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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 HANFORD PROJECT OFFICE
712 SWIFT BOULEVARD, SUITE 5
RICHLAND, WASHINGTON 99352

January 4, 1995

Donna Powaukee
Nez Perce Tribe
P.O. Box 305
Lapwai, Idaho 80540

Re: Review of the 200-BP-1 Operable Unit Proposed Plan

Dear Ms. Powaukee:

The Proposed Plan for the 200-BP-1 Operable Unit has been available in draft form for nearly a year. At this time I would like to request the Nez Perce Tribe provide formal comments on the 200-BP-1 Operable Unit Proposed Plan. In order to facilitate the finalization of this plan, please submit your comments to me within thirty days.

Enclosed is an updated version of the 200-BP-1 Operable Unit Proposed Plan. If you have any questions or would like to meet with me to discuss any issues, please contact me at (509) 376-8665.

Sincerely

Paul R. Beaver
Unit Manager

cc: Rico Cruz, Nez Perce
Bryan Foley, USDOE
Larry Gadbois, USEPA
Feng Gang Ma, Ecology
Dave Lundstrom, Ecology
Herman Rubin, Nez Perce
Doug Sherwood, USEPA
Donna Wanek, USDOE
Administrative Record, 200-BP-1 operable unit

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INTRODUCTION

This Proposed Plan identifies the preferred cleanup action for the contaminated soils at 200-BP-1 Operable Unit at the Hanford Site near Richland Washington. This Proposed Plan has been prepared by the U.S. Department of Energy (DOE), with the concurrence from the U.S. Environmental Protection Agency (EPA) (lead regulatory agency), and the Washington State Department of Ecology (Ecology) (support regulatory agency).

The public is encouraged to review this Proposed Plan, the Remedial Investigation Report, Feasibility Study Report, and the Risk Assessment for this site. We encourage your written and verbal comments on all of the alternatives, including the Preferred Alternative. Written comments should be submitted to:

Paul Beaver
712 Swift Blvd.
Richland, WA 99352
(509) 376-8665

A public meeting will be held September 27, 1994 at ..... After reviewing public comment, EPA will select a cleanup alternative which will be described in the Record of Decision (ROD) for this site. Written responses to comments, called a responsiveness summary, will also become part of the Record of Decision.

The Proposed Plan summarizes the information that is presented in greater detail in the Remedial Investigation, Feasibility Study, and Risk Assessment. Copies of these documents and other supporting documents can be found at one of the Hanford Public Information Repositories listed below or by calling the Hanford Cleanup toll-free hotline at 1-800-321-2008.

University of Washington
Suzzallo Library
Government Publications Room
Mail Stop FM-25
Seattle, WA 98195
(206) 543-4664
ATTN: Eleanor Chase

Gonzaga University
Foley Center
E. 502 Boone
Spokane, WA 99258
(509) 328-4220 EXT 3125
ATTN: Lewis Miller

Portland State University
Branford Price Millar Library
Science and Engineering Floor
SW Harrison and Park
Portland, OR 97207
(503) 725-3690
ATTN: Michael Bowman

U.S. Department of Energy Reading Room
Washington State University, Tri-Cities
100 Sprout Road, Room 130 West
Richland, WA 99352
(509) 376-8583
ATTN: Terri Traub

The Administrative Record file, which contains the information on which the selection of the response action will be based, is available at the following locations:

U.S. Department of Energy Richland Operations
Administrative Record Center
2440 Stevens Center Place
Richland, WA 99352

EPA Region 10
Superfund Record Center
1200 Sixth Ave.,
Park Place Building, 7th Floor
Mail Stop: HW-074
Seattle, WA 98101

Washington Department of Ecology
Administrative Record
719 Sleater-Kinney Road SE
Capital Financial Building, Suite 200
Lacey, WA 98503-1138

SITE BACKGROUND

In 1989, the EPA included the 200 Area along with the 100, 300, and 1100 Areas of the Hanford Site on the National Priority List (NPL) under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The 200 NPL Site is located on the central plateau of the Hanford Site, and is divided into the 200 East and 200 West Areas. The 200 NPL Site is further divided into 43 smaller units, called operable units. The 200-BP-1 Operable Unit is located in the north central portion of the 200 East Area. The 200-BP-1 Operable Unit encompasses approximately 25 acres with nearly all of the waste located in a 4 acre section.

