0050150

ACTION MEMORANDUM

JAN 1999
RECEIVED
EDMC

SITE NAME AND LOCATION

USDOE Hanford 100 Area National Priorities List
100-N Area Ancillary Facilities Hanford Site
Benton County, Washington

I. PURPOSE

The purpose of this Action Memorandum is to document approval of the proposed removal action for the 100-N Area Ancillary Facilities at the U. S. Department of Energy's (DOE) Hanford Site, Benton County, Washington. Figure 1 shows the location of the Hanford Site. The proposed removal action to be implemented at 100-N Ancillary Facilities was outlined in *Engineering Evaluation/Cost Analysis for the 100-N Area Ancillary Facilities and Integration Plan*, DOE/RL-97-22, Revision 1 (DOE-RL 1998c) (hereafter referred to as *proposal*), which was prepared by the DOE. The proposal is available in the Administrative Record for the 100-N Area.

The preferred removal action identified in the proposal was to decontaminate and demolish the 100-N Area Ancillary Facilities. The work shall be planned and executed over a ten-year period. Surveillance and maintenance shall be performed at the 100-N Area Ancillary Facilities until such time that demolition activities are completed. Waste generated from the removal action shall be disposed at the Environmental Restoration Disposal Facility (ERDF), provided the waste meets ERDF waste acceptance criteria. The overall goal of the removal action is to protect human health and the environment by reducing the threat of a release of hazardous substances from contaminated facilities in the 100-N Area. The specific objectives include:

- Reducing the threat of release of hazardous substances contained within facilities
- Protecting workers from hazards posed by these facilities
- Minimizing or eliminating long-term surveillance and maintenance requirements and associated costs
- Facilitating consistency with future remediation in areas where facilities are located.

The approved removal action will meet these objectives. The scope of the removal action includes the inactive contaminated ancillary facilities in the 100-N Area, the facilities in the buffer zone[1], and the Hanford Generating Plant and the solid waste management units inside the Hanford Generating Plant support facilities. Decontamination and demolition of the 105-N Reactor and 109-N Heat Exchange facilities, which are part of the Interim Safe Storage Project,

[1] The buffer zone is defined as the facilities needed to support the 100-N Reactor until it is put into interim safe storage, all the waste sites within 15.25 m [50 ft] of the reactor buildings (105-N and 109-N), and the 116-N ventilation stack.

are excluded from the removal action. However, the removal action does include disposal of approximately 2500 cubic yards of roofing material removed from the 105-N and 109-N facilities. Figure 2 provides an overview of the 100-N Area. The specific facilities addressed by this removal action are identified in Table 1. A description of each facility is contained in the proposal available in the Administrative Record for the 100-N Area.

A 45-day public comment and review period for the DOE's proposal was held from March 16 through April 29, 1998. The responsiveness summary to public comments is attached. The approval of the removal action is based upon the information contained in the Administrative Record and the public comments received. There were no public comments opposing the selected removal action.

II. SITE CONDITIONS AND BACKGROUND

Pursuant to the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA), the U. S. Environmental Protection Agency (EPA) recommended the 100 Area of the Hanford Site for inclusion on the National Priorities List (NPL) on June 24, 1988. In November 1989, the 100 Area was added to the NPL. The 100-N Area ancillary facilities are located within the geographic area of the 100-NR-1 and 100-NR-2 Operable Units, as described by the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1990). Due to hazardous substances in the 100-N Area ancillary facilities, the DOE determined that the facilities may present a potential threat to human health or the environment, and that a CERCLA non-time critical removal action is warranted. Additionally, because the solid waste management units require corrective action under Section 3004(u) of *Resource Conservation and Recovery Act of 1976* (RCRA) and the *Washington Administrative Code* 173-303-646), the parties intend to satisfy RCRA corrective action requirements with this CERCLA removal action. The RCRA Permit has been revised to incorporate these actions as corrective action requirements. The Washington State Department of Ecology has been identified as the lead regulatory agency for this project.

A. Site Description

1. Removal Site Evaluation

The 100-N Reactor, the Hanford Generating Plant and associated support facilities, and source waste sites addressed by the removal action are located in the 100-N Area of the Hanford Site along the southern shore of the Columbia River in southeastern Washington. The 100-N Reactor operated from December 1963 until December 1987. It was the last production reactor to be constructed at the Hanford Site and differed from the other eight reactors in that it could produce both special nuclear materials and steam for the production of electric power. The EPA placed the 100 Area on the NPL because of soil and groundwater contamination resulting from the operation of the reactors and support facilities. The 100 Area includes many liquid and solid waste disposal sites used to support past reactor operations. To organize remediation efforts under CERCLA, these sites were subdivided into operable units consisting of waste sites that were related, both geographically and by type. The 100-N Area contains two operable units: one

that consists of the liquid and solid waste disposal sites (100-NR-1 Operable Unit), and another that consists of contaminated groundwater underlying the 100-N Area (100-NR-2 Operable Unit). The 100-NR-1 Operable Unit includes four sites that are treatment, storage, and disposal (TSD) units managed under RCRA.

The key problems posed by the facilities addressed in this removal action are residual radioactivity and hazardous materials associated with the building construction such as lead, asbestos, and polychlorinated biphenyls (PCBs).

2. Physical Location

The Hanford Site occupies an area of approximately 560 mi^2 (1,450 km^2) located north of the city of Richland and the confluence of the Yakima and Columbia Rivers. This large area provides a buffer for the smaller areas on site that were historically used for production of nuclear materials, waste storage, and waste disposal. Only about 6% of the land area has been disturbed and is actively used. The Columbia River flows eastward through the northern part of the Hanford Site and then turns south, forming part of the eastern site boundary. The Yakima River flows near a portion of the southern boundary and joins the Columbia River downstream from the city of Richland.

The cities of Richland, Kennewick, and Pasco (Tri-Cities) constitute the nearest population center and are located southeast of the site. The 1995 estimated populations of the three cities were 36,270, 48,130, and 22,500, respectively (PNNL 1997). Figure 1 provides a vicinity map of the Hanford Site.

a. Land Use Access

Public access to the Hanford Site, including the 100-N Area, is currently restricted. Current land use in the 100 Area consists of DOE spent-fuel management activities and remediation activities. The Columbia River, adjacent to the 100 Area, is accessible to the public for recreational use (e.g., boating and sport fishing). The river is currently under consideration for designation as a National Wild and Scenic River. In prehistoric and early historic times, the area along the banks of the Columbia River, including the 100 Area, was a focal point for camping and village sites for northwestern Native American tribes. More recently, before government acquisition of the land in January 1943, the area was used for irrigated and dry-land farming and livestock grazing. Future land use of the 100 Area has not been determined.

b. Flora and Fauna

The plant community within the perimeter of the 100-N Area is characterized primarily as cheatgrass/rabbitbrush, with a riparian community in a narrow strip along the river shoreline. Many areas within the 100-N Area have been physically disturbed by construction and operation of the 100-N Reactor, support facilities, and waste sites. The habitats along the river are used by a variety of mammals, birds, reptiles, and insects. Three species of birds on the federal list of threatened or endangered species are found on the Hanford Site. These are the bald eagle, the peregrine falcon, and the Aleutian Canada goose. The steelhead trout in the Hanford Reach of

the Columbia River was added to the endangered species list in August 1997.

c. Cultural Resources

The area along the Columbia River contains many cultural resources, including prehistoric and historic sites, Native American artifacts, and sites of religious significance. Archaeological sites and traditional-use areas have been located adjacent to the 100-N Area. Within the fence line around 100-N Area, however, the likelihood of archaeological remains is remote because of the extensive disturbance resulting from construction of the 100-N Reactor.

The 100-N Complex itself is also considered an historic resource. DOE, the Washington State Historic Preservation Office, and the Advisory Council on Historic Preservation concurred that the Hanford Site Manhattan Project and Cold War Era Historic District is eligible for listing in the National Register of Historic Places and agreed to a sitewide treatment plan adopted under a programmatic agreement. Federal regulation requires the completion of the mitigation process prior to any proposed federal undertaking (e.g., the demolition of buildings) that would adversely impact historic properties. Several buildings at the 100-N Complex were identified in the programmatic agreement as contributing properties to the Hanford Site Manhattan Project and Cold War Era Historic District. Mitigation requirements for these buildings have been met by preparing the appropriate historic property inventory forms and other necessary documentation.

d. Wetlands Review

A wetlands review was conducted in 1992 (DOE 1992) in which no significant wetlands conditions were identified. During implementation of this removal action, efforts will be made to prevent and minimize any impacts to the shoreline and riverine habitats. An ecological review will be completed prior to implementation of the removal action activities, and the removal action will proceed only if the review confirms the findings of the 1992 wetlands review.

3. Site Characteristics

The Hanford Site is owned by the federal government. The DOE, Richland Operations Office (RL) is responsible for operating and remediating the site, including the 100-N Area. The 100-N Area is composed of many ancillary facilities that supported 100-N Reactor operations. Consistent with the remediation mission identified for the 100-N Area, the existing ancillary facilities have been, or are currently being, deactivated. Deactivation places the facilities in a safe and stable condition, minimizing the long-term cost of surveillance and maintenance and protecting workers, the public, and the environment. Deactivation includes removing all easily removable tools and equipment and performing facility decontamination. Decontamination of radiological and hazardous substances is accomplished either by removing materials that can be readily dislodged or by applying a fixative. This process prevents the spread of contamination during long-term storage or subsequent demolition activities.

4. Release or Threatened Release into the Environment of a Hazardous Substance, Pollutant, or Contaminant

This removal action addresses the contaminated inactive ancillary facilities and the contaminated facilities within the buffer zone (identified in Table 1), which were determined to be potentially contaminated with hazardous substances used in or generated by 100-N Reactor operations. Information regarding hazardous substances in these facilities is based primarily on knowledge of construction material, historical operations, and process knowledge of analogous facilities in the 100 Area.

The primary hazardous substances of concern are radioactive materials. All identified quantities of hazardous chemicals have been removed from the facilities during the deactivation, although some minor residual quantities of hazardous chemicals may remain in process lines, tanks, drains, etc. In addition to the radioactive materials, many of the facilities are expected to contain one or more of the hazardous materials that are known to be present in most Hanford Site facilities, including the following:

- Polychlorinated biphenyls (PCBs) and non-PCB light ballasts
- Lead paint
- Lead for shielding
- Mercury switches, gauges
- Fluorescent light bulbs
- Mercury or sodium vapor lights
- Used oil from motors and pumps
- Asbestos and asbestos-containing materials.

