storage of fissile materials as embodied in the Draft Programmatic Environmental Impact Statement (PEIS). As a result, ERWM endorsed disposition options similar to the recommendations in the Record of Decision (ROD).

The Nez Perce Tribe has long ago determined that current risk assessment methodologies and models are limited only to human health, neglecting ecological impacts and cultural impacts. Current risk models incorporate very limited consideration ecological impacts. Hence, through grants from Xavier University Center for Environmental Programs, the Tribes banded together to address a holistic view on environmental risk through tribal forums. The first forum hosted by the Shoshone-Bannocks of Idaho set the stage to a fluid discussion of issues. The Nez Perce Tribe hosted the second forum in October 1996. The main focus of the forum was to share tribal experiences and approaches relating to environmental risk assessment. A third forum was hosted by the Pueblos in New Mexico in 1997 with similar agenda as the first two. In 1998, the Nez Perce Tribe was one of the sponsors of a national tribal roundtable on risk assessment. The roundtable was hosted by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and the Consortium for Risk Evaluation with Stakeholders Participation - University of Washington (CRESP-UW). Areas covered were similar to the previous risk forums.

#### **CONCLUSION**

The U.S. Department of Energy funding has allowed Nez Perce participation to reach the necessary level of technical and program sophistication that is currently producing cost savings and building a stronger regional economy. The Nez Perce Tribe is aware of the possible funding shortfalls and makes no mystery of the fact that the Nez Perce ERWM Department is moving into the contracting arena (i.e., native revegetation subcontract with BHI) to satisfy their issues and concern. By performing tribal assessments on the various activities associated with Hanford's diverse mission, the Nez Perce is continually developing a culturally informed involvement, positions, and strategies for the protection of the reserved treaty rights. The Nez Perce ERWM Department is undoubtedly adding value to every Federal dollar spent by transitioning some of its functions into the marketplace, by building an educated and technically capable workforce, by improving coordination of efforts on site, by piloting an effective tribal participation core program, and by offering new insights to environmental management practices and strategies.