The 200-BP-1 Operable Unit contains contaminated soils associated primarily with 10 inactive cribs (216-B-43 through 216-B-50, 216-B-57, and 216-B-61). These cribs were used for disposal of low level radioactive liquid waste. Historical records indicated cribs 216-B-43 through 216-B-49 were in operation from 1955 to 1956, cribs 216-B-50 and 216-B-57 were in operation from 1965 to 1975, and crib 216-B-61 was constructed, but there is no evidence that the crib was ever used or received waste. This historical information was verified through extensive investigations and sampling of the soils. In addition to the cribs, four unplanned releases of radioactive materials have occurred within this operable unit.

EARLY SITE WORK

Contaminated surface soils associated with the unplanned releases have been moved and consolidated over the top of the cribs where they have been covered with approximately 2 feet of clean soil to reduce contaminant migration and exposure. These soils contain relatively low levels of contaminants.

A prototype surface barrier called the Hanford Barrier is being constructed over the 216-B-57 Crib. Efforts to design a barrier that will last for over 1,000 years has been ongoing over the last 10 years. This will be the first full scale model of the Hanford Barrier. This test is being performed to gather construction and performance data so that these barriers can be used more extensively on the Hanford Site as well as other semi-arid environments.

EXTENT OF CONTAMINATION

Contaminated soils at the site can be categorized by the types of contaminants, their distribution in the soil column, and the risk posed by the various potential exposure pathways (e.g., surface, air, water).

Contaminants of concern at this site are Cesium-137, Radium-226, Plutonium-238,-239, -240, Strontium-90, Technetium-99, Cobalt-60, Uranium, Thorium-238, and Nitrate. All contaminants of concern are radionuclides except Nitrate.

Below the 2-ft clean soil cover, the near-surface soils (2 to 15 ft) contain low levels of contamination with Cesium-137, Radium-226, Strontium-90, Thorium-238, and Uranium.

Contaminated soils located between 15 and 50 ft below ground surface contain much higher levels of radionuclides than the upper and lower soils. The most significant contaminants in this zone include Strontium-90, Cesium-137, Plutonium-238,-239,-240, and Uranium. Most of the radioactivity is attributable to Strontium-90 and Cesium-137. These radionuclides have relatively short half-lives (29 and 30 yr, respectively). This means Cesium and Strontium will decay away within 200 - 300 years. Also, these two radionuclides are strongly bound to the soils and are not easily transported with water moving through the soils.

Contaminants of concern present in soils below 50 ft include Nitrate, Cobalt-60, Technetium-99, and Uranium. Nitrate, Cobalt-60, and Technetium-99 are highly mobile and reached groundwater very soon after being discharged to the cribs. Contamination of groundwater beneath the 200-BP-1 Operable Unit is currently being addressed in the 200-BP-5 Groundwater Operable Unit. These contaminants have migrated more than a mile north of the 200-BP-1 Operable Unit. Concentrations currently entering groundwater from the soils at 200-BP-1 are declining and are generally near or below EPA's drinking water standards. The groundwater is located approximately 230 feet below the ground surface. Contamination of groundwater beneath the 200-BP-1 Operable Unit is currently being addressed in the 200-BP-5 Groundwater Operable Unit.

SUMMARY OF SITE RISKS

During the Remedial Investigation/Feasibility Study phase, an analysis was conducted to estimate the health or environmental problems that could result if contaminated soils at the 200-BP-1 Operable Unit were not cleaned up. This analysis is commonly referred to as a **baseline risk assessment**, which can be found in the Remedial Investigation Report. For **carcinogens** (cancer causing agents), the risk is presented as the possible (excess) risk of contracting some form of cancer given a lifetime exposure to a chemical or radionuclides. State and federal guidelines for acceptable cancer risks normally range from 1×10^{-4} (1 chance in 10,000) to 1×10^{-6} (1 chance in 1,000,000) of developing cancer due to exposure to a carcinogen.