In addition to the radiological and hazardous materials, physical hazards (e.g., confined space, electrical, tripping hazard) are known to exist in some of the facilities.

In general, the facilities addressed in this removal action are in fair to good structural condition. Facility surveillance and maintenance activities are ongoing to help ensure the integrity of the facilities. However, as the ancillary facilities age, it will become increasingly difficult to confine the hazardous substances within the facilities. Also, the increased surveillance and maintenance that will be required to maintain the facilities increases the potential for exposure to site workers and personnel.

5. NPL Status

As stated in II.A.1, above, the 100 Area of the Hanford site, including the 100-N Area, was placed on the NPL in 1989 because of soil and groundwater contamination resulting from the operation of the reactors and support facilities. Remediation efforts are already underway in other sections of the 100 Area. For example, interim action records of decision (ROD) have been attained for the 100-BC, 100-HR, and 100-DR Areas (EPA et al. 1995 and EPA et al. 1997). Portions of the 100 Area, including the 100-IU-1 and 100-IU-3 independent units, were removed from the NPL in July 1998. However, the entire 100 Area will be removed from the NPL only after each area has been adequately addressed.

Figure 3 is a diagram of the environmental cleanup strategy in the 100 Area.

6. Maps, Pictures and Other Graphic Representations

Three figures and a table are included in this Action Memorandum that help provide an understanding of the area being addressed by the removal action and the specific facilities involved. Additionally, references are provided to give detailed information on other documents that were mentioned in this Action Memorandum or were used to support the information contained herein. The figures and table are listed below and are identified throughout the text of this Action Memorandum. References are called out in the appropriate text and are listed at the end of the memorandum. Attachment 1 provides the responsiveness summary to public comments on the proposal.

Figure 1 - Hanford Site
Figure 2 - Overview of the 100-N Area
Figure 3 - 100 Area Environmental Cleanup Strategy
Table 1 - Existing 100-N Area Facilities Addressed in the Approved Removal Action

B. Other Actions to Date

Remedial actions in the 100 Areas are in various stages of completion. For example, in September 1995, a CERCLA interim action ROD (EPA et al. 1995) was issued to address contaminated soils in the 100-BC, 100-D, and 100-H Areas. A subsequent interim action ROD amendment in April 1997 added soil sites that were sufficiently similar to those addressed in the original interim action ROD (EPA et al. 1997). Removal and disposal of soil waste sites in the 100-BC, 100-D, and 100-H Areas is continuing in accordance with the interim action ROD and ROD amendment. In March 1996, another ROD was issued stating that no further action was required at several soil sites in 100 Area independent units (EPA et al. 1996b). Subsequently, in July 1998, two independent units (100-IU-1 and 100-IU3) were delisted from the NPL. A CERCLA Action Memorandum for the 100-BC Ancillary Facilities and 108-F Building (EPA and DOE 1997) authorized the decontamination and demolition of several reactor support facilities in the 100-BC and 100-F Areas. That removal action was initiated in early 1997 and is scheduled to be complete by September 1999. Meanwhile, a proposed plan is being developed to address the remaining soil waste sites in the 100 Area, and a feasibility study is underway to evaluate technologies to address 100-Area burial grounds.

Specific to the 100-N Area, some remediation activity is in progress. A majority of the effort, however, is still in the decision making process that precedes actual cleanup work. The overall strategy for remediation of the 100-N Area focuses on five major components:

- Contaminated soils and underground pipelines
- Land areas used for treatment, storage, and disposal of dangerous wastes (called cribs and trenches) and associated pipelines
- 100-N Reactor Interim Safe Storage
- Groundwater beneath the 100-N Area

- Facilities (such as buildings, structures, and pipelines) to be decontaminated and/or taken out of service, which are the subject of this Action Memorandum.

Remediation of these components will be carried out by coordinating remediation, deactivation, decontamination, and demolition activities to achieve cost-effective, consistent remediation of the entire 100-N Area. In 1994, the 100-N Area Pilot Project was initiated to move the remediation strategy forward and included actions under the authority of CERCLA, RCRA Section 3004(u) corrective action, RCRA Subtitle C for TSD facilities, and RL's Decontamination and Decommissioning Program. Milestone M-16-01 of the Tri-Party Agreement (Ecology et al. 1990) was developed to propose a schedule for coordinating these actions.

Activities covered under the pilot project include an expedited response action (ERA) for strontium-90 (^{90}Sr) contamination in groundwater, deactivation of 100-N Area facilities, characterization of environmental contamination, and evaluation of remedial alternatives for waste sites. A brief status of these activities follows:

- The ERA was authorized via a CERCLA Action Memorandum (Ecology and EPA 1994). In accordance with the Action Memorandum, a groundwater extraction and treatment system was constructed in the 100-N Area and will continue to operate until other decisions are made relative to groundwater remediation.

- Deactivation of 100-N Area facilities is under way in accordance with the *National Environmental Policy Act* Environmental Assessment (DOE 1995). Deactivation is work that precedes decontamination and demolition activities, and involves isolating utilities such as water and electricity and ensuring stability of the facility in preparation for decontamination work. The deactivation work is essentially complete with the exception of those facilities expected to remain active to support long-term 100 Area activities. To facilitate disposal of N Reactor deactivation waste, a CERCLA Action Memorandum was issued in 1996 designating ERDF as the disposal facility (EPA et al. 1996a).

- Remedial alternatives for waste sites and groundwater were evaluated in the *Corrective Measures Study* (CMS) *for the 100-NR-1 and 100-NR-2 Operable Units* (DOE-RL 1998b) and the *100-NR-1 Treatment, Storage, and Disposal Units Corrective Measures Study/Closure Plan* (DOE-RL 1998a). Subsequently, in March 1998, proposed plans identifying the preferred alternatives for these waste sites and groundwater were submitted to the public for review (DOE-RL 1998d and DOE-RL 1998e). Pending resolution of comments from public review, interim action RODs will be issued that will authorize the selected remedial actions at these operable units.

- The EE/CA for the 100-N Area ancillary facilities was issued for public review in March 1998. The EE/CA evaluated alternatives to determine what should be done with the inactive buildings and structures that supported N Reactor operations. Additionally, the EE/CA addressed three solid waste management units located within the Hanford Generating Plant facilities. This action memorandum documents the selected alternative and authorizes the removal action for the ancillary facilities and the solid waste management units.

This Action Memorandum is consistent with and supports the overall 100-N Area remediation strategy. While some groundwater and soil remediation activities in the 100-N Area can occur simultaneously, this approval of the removal action for the ancillary facilities is the precursor to some soil remediation. Figure 3 provides a diagram of the cleanup strategy in the 100 Area, detailing proposed actions in the 100-N Area.

C. State and Local Authorities' Roles

The Tri-Party Agreement (Ecology et. al 1990) delineates the roles of the EPA, DOE, and the Washington State Department of Ecology (Ecology) at the Hanford Site. The DOE-RL is the responsible agency for implementing the removal actions specified in this Action Memorandum. In accordance with the Tri-Party Agreement, Ecology is the lead regulatory agency for the 100-N Area. The lead regulatory agency approach was established to minimize duplication of effort and maximize productivity, particularly when both RCRA and CERCLA authorities impact a site. In the role of lead regulatory agency, Ecology is responsible for overseeing the activities covered by this Action Memorandum. However, EPA and Ecology retain their respective legal authorities.

The Tri-Parties recognize the similarities between RCRA corrective action and CERCLA remedial action processes, and their common objective of protecting human health and the environment from the potential releases of hazardous substances, wastes, or constituents. The regulatory conditions that control cleanup (such as RCRA corrective action and applicable or relevant and appropriate requirements identified during the CERCLA process) should remain similar and consistent in implementation. It is logical, then, that the applicable requirements of both the RCRA corrective action and CERCLA remedial action programs be satisfied in a consistent way during cleanup at 100-N Area. As such, actions taken to cleanup the solid waste management units will comply with the provisions of both CERCLA and RCRA.

The technical and procedural elements of RCRA and CERCLA are both addressed in full in this process. Section 3004(u) of RCRA requires that RCRA permits include corrective action conditions as necessary to protect human health and the environment, including schedules of compliance for work not completed at the time of permit issuance. Thus, in accordance with RCRA, the selected CERCLA alternative authorized in this Action Memorandum and the RCRA permit conditions will be incorporated into the Hanford Facility RCRA Permit as the RCRA corrective action.

III. THREAT TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

CERCLA section 104(a) authorizes removal responses "whenever (A) any hazardous substance is released or there is a substantial threat of such a release into the environment, or (B) there is a release or substantial threat of release into the environment of any pollutant or contaminant which may present an imminent and substantial danger to the public health or welfare".

The 100-N Area ancillary facilities addressed by this action memorandum are known to be contaminated with hazardous substances. A potential threat exists to human health and the

environment through the deterioration of the buildings, which poses a substantial threat of a release of hazardous constituents to the air or soil. The threat to public health involves Hanford site employees that work in and around the 100-N Area. A release of hazardous substances, including radionuclides, from the facilities could result in exposure to external radiation as well as exposure from inhalation. Because of the threat of a release of hazardous substances into the environment, and the potential danger that such a release would pose to Site workers, public health, or public welfare, the requirements of CERCLA section 104(a) are met. Therefore, a non-time critical removal action is justified.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Action Memorandum, may present a threat to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

In order to determine the most appropriate removal action to address the 100-N Area Ancillary Facilities, the DOE conducted an engineering evaluation/cost analysis. The *Engineering Evaluation/Cost Analysis for the 100-N Area Ancillary Facilities and Integration Plan,* DOE/RL-97-22, Revision 1 (DOE-RL 1998c), or proposal, is referred to throughout this document and contains the evaluation and comparison of removal action alternatives. The Administrative Record for the 100-N Area contains the proposal and the public comments on the proposal. The responsiveness summary to the public comments on the proposal is attached to this Action Memorandum. The analysis evaluated four removal action alternatives, which are summarized below. However, based on implementability, short-term effectiveness, and cost, the approved action consists of combining two alternatives to ensure protectiveness during the implementation period. The combination alternative is summarized in section V.A.5., below.

A. Description of Alternatives

1. Alternative One - No Action

Under the no action alternative, no action would be taken to address the hazards, and the facilities would be allowed to deteriorate. Although Hanford Site controls would continue to help prevent personnel or worker entry to the facility, releases of contaminants from the facility would ultimately occur. No waste would be generated from this alternative and the costs for implementation would be negligible. The no action alternative would be ineffective at protecting human health and the environment.

