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State of Washington
DEPARTMENT OF FISH AND WILDLIFE

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18 October, 1996

David Olson
U.S. Department of Energy
Richlands Operations Office
P.O. Box 550, MS: H0-12
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Phillip Staats
Washington Department of Ecology
1315 W. 4th Ave.
Kennewick, WA 99336

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Re: Comments of concern on the In Situ Treatability Test

Dear Messrs. Olson and Staats:

Washington Department of Fish and Wildlife (WDFW) appreciates the opportunity to provide comments on the document titled *In Situ Treatability Test Plan*, DOE/RL-95-107 Rev.0. We would like to thank Washington Department of Ecology and U.S. Department of Energy (USDOE) for granting an extension of the comment period, and for providing the briefing on the In Situ Treatability Test. 44941

Natural Resources of the Hanford Reach

The Hanford Reach of the Columbia River provides the only significant mainstem spawning habitat remaining for upriver bright (URB) stocks of fall chinook salmon *Oncorhynchus tshawytscha*[1]. The majority of suitable spawning habitat is located downstream of the N-area. In addition, the Reach also comprises the only significant spawning habitat for white sturgeon *Acipenser transmontanus*[2], and is the only remaining section of the mainstem which supports healthy populations of fishes that are native to a free-flowing aquatic system[3]. Finally, the Reach supports a high diversity of aquatic

[1] D.D. Dauble and D.G. Watson. 1990. Spawning and abundance of fall chinook salmon (*Oncorhynchus tshawytscha*) in the Hanford Reach of the Columbia River, 1948-1988. PNL-7289.
[2] J.W. Mullan. 1986. Status and propagation of chinock salmon in the mid-Columbia River through 1985. U.S. Department of the Interior, Fish and Wildlife Service, Washington D.C.
[3] J.L. Downs and et al. 1993. Habitat types on the Hanford Site: wildlife and plant species of concern. PNL-8942.

organisms ranging from bacteria to protozoa to invertebrates, such as, caddisflies, stoneflies and mayflies. Some of these aquatic organisms may spend the majority of their life cycle as larvae in the interstitial spaces of the groundwater aquifer influenced by the Columbia River and are only found in the river channel just before emergence as adults. During emergence, these organisms become an important critical part of the food chain for juvenile salmon and steelhead trout.

Test Background

The proposed test is to evaluate the effectiveness of a permeable barrier at N-Area using a natural occurring zeolite (clinoptilolite) in preventing the contaminant of concern (COC) strontium-90 (Sr90), which is above the maximum contaminant level of 8pCi/L in the groundwater, from reaching the Columbia River. The cost is $4 million with USDOE Environmental Restoration program (EM40) funding $3.25 million of the project cost. The test and full scale implementation would be located 30 ft from the normal high water line. The test barrier dimensions are 30 ft in depth by 3 ft ranging up to 6 ft in width by 100 ft in length. The full scale implementation dimensions would be up to 50 ft in depth by an unknown width to be determined by the test by 3000 ft in length.

Concerns

WDFW has the following concerns with the In Situ Treatability Test and potential full scale implementation.

Non-protective of biological receptors

A full scale barrier would not be protective of biological receptors (CERCLA implementing regulations 40 *Code of Federal Regulations* [CFR] 300, first criterion). Over the life of the treatment, the barrier would load with Sr90 and at year 40, the permeable barrier would be loaded with 268Ci of Sr90. This is well above the MCL. Aquatic organisms living in the interstitial spaces of the groundwater aquifer would be exposed to this highly contaminated zone of Sr90 when navigating through the loaded barrier to the river to emerge as adults. Thus, these invertebrates would become highly contaminated, and available to the rest of the foodweb, including humans. Other factors threaten to expose the aquatic life to Sr90 as well, and are discussed later.

Location

The location for the test and full scale implementation is unacceptable because it would: 1) be subjected to floods; 2) jeopardize shoreline stability making it highly susceptible to erosion since the project is within the 100 year flood zone.

Floods

Flood elevations can be predicted, however; a flood occurrence cannot. For example, a 100 year flood event could occur next year and another 40 years from now when the full scale barrier contains the highest concentration of Sr90. Over

the life time of the full scale barrier, it is conceivable that the barrier could be susceptible to approximately five 100 year flood events. The location significantly increases the likelihood for shoreline erosion/destruction during these 100 year events.

The upstream dams have a finite life expectancy. Thus, they may not be in place, or may be reconfigured preventing them from assisting in flood control during the period required for the full scale implementation to effectively reduce the Sr90 to innocuous levels. An uncontrolled river would increase the uncertainty factor of where the river channel may be in the future.

Shoreline Erosion

The project would be located 30 ft from the river's normal high water line. A 25 year flood event occurred this past spring which destroyed approximately 10 ft of the roadway where the test is proposed. A 30 foot lateral movement by the Columbia River is highly probable. Since the project location is along an outside bend of the river, the thalweg (highest energy portion of the river cross section) would also be expected to be along this bank which would significantly increase the certainty for lateral erosion.