The risk associated with exposure to contaminated soils at the 200-BP-1 Operable Unit while maintaining current **institutional controls** is less than 10^{-6} (1 in 1,000,000) which is within the acceptable risk ranges. However, there is the possibility that institutional controls would be lost or discontinued and the contaminated soils are uncovered or brought to the surface making risks much higher. Institutional controls include, but are not limited to: Fencing, posting warning signs, and deed restriction on land use such as no irrigating or no digging at the site, and groundwater use restrictions.

The total lifetime cancer risk associated with exposure to the soils located from 2 to 15 ft, if exposed to the surface, is 9×10^{-5} (9 in 100,000).

If the higher contaminated soils (from 15 to 50 ft) become exposed at the ground surface, they will pose an unacceptable risk (greater than 10^{-2} life-time incremental cancer risk or 1 in 100). The majority of the total risk is from Cesium-137 and Strontium-90. However, due to the relatively short half-lives and immobility of Cesium-137 and Strontium-90, they do not pose an unacceptable risk to groundwater. At some Hanford sties, Plutonium isotopes are the source of greatest risk. At this site however, they are not because the levels in the soils are very low. Uranium is relatively mobile and extremely long lived (half-life greater than 100 million years) and poses the most significant future risk, but only for groundwater contamination.

Modeling indicates that, if no action was taken to remediate the contaminated soils, natural precipitation (rain and snow) will transport uranium downward towards the groundwater. According to the modeling, uranium concentrations will exceed the proposed drinking water standard (30 pCi/L) in about 700 years.

SCOPE AND ROLE OF ACTION

This proposed plan addresses soils contaminated at the 200-BP-1 Operable Unit. Based on the remedial action objectives presented below, this plan summarizes a range of remedial alternatives and presents a preferred alternative. The remedial action objectives include:

- Limit human exposure to the contaminated soils to maintain risks at an acceptable level (i.e., excess cancer risk in the range of 10^{-4} to 10^{-6} and preferably below).

- Limit biotic (plant and animal) intrusion into the contaminated soils that could result in exposing contaminants to the surface.

- Limit future impacts to groundwater.

- Consider the proximity and potential remedial action (e.g., excavation of tanks) at the adjacent 241-BY Tank Farm in evaluation of alternatives and remedy selection.

SUMMARY OF ALTERNATIVES

The alternatives analyzed for the 200-BP-1 Operable Unit are presented below. These letters correspond with the numbers in the RI/FS reports. Alternatives for the soil cleanup are:

- Alternative A: No Action
- Alternative B: Institutional Controls
- Alternative C: Biointrusion Barrier (barrier to prevent plant and animal intrusion)
- Alternative D: Modified RCRA Barrier
- Alternative E: Hanford Barrier
- Alternative F: Excavation and Soil Washing
- Alternative G: Excavation and Soil Washing with Vitrification
- Alternative H: Excavation and Fixation
- Alternative I: Landfill Disposal
- Alternative J: In-Situ Fixation.

Except for the "No Action" alternative, all of the alternatives now being considered for the site would include a number of common components.

- All of the alternatives would require some form of institutional control to provide long-term effectiveness.
- All barrier designs and in-situ fixation alternatives would leave waste in place.
- All excavation alternatives assume a maximum excavation depth of 50 ft and remove the same amount of soil. Excavation below 50 ft would compromise the integrity of the adjacent 241-BY Tank Farm.
- All waste removed from this operable unit would be placed in a permanent landfill on the Hanford Site that is presently in the conceptual design

stage. All waste disposed at the permanent landfill must meet a waste acceptance criteria.

- A relatively impermeable cap/barrier [i.e., a Resource Conservation and Recovery Act (RCRA) Barrier, or equivalent] would be required to prevent contaminants below 50 feet from entering the groundwater for all excavation alternatives.

Alternative A: No Action

The National Contingency Plan requires that a "no action" alternative be included in remediation alternatives to provide a baseline for comparison to other alternatives. Under this alternative, no further action would be taken to prevent exposure to the contaminated soil. The total cost of this alternative is $1,140,000 over the next 30 yr. These costs are associated with environmental monitoring required under CERCLA. Environmental monitoring consists of monitoring the waste and groundwater to determine the need for future remedial actions.