2. Alternative Two - Long Term Surveillance and Maintenance

The goal of the long term surveillance and maintenance is to sustain a contaminated facility in a safe condition until final disposition. The surveillance and maintenance measures include routine radiological and hazard monitoring of the facilities, safety inspections, and periodic confirmatory measurements of ventilation systems. The surveillance and maintenance activities are tailored to the specific condition of each facility. Activities are kept at a minimum to reduce hazards to workers while reducing the potential for releases of contaminants. As the facility ages and deteriorates, typically surveillance and maintenance must become more aggressive and involves increased frequency of required activities and a higher level of worker protection, which increases cost. As cost increases, long term surveillance and maintenance becomes less viable than a decontamination and demolition program. Without an increasingly aggressive program, the threat of an unplanned release to the environment and the potential for exposure of workers and the public increases.

Although the volume is expected to be small, a variety of waste streams could be generated in the performance of surveillance and maintenance activities that will be characterized, packaged, and disposed. Waste that meets the waste acceptance criteria[2] for the Environmental Restoration Disposal Facility (ERDF) will be disposed there. ERDF, located in the Hanford Site's 200 West Area, is designed as an isolation structure for long-term disposal of wastes generated from the Hanford Site's remediation activities. The ERDF is designed to meet RCRA minimum technological requirements for landfills, including standards for a double liner, a leachate collection system, leak detection, and final cover. Waste may be treated as necessary as part of waste minimization efforts (for example, by crushing, sizing, and sorting) and will be treated to meet the ERDF waste acceptance criteria. Waste that cannot be treated to meet ERDF waste acceptance criteria will be managed to comply with identified applicable or relevant and appropriate requirements (ARARs). Non radioactive asbestos-containing material removed from the Hanford Generating Plant facility may be disposed at the Rabanco Regional Landfill in Roosevelt, Washington in accordance with applicable regulations. Approximately 2500 cubic yards of low-level radioactive contaminated roofing material resulting from roof repairs to eliminate water intrusion at the 105-N and 109-N facilities may be disposed at the ERDF, provided it satisfies ERDF waste acceptance criteria. The cost for disposal of the roofing material at the ERDF is estimated at $153,500.

The estimated cost to implement the surveillance and maintenance work is $609,130 per year. Cost has not been factored into the estimate to account for the increased resource demands on the surveillance and maintenance program that will be required over time, nor have costs

---

[2] *Environmental Restoration Disposal Facility Waste Acceptance Criteria* (BHI 1996) and *Supplemental Waste Acceptance Criteria for Bulk Shipments to the Environmental Restoration Disposal Facility* (BHI 1997) delineate primary requirements, including regulatory requirements, specific isotopic constituents and contamination levels, the dangerous/hazardous constituents and concentrations, and the physical/chemical waste characteristics that are acceptable for disposal of wastes at ERDF.

associated with major repairs (e.g., roof replacement) been included because they are considered non-routine maintenance activities. The non-routine costs cannot be determined until such time that a risk assessment is completed for each facility; therefore, the surveillance and maintenance costs represent a minimum cost.

3. Alternative Three - Decontamination and Demolition with Disposal at ERDF and Other Landfills

Decontamination and demolition consists of four components: assessment, decontamination, demolition, and disposal. Assessment consists of sampling and characterization and preparation of work packages to perform field work. Decontamination consists of either physically removing contaminants, or "fixing" contaminants in place to prevent mobility during demolition. Standard methods of physical removal include washing with water (possibly containing detergent), scraping, scabbling, and sandblasting. When physical removal of contaminants is not feasible or cost effective, the contamination may be "fixed" so the contaminants remain attached to the construction materials and are less likely to be disturbed during subsequent demolition activities. Methods of fixing contaminants in place include painting, applying asphalt, and spreading plastic sheeting.

Demolition involves destroying and removing above-grade structures. Demolition may be preceded by dismantlement of facility components, such as severing and removing duct work or selectively removing a facility wall or structure. Demolition itself generally means large-scale facility destruction.

Uncontaminated or decontaminated rubble generated during demolition would be segregated by material type (e.g., wood, concrete, metal) and would be recycled whenever possible. Inert demolition rubble that could not be recycled would be removed from the 100-N Area, transported, and disposed to an appropriate inert/demolition waste landfill.

Contaminated materials for which no reuse, recycle, or decontamination option is identified would be assigned an appropriate waste designation (e.g., solid, asbestos, radioactive, dangerous, mixed) and would be transported to the ERDF in the Hanford Site's 200 West Area for disposal. Waste may be treated as necessary to minimize volumes (e.g., by crushing, sizing, and sorting) or to meet the ERDF waste acceptance criteria.

Removing the entire structure from the site will create voids that would be backfilled to grade (with clean soils) to blend with the surrounding landscape. The clean backfill would be obtained from sources outside of the 100-N Area. If soils around or beneath the facility are determined to exceed the soil cleanup standards (15 mrem/yr above background for radionuclides and *Model Toxics Control Act* [MTCA] Method B for chemical contaminants in soil)[3], the soil would be

---

[3] The cleanup standards are based on State of Washington Model Toxics Control Act (MTCA) levels for organic and inorganic chemical constituents in soil to support unrestricted (residential) use (WAC 173-340) and EPA guidance (EPA 1997) that establishes human health protection standards for radionuclides in soils at 15 mrem/year above background. The EPA guidance provides clarification for establishing cleanup levels for radioactive contamination at CERCLA sites. The guidance addresses protection of human health but does not address levels necessary to protect ecological receptors. It should be noted, however, that for most radionuclides, remediation goals that are protective of human health are also

remediated in accordance with the process established for CERCLA waste sites in the Tri-Party Agreement (Ecology et al. 1990) and decision documents for the 100 N Area waste sites.

This decontamination and demolition alternative would be effective at protecting human health and the environment, but is not as cost-effective as the selected alternative. Specifically since all the debris would be excavated and disposed, and voids would be filled with clean backfill material, this option would significantly increase disposal costs over the selected alternative. In addition, the necessity to obtain and transport clean backfill material from sources outside of the 100-N Area could also increase costs over the selected alternative. The estimated waste volume associated with this alternative is 108,500 m^3. The estimated cost to implement this alternative is $55,961,000.

4. Alternative Four- Decontamination and Demolition with Disposal at ERDF and In Situ Burial

This alternative consists of the same four components as described above in section V.A.3, i.e., assessment, decontamination, demolition, and disposal. The primary differences occur during the disposal phase. Instead of excavating and disposing of all demolition debris, this alternative would use the uncontaminated and decontaminated debris to fill void spaces resulting from the demolition as detailed below.

Below-grade structures that meet the soil cleanup standards of 15 mrem/yr above Hanford site background for radionuclides and MTCA Method B would be left in place (see footnote 3). Inert rubble generated by demolition would be segregated by material type and would be reused or recycled whenever possible. During demolition of the buildings and structures, inert rubble and other miscellaneous structural material that cannot be recycled would be allowed to fall into the sub-level empty floor to fill void spaces in the below-grade structures. The bottom of the below-grade structures are approximately 9.1 m (30 ft) above the groundwater level, thereby precluding contact between the groundwater and disposed inert/demolition waste. Because only inert or decontaminated material would be disposed of in the below-grade structures, any infiltration that might occur would not result in the discharge of any toxic or hazardous constituents to the groundwater. Upon completing decontamination and demolition activities, a minimum of one foot of soil cover would be placed over any remaining below-grade structures and inert/demolition waste disposal sites and would be graded in such a manner that minimum infiltration of run off from precipitation would occur. Specific details on the soil cover and grading would be included in the Removal Action Work Plan.

Prior to demolition, an evaluation would be performed to determine if uncontaminated concrete interferes with waste site remediation. If uncontaminated concrete interferes with waste site remediation, the concrete would be removed to facilitate contaminated soil removal. Soil would

---

considered protective of ecological receptors. The guidance indicates that cleanup levels should consider exposure from all pathways, and through all media (e.g., soil, groundwater, surface water, sediment, air, structures, biota). In addition, it establishes a 15 mrem/yr effective dose equivalent as the maximum dose limit for humans. It further states that background should be determined on a site-specific basis. This cleanup standard, which is interpreted to be 15 mrem/yr above Hanford site background, must be addressed to satisfy protectiveness of human health and the environment.

be used to fill void spaces and cover the site. Contaminated materials for which no reuse or recycle option is identified would be transported to the ERDF for disposal. If soils around or beneath the facility are determined to exceed the soil cleanup standards (see footnote 3), the soil would be remediated in accordance with the process established for CERCLA waste sites in the Tri-Party Agreement (Ecology et al. 1990) and decision documents for the 100-N Area waste sites. In the event that large volumes of contaminated soil are encountered, removal of contaminated soils may be deferred to the remedial actions program. The decision to defer removal of contaminated soils to the remedial action program requires concurrence by the lead regulatory agency.

Both low-level radioactive and nonradioactive liquid wastes may be encountered or generated during the decontamination and demolition work. Radioactive liquids may be sent to the Hanford Effluent Treatment Facility (ETF) provided the waste meets ETF acceptance standards and treatment to satisfy ARARs. Small amounts of liquids may be treated or stabilized (to meet applicable waste acceptance criteria) and sent to ERDF for disposal. If transuranic waste above ERDF waste acceptance criteria is encountered, it would be sent to the Hanford Central Waste Complex (CWC) for storage.

CERCLA Section 104(d)(4) states where two or more non-contiguous facilities are reasonably related on the basis of geography, or on the basis of the threat or potential threat to the public health or welfare or the environment, the President may, at his discretion, treat these facilities as one for the purposes of this section. The preamble to the National Contingency Plan clarifies the stated EPA interpretation that when non-contiguous facilities are reasonably close to one another and wastes at these sites are compatible for a selected treatment or disposal approach, CERCLA Section 104(d)(4) allows the lead agency to treat these related facilities as one site for response purposes and, therefore, allows the lead agency to manage waste transferred between such non-contiguous facilities without having to obtain a permit. Therefore, the 100 Area NPL site and the ERDF are considered to be a single site for response purposes under this Action Memorandum. It should be noted that the scope of work covered in this Action Memorandum is for those facilities and wastes contaminated with hazardous substances. Materials encountered during this action that are not contaminated with hazardous substances would be dispositioned by the DOE program.

The waste volume associated with the decontamination and demolition aspect of this alternative is about 24,900 m^3. The estimated cost to implement this work is $41,589,000.