The requirements for emplacement of the clinoptilolite call for no compaction. Furthermore, the 10 ft of clean overburden will receive little if any compaction since its own weight will compact the clinoptilolite. One-hundred year flood events are predicted to breach the sloped top of the road surface. Water velocities of over top flows would follow the constructed channel undercutting/removing overburden and clinoptilolite and then eroding the remaining 30 ft of shoreline toward the river. This would result in an increase of downstream siltation and sedimentation, and potential destruction of salmon spawning areas. Even if riprap is used, the loose overburden soil underneath would be highly erodable during a 100 year flood event. Riprap does not ensure shoreline protection because it does not incorporate deflection or energy dissipation. This was illustrated in recent flooding in the Yakima River system where numerous instances of riprap failure occurred. Even big riprap projects designed by the Army Corp of Engineers failed.

Disposal Site

Based on the value presented in the treatability test plan of 5000 pCi/L loading, a Kd of 25 for Sr90, a concentration of 20600 pCi/g would accumulate at year 40. This value equates to a total Curie load of 268Ci in a 3000 ft wall. This value would make it a Class B radioactive waste site. Materials would have to be disposed of at the Environmental Restoration Disposal Facility, or at the US Ecology facility.

If a 100 year flood event occurred during the period when the barrier was highly loaded with Sr90 and washed the clinoptilolite from the trench, an acute release of the contaminant would occur to the river ecosystem.

Future remedial actions

The test addresses one COC above the MCL in the N-Area. Ten other COCs are also above the MCL in the groundwater plumes at N-Area. These COCs are not being addressed in the proposed tested, nor would they be in a full scale implementation treatment.

The clinoptilolite has certain physical properties. One is the effective pH range (3-9) which the clinoptilolite can adsorb Sr90. This pH requirement may prevent future remedial actions on those COCs above MCL requiring remediation using extremely acidic or basic material outside the range of this project's requirements.

Other clinoptilolite properties

The pump and treat system has demonstrated that clinoptilolite is an effective media for stripping Sr90 from the groundwater. However, this ability is negated in the presence of total petroleum hydrocarbons (TPH). A 80,000 gallon release of diesel fuel occurred and has been documented in the groundwater at N-Area. These TPHs are expected to be found on the surface of the aquifer. But the aquifer is in a state of flux due to rising and falling river depths (documented up to 8ft changes). This would essentially reduce the effectiveness of the barrier by 50% where the plume intercepts the barrier.

Inconsistent with other documents

This project is inconsistent with several other documents. The Hanford Future Site Uses Working Group developed several clean-up scenarios for the 100 Area. All three clean-up scenarios have as their ultimate goal cleaning up groundwater to an "unrestricted" status because of the threat groundwater contamination poses to the river. Under this proposed project, Sr90 clean-up would not occur for nearly three hundred years. Ten other COCs above MCL remain unaddressed.

Furthermore, the clinoptilolite will be covered with 10 ft of soil. This action is inconsistent with the current interim Record of Decision (IROD) for the HR1, DR1, BC (0-15 ft residential clean-up scenario).

NR1 and NR2 IROD

The IROD for these operable units will be issued during the summer of 1997. This project would not have results until sometime in 1998.

Current Remediation

Currently, a pump and treat system for Sr90 is in operation at N-Area which is approximately 74% effective at a pumping rate of 50gpm. In addition, this system is creating a hydraulic flow landward which is preventing the other COCs above MCL from reaching the river. It is our understanding the pump and treat system's effectiveness could be increased to 96% by modifying the pumping rate to 60gpm. This remedial action is addressing several COCs and does not pose the environmental risk as does the proposed In Situ treatment.

Conclusions

The test would have localized significant impacts to resources from the use of riprap and the alteration of the shoreline. It is impossible to provide comments on the test and ignore the larger scale ecological impacts which would be created by full scale implementation. The proposed treatment is consider a passive remediation alternative requiring no additional cost once in place. However, the full scale implementation would do more environmental harm than good. Cleanup dollars would be better spent on maintaining the current pump and treat for several years, until better solutions are found having fewer detrimental natural resource impacts.

Recommendation

WDFW strongly recommends USDOE and Ecology cancel the In situ Treatability Test since the specified location has too many ecological risk factors associated with it. These factors include natural flood events which could pose adverse impacts to the natural resources. These impacts would be much greater than the current status quo. The In situ Treatability test may be appropriate at other USDOE facilities, but not at the Hanford Site. Full scale implementation would not be protective of biological receptors, including humans.

If you have questions regarding these comments, please contact Jay McConnaughey, Habitat Biologist for the Hanford Site, at (509) 736-3095.

Sincerely

Ted Clausing
Regional Ecosystem Director

TC:JM

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cc:
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