Alternative B: Institutional Control

This alternative assumes that the current administrative controls and maintenance of the existing clean soil cover remain in effect. Institutional controls consist of fencing, warning markers and signs, site use restrictions, and groundwater use restrictions. These controls are consistent with current plans for dedication of the 200 East Area as a waste management area. The total cost of this alternative is $1,240,000. These costs include monitoring as well as maintenance of the institutional controls.

Alternative C: Biointrusion Barrier

Contaminated soils would be left in place and covered with a 3-ft-thick multi layer barrier. The multilayered barrier would be designed to prevent plant, animal, and human contact with contaminated soils and to prevent plant or burrowing animals from bringing contaminated soils to the surface. The barrier's primary functional layer is crushed basalt, which provides a physical barrier to burrowing animals and plant roots. The overlying layers provide a soil filter to prevent fine soils from entering the basalt layer and reducing effectiveness. The biointrusion barrier does not attempt to decrease infiltration of water through the contaminated soils. An increased water infiltration rate over current conditions is expected. Increased water infiltration is expected because of the absence of plants to help transfer the moisture back into the air. The total cost of this alternative is $3,470,000.

Alternative D: Modified RCRA Barrier

Contaminated soils would be left in place and covered with a modified RCRA barrier. The modified RCRA barrier is a multi-layered barrier intended to minimize water infiltration, prevent plant and animal intrusion, and resist erosion. The major components of the barrier consist of (from top to bottom):

1. The top layer consist of silt with gravel (admix) added. The next layer is comprised of silt with no gravel added. These layers promote water runoff, provide suitable soil for shallow-rooted vegetation that will recycle moisture to the atmosphere, and reduce erosion.

2. The middle layers consist of a graded soil filter to prevent fine soils from entering the lower layers and creating a capillary break. The capillary break prevents water from entering the lower layers until the silt layers are totally saturated or filled with water.

3. The bottom layer is constructed of asphaltic concrete, very similar to asphalt but contains a higher oil content. The higher oil content enables this layer to withstand more settlement or movement than traditional asphalt used for roadways without cracking or otherwise failing. The purpose of this layer is to stop any water that may have passed through the upper layers and prevent animal and plant intrusion.

The modified RCRA barrier has been designed to meet or exceed all RCRA barrier requirements and includes a minimum design life of 500 yr and up to 1,000 yr. The total cost of this alternative is $5,650,000.

Alternative E: Hanford Barrier

Contaminated soils would be left in place and covered with a multilayered barrier called the Hanford barrier. The barrier is designed to minimize water infiltration, prevent biological intrusion, and resist erosion for a design life of 1,000 yr or greater. The Hanford barrier is similar in design to the modified RCRA barrier. The main differences are thicker silt layers and a crushed basalt (riprap) layer has been added just above the asphalt layer to eliminate plant and animal intrusion. These layers have been added to increase the design life of the barrier to over 1,000 years. The total cost of this alternative is $8,470,000.

Alternative F: Excavation and Soil Washing

Soil washing is used to physically or chemically separate soil particles into various sizes. This alternative would begin by removing contaminated soils to a depth of 50 ft below the cribs. To prevent contaminated dust from leaving the excavation, temporary enclosure would need to be constructed. Contaminated soils would be removed by shielded and/or remotely operated backhoes and bulldozers to minimize radiation exposure of the workers. The actual soil washing process would wash the contaminated soils through different size screens to separate the particle sizes. Higher contaminated soils are generally found in the fine soil particles and would be disposed of in an approved landfill on the Hanford Site. The wash water used would be treated to meet waste acceptance criteria and disposed of accordingly. The total cost of this alternative is $182,000,000.

Alternative G: Excavation and Soil Washing with Vitrification

This alternative is essentially the same as alternative F with the addition of vitrifying the highly contaminated soils once separated. The vitrification process heats the soils until they melt and when cooled, a glass like material is formed that resembles obsidian. The vitrification process would immobilize the contaminants in a glass matrix. The vitrification material will be disposed of in an approved landfill. the total cost of this alternative is $268,000,000.

Alternative H: Excavation and Fixation

Contaminated soils would be removed, mixed into a grout matrix (similar to concrete), and returned to the excavation. The grout matrix would reduce the mobility of the contaminants. The total cost of this alternative is $81,000,000.