5. A Combination of Alternatives

The decontamination and demolition work cannot be accomplished at the same time. Therefore, the ancillary facilities would be included in a program of surveillance and maintenance (Alternative Two), which would be used to maintain the deteriorating facilities in a safe condition until such time that the decontamination and demolition work is executed. Since the in situ burial alternative (Alternative Four) would generate less waste volume and would be less expensive (than Alternative Three), it would be paired with the surveillance and maintenance activities. The work would be planned and executed, in priority order, over a ten-year period. Contaminated waste would be treated if necessary to meet waste acceptance criteria, and

disposed at the ERDF. Uncontaminated or decontaminated demolition rubble would be used to fill the voids resulting from the demolition activities. Alternative Four provides a protective, permanent solution and is more effective than Alternative Two. However, in the interim period when decontamination and demolition activities are being planned and executed on specific facilities, implementation of Alternative Two provides an adequate protection until final remedial actions can be scheduled. The total cost to implement this alternative is $45,310,000.

B. Contribution to Remedial Performance

As stated earlier, the overall goal of the removal action approved in this Action Memorandum is to protect human health and the environment from the threat of a release of hazardous substances. The approved removal action, which, in part, consists of decontaminating and demolishing contaminated facilities and structures, will contribute to this goal by removing and permanently disposing of hazardous substances, thereby controlling the source of contamination and preventing a future release.

The selected removal action is effective in the long term because hazardous materials and dangerous waste are being moved from a condition where they present a potential for release to a disposal situation where they can be more easily contained. Because buildings will be demolished and contaminated underground structures will be removed, it is unlikely that future action at these sites will be required. Therefore, the selected removal action provides a permanent solution by eliminating the source of the potential release. Given the level of effectiveness and permanence, the selected removal action is the most cost effective among the alternatives evaluated. Additionally, this removal action is consistent with existing 100 Area interim action RODs and selected long-term remedies.

C. Applicable or Relevant and Appropriate Requirements and Other Guidance to be Considered

Applicable or relevant and appropriate requirements (ARARs) are standards, requirements, criteria, or limitations promulgated under federal or state environmental laws that must be met when practicable in the execution of a removal action or waived for actions conducted under CERCLA. To be considered (TBC) material is nonpromulgated federal and state advisories and guidance that, while not enforceable, should be considered during implementation of the removal action. The approved removal action will comply, to the extent practicable, with the federal and state ARARs identified below. No waivers of ARARs are being sought. An evaluation and comparative analysis of the ARARs is contained in the proposal. Details on how compliance with ARARs will be achieved during implementation of the removal action will be contained in the removal action work plan.

1. Applicable or Relevant and Appropriate Requirements

- *Safe Drinking Water Act* (42 United States Code [USC] 300j-9) and "Maximum Contaminant Levels" (40 *Code of Federal Regulations* [CFR] 141, Subpart B) for public drinking water supplies are applicable for establishing cleanup goals that are protective of groundwater. Although groundwater remediation is not addressed in the removal action, some material

resulting from demolition activities will be left in place. Soil and debris left in place must be cleaned up to levels that will be protective of groundwater.

- *Clean Water Act* (33 USC 1251) standards for protection of aquatic life, and "Water Quality Standards for Surface Waters of the State of Washington " *(Washington Administrative Code* [WAC] 173-201A) are relevant and appropriate for establishing cleanup goals that are protective of the Columbia River. Although there would be no direct discharges to the river in this removal action, the removal action must ensure protection of the river from contamination in soil. In addition, any stormwater, which is governed by the regulations, "EPA-Administered Permit Programs: The National Pollutant Discharge Elimination System" (40 CFR 122) would need to be controlled.

- *Model Toxics Control Act--Cleanup* (WAC 173-340) specifies that all cleanup actions must be protective of human health, comply with applicable state and federal regulations, and provide for compliance monitoring. It also establishes risk-based cleanup levels for soil, structures, and debris. MTCA Method B cleanup levels are applicable to this removal action.

- State of Washington "Dangerous Waste Regulations" (WAC 173-303) are applicable for dangerous wastes encountered during the removal action.

- *The Toxic Substances Control Act of* 1976 (TSCA) is applicable to the handling and disposal of PCB waste encountered during the removal action.

- The *Clean Air Act* (40 USC 7401, et seq. as implemented via 40 CFR 61, Subpart M) provides standards to ensure that emissions from asbestos are minimized during collection, processing, packaging, and transportation. These standards are applicable to asbestos and asbestos-containing material encountered during the removal action.

- "General Regulation for Air Pollution Sources" (WAC 173-400) and "Controls for New Sources of Toxic Air Pollutants" (WAC 173-460) are applicable to the release of toxic air pollutants that may occur during the removal action, as well as the air monitoring requirements and best available control technology for toxics.

- Most of the provisions under the *Resource Conservation and Recovery Act* (RCRA) Title 42 USC 6901 et seq., Subtitle C authority regarding the generation, transportation, storage, treatment, and disposal of hazardous waste have been delegated to the State of Washington. State dangerous waste management regulations promulgated pursuant to this delegated authority and the State's *Hazardous Waste Management Act* are codified at WAC 173-303. WAC 173-303 is applicable for dangerous waste that may be encountered during the removal action. Federal and state land disposal restrictions (40 CFR 268 and WAC 173-303-140, respectively), are applicable to the treatment and disposal of RCRA hazardous and dangerous waste encountered during the removal action.

- "U.S. Department of Transportation Requirements for the Transportation of Hazardous Materials" (49 CFR Parts 100 to 179) and the *Hazardous Materials Transportation Act* (49 USC 1801-1813) are applicable to the offsite transportation of any hazardous materials, including samples and waste.

- "Radiation Protection—Air Emissions" (WAC 246-247) is applicable to the release of airborne radionuclides, which may occur during surveillance and maintenance or decontamination and demolition activities.

- *The Archeological Resources Protection Act of* 1974 (16 USC 470aa) requires the recovery and preservation of artifacts in areas where an action may cause irreparable harm, loss, or destruction of significant artifacts. Although the removal actions will occur in previously disturbed areas, this law would be applicable to any significant artifacts that may be discovered.

- The *Native American Graves Protection and Repatriation Act* (25 USC 3001) requires agencies to consult and notify culturally affiliated tribes when native American human remains are inadvertently discovered during project activities. Since the removal action involves excavation, there is a possibility that remains may be discovered, therefore, this law is applicable.

- The *National Historic Preservation Act of 1966* (16 USC 470) requires the preservation or mitigation of historic properties controlled by a federal agency. Since some of the ancillary facilities were determined to be eligible for the *National Register of Historic Places,* this law is applicable.

- *The Endangered Species Act of 1973 (16 USC* 1531) requires the conservation of critical habitat upon which endangered or threatened species depend. *The Migratory Bird Treaty Act* makes it illegal to remove, capture, or kill any migratory bird, or any part of nests or the eggs of any such birds. Threatened and endangered species are known to be present in the 100 Area, therefore, these laws would be applicable during implementation of the removal action.

b. Other Criteria, Advisories, or Guidance to be Considered

In addition to the ARARs listed above, the following materials will also be considered during implementation of the removal action.

- "Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination" (EPA 1997) provides clarifying guidance for establishing cleanup levels for radioactive contamination at CERCLA sites. It establishes a 15 mrem/yr effective dose equivalent as the maximum dose limit for humans. This standard, which is interpreted to be 15 mrem/yr above Hanford site background, must be addressed to satisfy protectiveness of human health and the environment.

- *Environmental Restoration Disposal Facility Waste Acceptance Criteria* (BHI 1996) and *Supplemental Waste Acceptance Criteria for Bulk Shipments to the Environmental Restoration Disposal Facility* (BHI 1997) delineate waste characteristics that are acceptable for disposal of wastes at ERDF. Since most of the waste that would be generated by the removal action will be disposed at ERDF, the waste acceptance criteria are pertinent.

- *Revised Procedures for Planning and Implementing Off-Site Response Actions* (EPA OSWER 9834.11) provides procedures for off-site disposal of CERCLA wastes. Although it

is anticipated that waste generated by the removal action will be disposed on site, these procedures would be pertinent for any off-site disposal that would be required.

6. Project Schedule and Deliverables

The schedule for accomplishing the removal action was integrated with other remedial action activities currently underway or planned in the 100-N Area and was based on a ten-year duration. The prioritization and sequencing of this integrated work follows a critical path approach and a logical order:

1. Deactivated facilities that interfere with a waste site
2. Waste sites associated with deactivated facilities
3. Active facilities
4. Waste sites associated with active facilities
5. Independent facilities and underground piping systems.

The sequencing was developed to allow a relatively even distribution of funding each year over the ten-year period. Refined scheduling within these subgroups will be accomplished during detailed remedial design and documented in the removal design/removal action work plan. Additional detail regarding the project schedule and integration plan are contained in the proposal.

The specific deliverables required for this removal action are listed below:

1. Removal action work plan that shall outline how DOE will comply with the ARARs and satisfy requirements specified herein, as well as provide an enforceable schedule. The Work Plan must be approved prior to initiating any removal work. The schedule shall outline the timeframe for submittal of Sampling and Analysis Plans for characterization and waste disposal, verification sampling, and the cleanup verification report.

2. Sampling and analysis plans for waste characterization and waste disposal. This can be accomplished in phases if necessary.

3. Waste treatment plans if treatment is necessary prior to waste disposal in ERDF.

4. Verification sampling and analysis plans for soils and below-grade structures.

5. Cleanup verification report.

B. Estimated Costs

Overall cost estimates for the alternatives evaluated were provided above. Additional cost estimate details are contained in the proposal, as well as an evaluation of the alternatives based on cost.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Should this action not be undertaken, an unplanned release of hazardous substances, either chemical or radioactive, to the environment may occur. Continued deterioration of the contaminated facilities increases the likelihood of a release. Prolonged surveillance and maintenance of the contaminated facilities increases the potential for exposing site workers and personnel.

VII. OUTSTANDING POLICY ISSUES

There are no significant policy issues regarding this action.

VIII. APPROVED ALTERNATIVE

The approved removal action for the ancillary facilities is described in detail in section V.A.5 above. The removal action includes decontaminating and demolishing the facilities in the priority order established in the integration plan that appears in Appendix A of the proposal (DOE-RL 1998). In addition, the approved removal action includes performance of surveillance and maintenance activities to maintain the facilities in a safe condition until the decontamination and demolition is executed. The enforceable schedule for this work is included in the RCRA permit and will also be detailed in the removal action work plan. The disposal of contaminated waste resulting from maintenance, decontamination, or demolition activities will be at the ERDF. Placement of inert demolition debris may be made in situ.

This decision was developed in accordance with CERCLA, as amended by the *Superfund Amendments and Reauthorization Act* (SARA), and the *National Contingency Plan*. This decision is based on the administrative record for this project and is not anticipated to preclude the final remedy for this site.

Figure 1. Hanford Site.

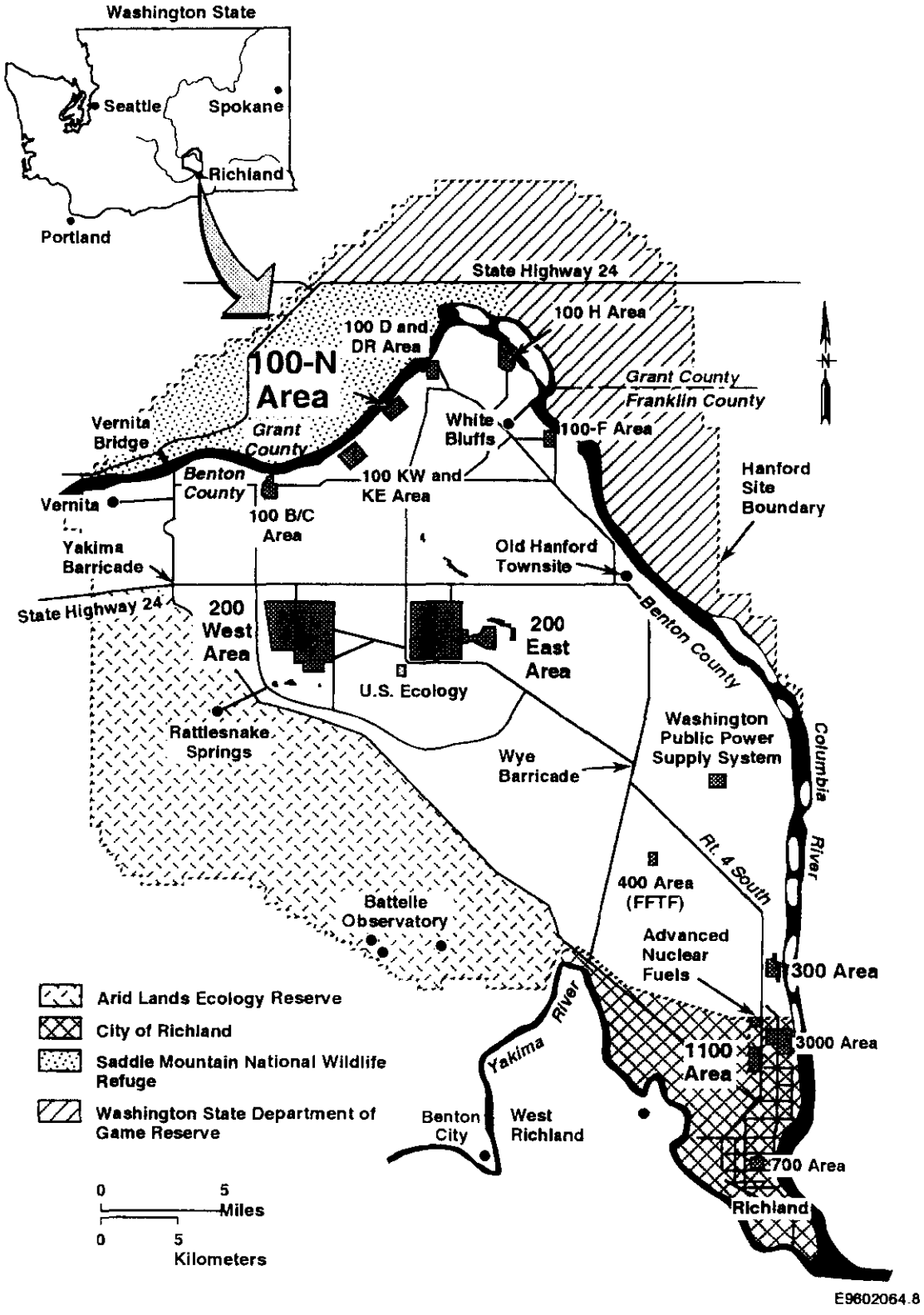
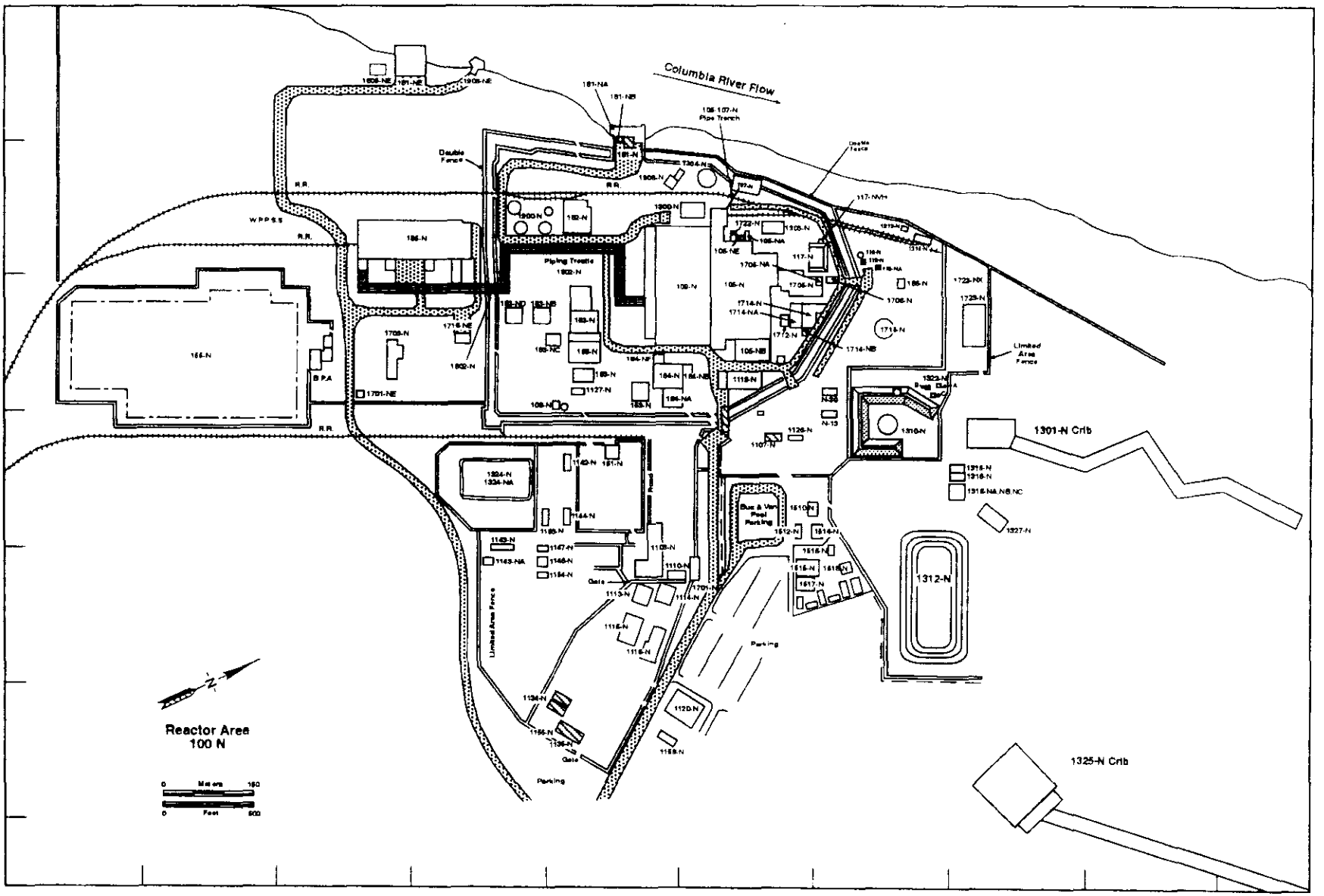


Figure 2. Overview of the 100-N Area.



E9702088
3/13/97

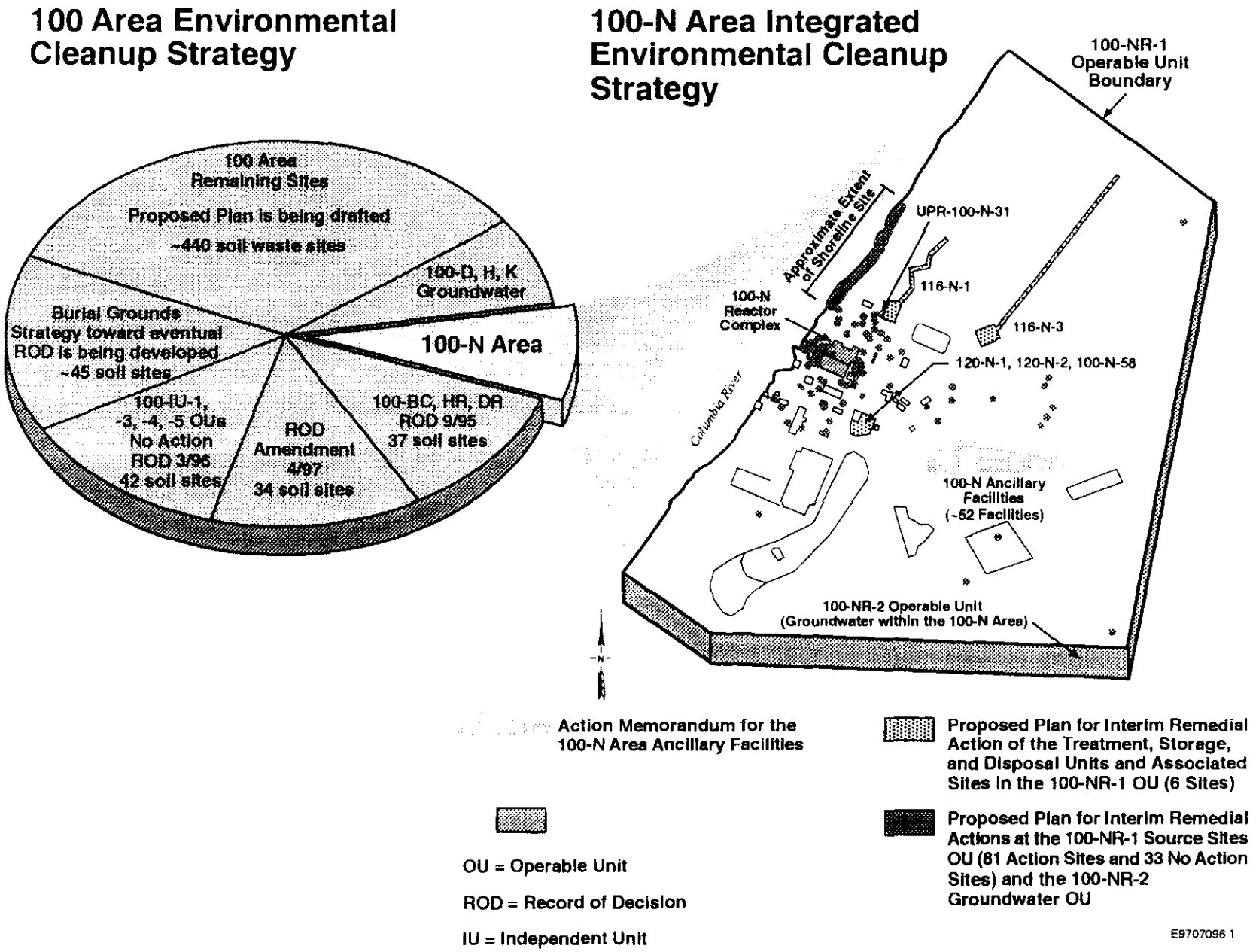


Figure 3. 100 Area Environmental Cleanup Strategy.