Alternative I: Landfill Disposal

Contaminated soils would be removed and disposed of, with no treatment, in an approved landfill on the Hanford Site (off the 200-BP-1 Operable Unit). The area will be backfilled, a barrier/cap placed over the backfilled area and revegetated. All contaminated soils disposed of in the landfill would have to meet waste acceptability criteria. The total cost of this alternative is $82,000,000.

Alternative J: In Situ Fixation

This alternative would involve treating most of the highly contaminated soils in place with fixation. Deep soil mixing would be accomplished by drilling with large augers to mix the soil in place while grout or other fixation agents are injected. Success of this technology is questionable due to the difficulties in ensuring adequate mixing of the grout and contaminated soils. The total cost of this alternative is $53,000,000.

EVALUATION OF ALTERNATIVES

Evaluation Criteria

An evaluation of each alternative is conducted using nine criteria. Listed below are the nine criteria as set forth by EPA.

Threshold Criteria:

1. Overall Protection of Human Health and the Environment- How well does the alternative protect human health and the environment, both during and after construction?

2. Compliance with federal and state regulations (ARARs)- Does the alternative meet all federal and state applicable or relevant and appropriate regulations (ARARs)?

Balancing Criteria:

3. Long-Term effectiveness and performance- How well does the alternative protect human health and the environment after completion of cleanup? What, if any, risks will remain at the site?

4 Reduction of toxicity, mobility, or volume through treatment- Does the alternative effectively treat the contamination to significantly reduce the toxicity, mobility, and volume of the hazardous substance?

5. Short-term effectiveness- Are there potential adverse effects to either human health or the environment during construction or implementation of the alternative? How quickly does the alternative reach the cleanup goals?

6 Implementability- Is the alternative both technically and administratively feasible? Has the technology been used successfully on other similar sites?

7. Cost- What are the estimated costs of the alternative?

Modifying Criteria:

8. State acceptance- What are the state's comments or concerns about the alternatives considered and about EPA's preferred alternative? Does the state support or opposed the preferred alternative?

9. Community acceptance- What are the community's comments or concerns about the preferred alternative? Does the community generally support or oppose the preferred alternative?

Overall Protection

All alternatives, with the exception of the "No Action", "Institutional Controls", and possibly the "Biointrusion Barrier" alternatives, will provide adequate protection of human health and the environment by reducing or controlling the risk through engineering and institutional controls. It is unknown how much the biointrusion barrier will effect the rate of infiltration due to precipitation, but preliminary expectations indicate increased infiltration. All remaining alternatives provides long term protection from direct contact exposure, plant and animal intrusion, reduce water movement through the contaminated soils, thereby decreasing the potential for the contaminants to migrate to the groundwater.

Because the "no action", "institutional controls", and "biointrusion barrier" alternatives are not protective of human health and the environment, they are not considered further in this analysis as options for this site.

Compliance with ARARs

All the remaining alternatives will comply with all applicable or relevant and appropriate Federal and State environmental laws. The most significant of these are: long term protection (up to 1,000 yr) of the groundwater due to uranium discharges in the 200- to 1,000-yr period of concern, provides adequate protection for inadvertent intruders (i.e.,a person unknowingly digging, drilling... etc. into the contaminated soils) for up to and beyond 500 years, and overall protection of the environment.

Long-Term Effectiveness and Permanence

All remaining alternatives will provide adequate long-term protection of the groundwater, contact exposure, and plant and animal for the 200 to 1,000 yr period of concern. This is accomplished through isolation of the contaminated soils and preventing migration of the contaminants by reducing or eliminating infiltration of precipitation through the use of a barrier and/or vitrification or fixation.

Reduction of Toxicity, Mobility, or Volume of the Contaminants Through Treatment

None of the alternatives under consideration reduces the toxicity of the contaminated soils, since radionuclides cannot be destroyed or transformed into a less hazardous substance. Only alternatives with soil washing are capable of reducing the volume of contaminated soils.

All remaining alternatives will reduce the mobility of the contaminants in the soils, to varying degrees, through the use of a barrier to reduce or eliminate infiltration due to precipitation and/or vitrification or fixation.