Table 1. Existing 100-N Area Facilities Addressed in the Approved Removal Action.

13-N	Storage Building	1304-N	Emergency Dump Tank
105-NA	Emergency Diesel Enclosure	1310-N	Radioactive Liquid and Waste Treatment Facility
105-NE	Fission Products Trap	1312-N	Liquid Effluent Retention Facility
105-N - 107-N	Pipe Trench	1313-N	Change Control Building
107-N	Basin Recirculation/Cooling	1314-N	Liquid Waste Disposal Building
108-N	Chemical Unloading/Storage	1315-N	Diversion Valve House
116-N	Exhaust Air Stack	1316-N	Valve House
117-N	Exhaust Air Filter House	1316-NA	Valve Vault
117-NVH	Valve Control House	1316-NB	Magnetic Flowmeter Vault
119-N	Exhaust Air Monitoring Bldg.	1316-NC	Turbine Meter Vault
119-NA	Stack Air Monitoring	1322-N	Waste Treatment Pilot Facility
163-N	Demineralized Water Plant	1322-NA	Effluent Water Pilot plant
166-N	Fuel Oil Pumphouse/Storage	1322-NC	Crib Sample Pump Pit
181-N	River Pumphouse	1322-NB	Crib Effluent Iodine Monitoring Bldg.
181-NA	River Pumphouse Guard Tower	1327-N	Diversion Valve House
181-NB	No. 3 Diesel Pumphouse	1605-NE	Observation Post
181-NE	HGP River Pumphouse	1701-NE	Gatehouse
182-N	High Lift Pumphouse	1703-N	Patrol Headquarters
184-N	Power House	1712-N	Insulator Shop
184-NA	Power House Annex (CE Boilers)	1716-NE	Maintenance Garage
184-NB	Air Handler Main Bldg.	1714-NB	Warehouse
184-NF	Chemical Injection Pump	1715-N	Diesel Oil Storage tanks
185-N	HGP Turbine Generator Plant	1722-N	Decontamination Building
1300-N	Emergency Dump Basin	1802-N	Pipe Trestle, 109-N to HGP Fence
1303-N	Spacer Silos	1900-N	Water Supply Tank
		1908-N	N Reactor Outfall
		1908-NE	HGP Outfall

HGP = Hanford Generating Plant.

References

BHI, 1996, *Environmental Restoration Disposal Facility Waste Acceptance Criteria,* BHI-00139, Rev. 2, Bechtel Hanford, Inc. Richland, Washington.

BHI, 1997, *Supplemental Waste Acceptance Criteria for Bulk Shipments to the Environmental Restoration Disposal Facility*, 0000XDC-W0001, Rev. 1, Bechtel Hanford, Inc. Richland, Washington.

DOE, 1992, Memorandum, J. D. Wagoner, U.S. Department of Energy, Richland Operations Office, to C. M. Borgstrom, U.S. Department of Energy, "National Environmental Policy Act (NEPA) Categorical Exclusion (CX) Determination: RCRA and CERCLA Characterization and Remediation 100 and 600 Area, Hanford Site, Richland, Washington" CCN 9205267, dated July 23, 1992.

DOE, 1995, *Environmental Assessment for the Deactivation of the N Reactor Facilities,* DOE/EA-0984, U. S. Department of Energy, Richland, Washington.

DOE-RL, 1998a, *100-NR-1 Treatment, Storage, and Disposal Units Corrective Measures Study/Closure Plan,* DOE/RL-96-39, Rev. 0, U. S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 1998b, *Corrective Measures Study for the 100-NR-1 and 100-NR-2 Operable Units,* DOE/RL-95-111, Rev. 0, U. S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 1998c, *Engineering Evaluation/Cost Analysis for the 100-N Area Ancillary Facilities and Integration Plan*, DOE/RL-97-22, Rev. 1, U. S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 1998d, *Proposed Plan for Interim Remedial Action and Dangerous Waste Modified Closure of the Treatment, Storage, and Disposal Units and Associated Sites in the 100-NR-1 Operable Unit*, DOE/RL-97-30, Rev. 0, U. S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 1998e, *Proposed Plan for Interim Remedial Actions at the 100-NR-1 Source Sites Operable Unit and the 100-NR-2 Groundwater Operable Unit*, DOE/RL-96-102, Rev. 0, Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, EPA, and DOE, 1990, *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement), 2 vols., as amended, Washington State Department of Ecology, U. S. Environmental Protection Agency Region 10, and U. S. Department of Energy, Olympia, Washington.

Ecology and EPA, 1994, *Action Memorandum; N-Springs Expedited Response Action Cleanup Plan, U.S. Department of Energy Hanford Site, Richland, WA,* Washington State

Department of Ecology, Olympia, Washington, and U. S. Environmental Protection Agency Region 10, Seattle, Washington.

EPA 1997, letter, S. D. Luftig to L. Weinstock, "Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination," OSWER No. 9200.4-18, August 22, 1997, U. S. Environmental Protection Agency, Washington, DC.

EPA and DOE, 1997, *Action Memorandum; 100 B/C Area Ancillary Facilities and the 108-F Building Removal Action, U. S. Department of Energy Hanford Site, Richland, WA*, U. S. Environmental Protection Agency Region 10 and U. S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, Ecology, and DOE, 1995, *Declaration of the Record of Decision* (for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington), Washington State Department of Ecology, U. S. Environmental Protection Agency Region 10, and U. S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, Ecology, and DOE, 1996a, *Action Memorandum N Area Waste Expedited Response Action Cleanup Plan U. S. Department of Energy, Hanford Site, Richland, WA*, Washington State Department of Ecology, U. S. Environmental Protection Agency Region 10, and U. S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, Ecology, and DOE, 1996b, *Declaration of the Record of Decision* (for the 100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Units, Hanford Site, Benton County, Washington), Washington State Department of Ecology, U. S. Environmental Protection Agency Region 10, and U. S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, Ecology, and DOE, 1997, *Amendment to the Declaration of the Record of Decision* (for the 100-BC-1, 100-DR-, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington), Washington State Department of Ecology, U. S. Environmental Protection Agency Region 10, and U. S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA OSWER 9834.11, "Revised Procedures for Planning and Implementing Off-Site Response Actions," U. S. Environmental Protection Agency, Washington, DC, November 1987.

PNNL, 1997, *Hanford Site 1996 Environmental Report*, PNNL-111472, Pacific Northwest National Laboratories, Richland, Washington.

Signature sheet for the DOE Hanford Action Memorandum covering the 100-N Area Ancillary Facilities. This action is between the DOE, EPA, and Ecology.

Lloyd Piper
Deputy Manager, Richland Operations Office
U. S. Department of Energy

Date 12/16/98

Signature sheet for the DOE Hanford Action Memorandum covering the 100-N Area Ancillary Facilities. This action is between the DOE, EPA, and Ecology.

Michael Wilson
Program Manager, Nuclear Waste Program
Washington State Department of Ecology

12/17/98
Date

Signature sheet for the DOE Hanford Action Memorandum covering the 100-N Area Ancillary Facilities. This action is between the DOE, EPA, and Ecology.

Michael F. Gearheard
Acting Director, Environmental Cleanup Office
U. S. Environmental Protection Agency, Region 10

12-9-98
Date

Attachment 1

Responsiveness Summary to Public Comments on the 100 N Area Ancillary Facilities Hanford Site Action Memorandum

49851

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

September 16, 1998

Mr. David W. Fraley
Manager, WNP-1/3, HGP and Packwood
Washington Public Power Supply System
P.O. Box 968
Richland, WA 99352-0968

Dear Mr. Fraley:

The Washington State Department of Ecology (Ecology) would like to thank you for your comments concerning the 100N Area Proposed Plans, Corrective Measures Studies, Closure Plans, and Engineering Evaluation/Cost Analysis documents. In response, Ecology has prepared a responsiveness summary (enclosed) which addresses the comments received.

In consideration of the proposal, comments received, and in conjunction with the United States Environmental Protection Agency, Ecology will prepare two Interim Action Records of Decision, modification to the Hanford Resource Conservation and Recovery Act (RCRA) Sitewide Permit, and an Action Memorandum which advises the U.S. Department of Energy of the selected remedial alternatives.

Should you have any questions or concerns regarding this letter or the enclosed responsiveness summary, please contact me at (509) 736-3029.

Sincerely,

Phillip R. Staats, Project Manager
Nuclear Waste Program

PRS:sdb
Enclosure

cc: Owen Robertson, USDOE
Doug Sherwood, EPA
Administrative Record

49852

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

September 16, 1998

Mr. Matt Haass
Geosafe Corporation
2952 George Washington Way
Richland, WA 99352

Dear Mr. Haass:

The Washington State Department of Ecology (Ecology) would like to thank you for your comments concerning the 100N Area Proposed Plans, Corrective Measures Studies, Closure Plans, and Engineering Evaluation/Cost Analysis documents. In response, Ecology has prepared a responsiveness summary (enclosed) which addresses the comments received.

In consideration of the proposal, comments received, and in conjunction with the United States Environmental Protection Agency, Ecology will prepare two Interim Action Records of Decision, modification to the Hanford Resource Conservation and Recovery Act (RCRA) Sitewide Permit, and an Action Memorandum which advises the U.S. Department of Energy of the selected remedial alternatives.

Should you have any questions or concerns regarding this letter or the enclosed responsiveness summary, please contact me at (509) 736-3029.

Sincerely,

Phillip R. Staats, Project Manager
Nuclear Waste Program

PRS:sdb
Enclosure

cc: Owen Robertson, USDOE
Doug Sherwood, EPA
Administrative Record

49853

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

September 16, 1998

Mr. Gerald Pollet
Heart of America Northwest
1305 Fourth Ave., No. 208
Seattle, WA 98101

Dear Mr. Pollet:

The Washington State Department of Ecology (Ecology) would like to thank you for your comments concerning the 100N Area Proposed Plans, Corrective Measures Studies, Closure Plans, and Engineering Evaluation/Cost Analysis documents. In response, Ecology has prepared a responsiveness summary (enclosed) which addresses the comments received.

In consideration of the proposal, comments received, and in conjunction with the United States Environmental Protection Agency, Ecology will prepare two Interim Action Records of Decision, modification to the Hanford Resource Conservation and Recovery Act (RCRA) Sitewide Permit, and an Action Memorandum which advises the U.S. Department of Energy of the selected remedial alternatives.

Should you have any questions or concerns regarding this letter or the enclosed responsiveness summary, please contact me at (509) 736-3029.

Sincerely,

Phillip R. Staats, Project Manager
Nuclear Waste Program

PRS:sdb
Enclosure

cc: Owen Robertson, USDOE
Doug Sherwood, EPA
Administrative Record

49854

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

September 16, 1998

Ms. Debra McBaugh
Head, Environmental Radiation Section
Washington State Department of Health
P.O. Box 47827
Olympia, WA 98504-7827

Dear Ms. McBaugh:

The Washington State Department of Ecology (Ecology) would like to thank you for your comments concerning the 100N Area Proposed Plans, Corrective Measures Studies, Closure Plans, and Engineering Evaluation/Cost Analysis documents. In response, Ecology has prepared a responsiveness summary (enclosed) which addresses the comments received.

In consideration of the proposal, comments received, and in conjunction with the United States Environmental Protection Agency, Ecology will prepare two Interim Action Records of Decision, modification to the Hanford Resource Conservation and Recovery Act (RCRA) Sitewide Permit, and an Action Memorandum which advises the U.S. Department of Energy of the selected remedial alternatives.

Should you have any questions or concerns regarding this letter or the enclosed responsiveness summary, please contact me at (509) 736-3029.

Sincerely,

Phillip R. Staats, Project Manager
Nuclear Waste Program

PRS:sdb
Enclosure

cc: Owen Robertson, USDOE
Doug Sherwood, EPA
Administrative Record

49855

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

September 16, 1998

Mr. Alton Haymaker
1721 Cottonwood Dr.
Pasco, WA 99301

Dear Mr. Haymaker:

The Washington State Department of Ecology (Ecology) would like to thank you for your comments concerning the 100N Area Proposed Plans, Corrective Measures Studies, Closure Plans, and Engineering Evaluation/Cost Analysis documents. In response, Ecology has prepared a responsiveness summary (enclosed) which addresses the comments received.

In consideration of the proposal, comments received, and in conjunction with the United States Environmental Protection Agency, Ecology will prepare two Interim Action Records of Decision, modification to the Hanford Resource Conservation and Recovery Act (RCRA) Sitewide Permit, and an Action Memorandum which advises the U.S. Department of Energy of the selected remedial alternatives.

Should you have any questions or concerns regarding this letter or the enclosed responsiveness summary, please contact me at (509) 736-3029.

Sincerely,

Phillip R. Staats, Project Manager
Nuclear Waste Program

PRS:sdb
Enclosure

cc: Owen Robertson, USDOE
Doug Sherwood, EPA
Administrative Record

49856

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

September 16, 1998

Mr. Jay McConnaughey
Department of Fish and Wildlife
1701 S. 24th Ave.
Yakima, WA 98902-5720

Dear Mr. McConnaughey:

The Washington State Department of Ecology (Ecology) would like to thank you for your comments concerning the 100N Area Proposed Plans, Corrective Measures Studies, Closure Plans, and Engineering Evaluation/Cost Analysis documents. In response, Ecology has prepared a responsiveness summary (enclosed) which addresses the comments received.

In consideration of the proposal, comments received, and in conjunction with the United States Environmental Protection Agency, Ecology will prepare two Interim Action Records of Decision, modification to the Hanford Resource Conservation and Recovery Act (RCRA) Sitewide Permit, and an Action Memorandum which advises the U.S. Department of Energy of the selected remedial alternatives.

Should you have any questions or concerns regarding this letter or the enclosed responsiveness summary, please contact me at (509) 736-3029.

Sincerely,

Phillip R. Staats, Project Manager
Nuclear Waste Program

PRS:sdb
Enclosure

cc: Owen Robertson, USDOE
Doug Sherwood, EPA
Administrative Record

49848

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

September 16, 1998

Ms. Donna L. Powaukee
Nez Perce Tribe
P.O. Box 365
Lapwai, ID 83540-0365

Dear Ms. Powaukee:

The Washington State Department of Ecology (Ecology) would like to thank you for your comments concerning the 100N Area Proposed Plans, Corrective Measures Studies, Closure Plans, and Engineering Evaluation/Cost Analysis documents. In response, Ecology has prepared a responsiveness summary (enclosed) which addresses the comments received.

In consideration of the proposal, comments received, and in conjunction with the United States Environmental Protection Agency, Ecology will prepare two Interim Action Records of Decision, modification to the Hanford Resource Conservation and Recovery Act (RCRA) Sitewide Permit, and an Action Memorandum which advises the U.S. Department of Energy of the selected remedial alternatives.

Should you have any questions or concerns regarding this letter or the enclosed responsiveness summary, please contact me at (509) 736-3029.

Sincerely,

Phillip R. Staats, Project Manager
Nuclear Waste Program

PRS:sdb
Enclosure

cc: Owen Robertson, USDOE
Doug Sherwood, EPA
Administrative Record

49849

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

September 16, 1998

Ms. Heather Trumble
209 Armistead Ave.
Richland, WA 99352

Dear Ms. Trumble:

The Washington State Department of Ecology (Ecology) would like to thank you for your comments concerning the 100N Area Proposed Plans, Corrective Measures Studies, Closure Plans, and Engineering Evaluation/Cost Analysis documents. In response, Ecology has prepared a responsiveness summary (enclosed) which addresses the comments received.

In consideration of the proposal, comments received, and in conjunction with the United States Environmental Protection Agency, Ecology will prepare two Interim Action Records of Decision, modification to the Hanford Resource Conservation and Recovery Act (RCRA) Sitewide Permit, and an Action Memorandum which advises the U.S. Department of Energy of the selected remedial alternatives.

Should you have any questions or concerns regarding this letter or the enclosed responsiveness summary, please contact me at (509) 736-3029.

Sincerely,

Phillip R. Staats, Project Manager
Nuclear Waste Program

PRS:sdb
Enclosure

cc: Owen Robertson, USDOE
Doug Sherwood, EPA
Administrative Record

49850

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

September 16, 1998

Ms. Amy Hilderbrand
519 Newcomer
Richland, WA 99352

Dear Ms. Hilderbrand:

The Washington State Department of Ecology (Ecology) would like to thank you for your comments concerning the 100N Area Proposed Plans, Corrective Measures Studies, Closure Plans, and Engineering Evaluation/Cost Analysis documents. In response, Ecology has prepared a responsiveness summary (enclosed) which addresses the comments received.

In consideration of the proposal, comments received, and in conjunction with the United States Environmental Protection Agency, Ecology will prepare two Interim Action Records of Decision, modification to the Hanford Resource Conservation and Recovery Act (RCRA) Sitewide Permit, and an Action Memorandum which advises the U.S. Department of Energy of the selected remedial alternatives.

Should you have any questions or concerns regarding this letter or the enclosed responsiveness summary, please contact me at (509) 736-3029.

Sincerely,

Phillip R. Staats, Project Manager
Nuclear Waste Program

PRS:sdb
Enclosure

cc: Owen Robertson, USDOE
Doug Sherwood, EPA
Administrative Record

PUBLIC COMMENT DRAFT RESPONSES
100-N AREA DECISION DOCUMENTS

Hanford Generating Plant, Supply System General Comments

1. **Comment:** Based on the HGP site's location, the Supply System believes that the selection of a rural residential cleanup level is not warranted.

   Response: The selection of the rural residential cleanup level reflects precedence set in the remediation of the 100-BC-1, 100-DR-1, and 100-HR-1 liquid effluent waste sites. The Record of Decision for these remediation actions states 'for the purposes of this interim action, the remedial action objectives are for "unrestricted use."

2. **Comment:** The Supply System, as a fiscally responsible municipal corporation of the State of Washington, wants to minimize any undue burden on our customers. Therefore, it is in our best interest to immediately proceed with D&D as necessary to restore the HGP site. The resources are available and we intend to proceed at a quicker rate than proposed by 100 Area remediation schedule.

   Response: The proposed schedule identified in the *Engineering Evaluation/Cost Analysis for the 100-N Area Ancillary Facilities and Integration Plan* is a duration-only schedule, which does not include specific start or end dates, and is intended to indicate the relative priority and critical path of cleanup activities. Specifically, the schedule was established taking into consideration the priority of remediation activities, while ensuring that interference between facility decontamination and demolition and waste site remediation is minimized. Another consideration was to develop a schedule with a relatively even distribution of funding. However, as funding availability fluctuates, the schedule can be delayed or accelerated accordingly within the ten-year time frame.

3. **Comment:** The proposed schedule should provide the flexibility to permit immediate completion of the restoration work at HGP.

   Response: See response to General Comment 2 under Hanford Generating Plant, Supply System General Comments.

Hanford Generating Plant, Supply System Specific Comments

A. *Engineering Evaluation Cost Analysis for the 100-N Area Ancillary Facilities and Integration Plan*, DOE/RL-97-22, Rev. 1.

1. **Comment**: Page 1-2, Line 11: The Supply System would like to follow its own schedule to complete with work earlier than scheduled. This EE/CA should allow the Supply System to fund and contract for cleanup, decontamination, and demolition to a selected contractor of our own selection in accordance with our procedures as long as the cleanup, etc. meets the technical requirements of this

EE/CA.
Response: See response to General Comment 2 under Hanford Generating Plant, Supply System General Comments.

2. **Comment:** Page 2-9: In the first bullet, it is on the northwest wall.

   Response: Comment noted. The word *wall* was omitted from the description.

3. **Comment:** Page 2-15: The physical description for 181-NE is incorrect. The facility houses four circulating pumps and their respective lubricating water pumps in addition to the three fire protection pumps.