Short-Term Effectiveness

All excavation alternatives result in a very high risk to the workers due to the high levels of radioactivity. Offsite exposure due to windblown contaminated dust and/or erosion of the contaminated soils due to precipitation should be eliminated with the construction of containment structures over the excavation site. Alternative J (in-situ fixation) may result in some exposure to workers and equipment due to the mixing of contaminated soils, although exposure levels, if any, are expected to be low. Offsite and worker exposure to radiation is not a concern for the barrier alternatives since no excavation of the contaminated soils will take place. The highly contaminated soils are overlain by 15 ft of soil, which would shield workers from radiation during construction of the barrier alternatives.

Implementability

The barrier alternatives use materials located on the Hanford Site and is constructed with standard earth-moving equipment. These alternatives can be readily implemented and are the easiest to implement of the remaining alternatives. Alternative J ,in-situ fixation would be more difficult to implement than a barrier due to the auger drilling and mixing of highly contaminated soils. All excavation alternatives would be the most difficult to implement due to the use of shielding and robotics to protect workers from radiation exposure.

Costs

The following is a list of the estimated cost of each alternative. The estimated costs for each alternative reflects both capital costs and the net present value of operation and maintenance cost. Long-term performance monitoring is also included as required by CERCLA.

Alternative	Cost, $
A No Action	1,140,000
B Institutional Controls	1,240,000
C Biointrusion Barrier	3,470,000
D Modified RCRA Barrier	5,650,000
E Hanford Barrier	8,470,000
F Excavation and Soil Washing	182,000,000
G Excavation and Soil Washing with Vitrification	268,000,000
H Excavation and Fixation	81,000,000
I Landfill Disposal	82,000,000
J In Situ Fixation	53,000,000

State Acceptance

Ecology believes that the Modified RCRA Barrier would provide the best alternative for final remediation of the 200-B-1 Operable Unit.

Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the ROD for the 200-BP-1 Operable Unit.

SUMMARY OF THE PREFERRED ALTERNATIVE

The preferred alternative for the 200-BP-1 Operable Unit is alternative D, "Modified RCRA Barrier". This alternative complies with all identified ARARs. Alternative D is the most cost effective in comparison to all alternatives meeting the identified ARARs. Also, this alternative will utilize a final solution without further spreading contamination or creating additional waste site(s) or increasing risks due to implementation of the alternative. Since the contaminated soils must remain on the Hanford Site for the foreseeable future regardless of the alternative chosen, and the most significant contamination is located from 15 to 50 feet below the ground surface, it makes sense to leave the waste in place at this operable unit. This alternative complies with all identified ARARs. Alternative D is also cost effective in comparison to all alternatives meeting the identified ARARs.

EPA, Ecology, and DOE recognize the risk associated with placement of a barrier at 200-BP-1 Operable Unit due to future remediation of the adjacent BY

Tank Farm. However, all parties have agreed to work closely in the future to ensure remediation of the BY Tank Farm does not adversely affect remediation activities for the 200-BP-1 Operable Unit.

It is important for the public to recognize that this recommendation is only preliminary and will only be finalized once all public comments have been adequately addressed. Therefore, the public are encouraged to provide comments on this plan and examine all the alternatives considered during the Remedial Investigation/Feasibility Study phase for the 200-BP-1 Operable Unit.

GLOSSARY

Administrative Record: The files containing all the documents used to select a remedy at a superfund site.\

Alternative: An option for addressing site contamination.

ARARs (Applicable or relevant and appropriate requirements): The federal and state requirements or laws that a remedy must attain. ARARs include requirements such as allowable air emission limits and allowable levels of contaminants in water.

Baseline Risk Assessment: A part of the remedial investigation that evaluates the risks to public health and the environment.

Biotic: Humans, animals, insects, and plants.

Carcinogens: Cancer-causing agents.

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act. A federal law that establishes a program that enables the EPA to identify abandoned hazardous waste sites, ensures that they are cleaned up, and allows other government entities to evaluate damages to natural resources.

Crib: An underground system of piping used to discharge liquid beneath the ground. Similar to a septic tank.

Downgradient: The direction a contaminant flows away from the source.

Exposure Pathways: The routes contaminants take to impact the environment (e.g., water, air).

Half-lives: The amount of time required for a radioactive substance to reduce its volume by half.

Immobile: A contaminant that remains in the soils with very little movement.

Institutional Controls: Rules, regulations, laws, or covenants that may be necessary to ensure the effectiveness of a cleanup alternative.

National Contingency Plan: The federal plan that provides the organizational structure and procedures for responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

NEPA: National Environmental Policy Act. A federal law that establishes a program to prevent and eliminate damage to the environment.

Operable Unit: A distinct portion of a superfund site. An operable unit may be established based on a particular type of contamination, contaminated media (e.g., soils, water), source of contamination, and/or some physical boundary or restraint.

RI/FS: Two distinct but related studies. During the remedial investigation (RI), in formation is gathered to determine the nature and extent of contamination at the site. In the feasibility study (FS), alternatives for cleaning up the contamination are identified, screened, and compared before a cleanup method is chosen.

Vadose: The dry soils between the ground surface and the water table (unsaturated zone).

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[1]Words shown in Bold are defined in the Glossary.

PROPOSED PLAN FOR THE 200-BP-1 OPERABLE UNIT AT HANFORD, RICHLAND, WASHINGTON

MAY 1994

JUNE 1994

JULY 1994

AUGUST 1994

SEPTEMBER 1994

DOE/RL-93-72, Rev. 0 DOE/RL-93-72, Rev. 0 DOE/RL-93-72, Rev. 0

DOE/RL-93-72, Rev. 0 DOE/RL-93-72, Rev. 0 DOE/RL-93-72, Rev. 0

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Brian W. Drost
USGS - Tacoma
9/28/94

USGS COMMENTS ON:

HANFORD SITEWIDE
GROUNDWATER REMEDIATION STRATEGY
(DOE/RL-94-95 DRAFT A)

Page 4-2, Section 4.1.2, line 1
It is stated that the Ringold Formation sediments were deposited during the "past several million years". Their estimated age is 3.4 to 8.5 million years BP.

Page 4-2, Section 4.1.2, last sentence
The Hanford gravels are equated with deposits in the "middle Ringold". Gravels occur in the Ringold at varying positions from the top to bottom of the formation. Drop "middle" from the statement.

Page 4-3, Section 4.1.5, 2nd paragraph, 1st sentence
The range of flow velocities is given as "several to 4.6 m/day". The 4.6 appears to be very precise relative to "several".

Page 4-3, Section 4.1.5., 2nd paragraph, last sentence
It is implied that an upward gradient exists everywhere. Although this is anticipated to be true everywhere along the river, there are data suggesting downward gradients in some locations (e.g., Hartman and Lindsey '93 discovered a downward gradient in the 100-N Area).

Page 4-3, Section 4.1.5., 4th paragraph, last sentence
The statement is made that where contaminants have reached the confined system their areal extent "should be very limited". Although this is probably true, it is too strongly stated. Very large hydraulic conductivities are known to exist in some places in the Columbia River Basalts. Therefore, considering the general lack of contaminant data in the confined system, we cannot assume "very limited" extent of contamination.

Page 4-11, Section 4.1.5., lines 1-3
It is stated that mobile contaminants are expected to take about 100 years and 10-20 years, respectively, to reach the river from the 200-W and 200-E Areas. Presumably these times reflect the entire traveltime from the center of these areas to the river. Some readers may misinterpret this statement to mean that these times represent the time before any of the present contamination will reach the river.

Page 5-3, Section 5.2, Table 5-1
The cleanup approach for the strontium-90 plume in the 100-N

Area is listed as "Remediation". The present plan for this plume is a sheet-pile wall (containment) and some form of pump-and-treat (mass reduction). This plan does not represent a "remediation".

Page 5-6, Section 5.4.1, 1st sentence
It is stated that the fate of two-thirds of the carbon tetrachloride is unknown. Presumably this refers to the entire mass discharged to the ground.

Page 5-8, Section 5.7.2, 2nd paragraph, line 3
The N-Springs barrier length is given as 3800 feet. This dimension has been a moving target in recent days, but at present is 3000 feet.