   Response: Comment noted. The physical description for 181-NE should state that it houses four circulating pumps and their respective lubricating water pumps in addition to the three fire protection pumps.

4. **Comment:** Page 2-16: There is no 1605-NE Observation Post at HGP. Also see Figure 2-1.

   Response: At the time the EE/CA was prepared, available information indicated the existence of a 1605-NE observation post. The NE designation references facilities associated with the Hanford Generating Plant, which is managed by the Washington Power Supply System. A subsequent investigation has indicated that the facility is located in the 100-N Area, not within the boundaries of the Hanford Generating Plant, and is managed and controlled by the Project Hanford Management Contractor.

5. **Comment:** Page 3-1: In third paragraph, it should be clarified that areas inside the HGP fence do not interfere with any other cleanup operations.

   Response: Comment noted. The areas inside the HGP fence do not interfere with any other cleanup operations.

6. **Comment:** Pages A-6, 7: The availability of basic utilities is essential to keep demolition costs under control. However, we are already addressing the loss of power to HGP and there is no potable water or sewer system. In addition, the rail lines should be maintained for demolition. The large transformers are normally moved by rail.

   Response: Comment noted. As stated in the EE/CA, if there is no justification for keeping services functional, they should be removed. Therefore, the proposed actions provides flexibility to keep rail lines in operation as long as justified.

7. **Comment:** Appendix C: The cost estimates were based on a model that the Supply System has already shown to be unreliable for our work.

Response: An EE/CA is a document that assesses the various remediation alternatives of a collection of facilities or remediation units. In order to effectively compare one alternative to another, it is most helpful if the alternative estimates are developed using the same estimating methodology. This allows for an equitable comparison of alternative actions without concern over the use of differing estimating tools. Because the MCACES models have been approved by the DOE for out year baseline estimates, MCACES was applied to the 100-N Area EE/CA facilities as the estimating tool. MCACES meets the U.S. Environmental Protection Agency's guidance for accuracy of cost estimates, which states that typically "study estimate" costs are expected to provide an accuracy of +50 percent to -30 percent and are prepared using available data. During the remedial design, and when additional information becomes available, the cost estimates will be refined.

B. *Corrective Measures Study for the 100-NR-1 and 100-NR-2 Operable Units, DOE/RL-95-111, Rev. 0*

1. **Comment:** Page 1-2, line 15: Please note that the BPA Substation and transmission lines are still in service with no intent to demolish.

   Response: Comment noted. As stated on page 2-4, facilities to remain active are not addressed in this EE/CA. Appendix B Table B-2 identifies the BPA Substation as an active facility. Therefore, the BPA Substation is not addressed for removal in this EE/CA.

2. **Comment:** Page 3-75: We believe item 37 is a transformer oil spill and not a dump site. See also Table 3-7.

   Response: A review of the Waste Identification Data System (WIDS) listing report for the site in question (100-N-39) has indicated the site was a dumping area. The WIDS report references a Bonneville Power Administration memorandum (1981) that states that the site was used as a dump for construction debris. There is another site identified in WIDS, UPR-100-N-37, which was an unplanned release of transformer oil. The CMS addresses both 100-N-39 and UPR-100-N-37.

3. **Comment:** Page 3-83: In item 10 the facility in the third column should be 1701-NE.

   Response: Comment noted. The building listed (1710-NE) should be 1701-NE.

4. **Comment:** Page 3-93: The concrete and soil below the steam line trestle drains should also be listed.

   Response: Waste sites listed in the CMS were obtained from the Waste Identification Data System (WIDS). WIDS is the official database recognized by

the Tri-Parties containing information on all identified waste sites at Hanford. The concrete and soil below the stream line trestle were not included in the WIDS system during preparation of the CMS. However, an evaluation of the site will be made to determine appropriateness for inclusion in WIDS. If the site is added to WIDS, it will be addressed in accordance with the applicable action memorandum or record of decision.

5. **Comment:** Page 9-6, 9.2.4: The schedule should be flexible for the Supply System HGP activities.

   Response: See response to General Comment 2 under Hanford Generating Plant, Supply System General Comments.

6. **Comment:** Page 9-6: The Supply System will meet the training requirements with our own program.

   Response: All DOE-RL and DOE-RL contractor personnel working at the Hanford Site, including at sites associated with the 100-NR-1 Operable Unit, will be provided with and will successfully complete general site training as specified in Condition II.C.2 of the Hanford Facility Dangerous Waste Permit. Personnel working at the Hanford Generating Plant, which is operated by the Washington Public Power Supply System (WPPSS), will be trained in accordance with WPPSS training programs.

<u>Geosafe Comments</u>

A. *100-NR-1 Treatment, Storage and Disposal Units Corrective Measures Study/Closure Plan,* DOE/RL-96-39

1. **Comment:** The in situ vitrification (ISV) discussion should include a brief discussion of past ISV work performed at Hanford. Performance information regarding ISV's treatment effectiveness for plutonium, strontium and cesium should also be discussed.

   Response: In situ vitrification was included as a component in four of the alternatives that were evaluated in the screening process described in Section 5.2. The purpose of the assessment in Section 5.1 is to make a qualitative evaluation of effectiveness, implementability, and cost of potentially useful technologies. The qualitative evaluation against these factors relied on a variety of information, including the performance of in situ vitrification methodologies employed at Hanford. The in situ vitrification technology was carried forward for further evaluation, implying that the technology was considered potentially beneficial for remediating the sites under consideration, which could include treatment for plutonium, strontium, and cesium.

2. **Comment:** The discussion on the presence of excessive moisture effecting ISV

treatment cost is irrelevant and should be removed. This is true only if there is a substantial amount of groundwater moving into the treatment zone. Note in Figure 2-2 and 2-3, the groundwater elevation is approximately 60 and 70-ft below grade and would not be an issue.

Response: The discussion regarding the effect of moisture on the technology (Section 5.1.4.4) is provided in the context of discussing some of the advantages and disadvantages of the technology. The fact that the technology was carried forward for further evaluation implies that excessive moisture was not considered a factor in selecting remediation alternatives at these sites.

3. **Comment:** The discussion should include some mention of the added benefits resulting from vitrification such as: the product will exhibit no hazardous characteristic and should easily pass TCLP testing, the vitrified product has an extremely low leaching rate-even if ground to a fine powder and inundated in water and the vitrified product is expected to have a geologic life expectancy substantially greater than 10,000 years.

Response: Chapter 6 discusses the implementation of the in situ vitrification technology and how it would be implemented under four different alternatives. In two of the cases, in situ vitrification was rejected because of the potential for intrusion into the vitrified monolith, and the third case it was rejected because of depth limitations of the technology. In the fourth case, in situ vitrification was retained for detailed evaluation. During the detailed evaluation of alternatives, in situ vitrification was rejected because it had a higher cost of implementation than that of the preferred option (remove/dispose). The durability of the vitrified product was never called into question.

B. *Proposed Plan for Interim Remedial Action and Dangerous Waste Modified Closure of the TSD Units Associated Sites in 100-NR-1 Operable Unit,* DOE/RL-97-30, Rev. 0

1. **Comment:** Given the high concentration of radionuclies in the 116-N-1 and N-3 Cribs and Trenches, a discussion should be provided on how this material will meet the ERDF waste acceptance criteria (WAC). I assume the waste is not being diluted to meet the WAC requirements. A table showing the WAC criteria versus available characterization information from the subject units should be included.

Response: Clean or slightly contaminated soil would be added to the high contamination soil fraction for the purpose of controlling radiation exposure to workers and to meet some operational limitations at ERDF concerning ambient air quality. The need to blend the soil is not related to the ERDF WAC.

2. **Comment:** Given that plutonium concentrations greater than 100 nCi/g are considered to be a TRU regulated waste, some discussion should be provided on the TRU components of the waste being shipped to ERDF.

Response: There are a few samples that showed localized plutonium concentrations in excess of 100 nCi/g, but the contaminated soil in the cribs and trenches, taken in aggregate and without addition of any other soil, is expected to be significantly below the 100 nCi/g threshold. The radionuclide content will be verified by sampling that will be done during the remedial design phase.

3. **Comment:** Given that the proposed plan is selected for implantation the 116-N-1 and 116-N-3 units will still require institutional controls for the radionuclide plume that will be left in place; thus elimination of purely in situ treatment options for similar reasoning does not seem to be justified or logical. Additional discussion on why in situ treatment alternatives have not been evaluated should be provided.

   Response: Under the preferred option (remove/dispose), radionuclide contamination will be removed to a depth of at least 15 ft, thereby reducing the potential for exposure from near-surface intrusion. In contrast, the vitrification alternative would result in radionuclide contaminants remaining in relatively close proximity to the ground surface (and to potential intruders).

Amy Hilderbrand Comments

1. **Comment:** In evaluating a number of Hanford Annual environmental reports it appears for 1996 the dose from Strontium-90 was .-18 mrem per year. Which equated to 126 person mrems for the Tri-Cities. The government is spending $1,374,000,000,000.00 per mrem reduction (i.e., .062 Ci/yr flux reduction) or about 20 million dollars per person mrem reduction. Are these costs per mrem or person mrem reduction justified? In my review of cost benefit ALARA Analysis – number of ten thousand dollars per mrem reduction is what I remember being justified. Please provide references to dose reductions that justify this level of spending for such a small dose reduction.

   Response: There are no specific references to dose reductions to justify this level of expenditure. The concentrations of Strontium-90 in the groundwater reaching the Columbia River (which is a point of compliance) are 1000 to 2000 times the Maximum Concentration Level (8 picoCuries/L) allowed by law. Upon reaching the Columbia River, the incoming Strontium-90 is diluted by the Columbia River to levels which are below the MCL. However, because the groundwater at the river's edge is above the MCL, the DOE is required by law to address this problem. The DOE can achieve this requirement by either a remedial action that will clean-up the site to below the MCL's or by setting an alternative concentration limit (ACL). The ACL can only be set after demonstrating that it is impracticable to remediate the site. The present pump-and-treat is scheduled to last five years, and is part of a process to determine the practicability of remediating the site.

2. **Comment:** Page 2-3, 120-N-1 and 120-N-2 TSDs: Respectfully request Ecology delete TSDs 120-N-1 and 120-N-2 from this continued monitoring as a modified RCRA/CERCLA closure plan and provide a plan that is reflective of the current conditions of clean closure of TSD sites 120-N-1 and 120-N-2. Ecology and DOE provide only an inventory of acid or caustic liquids that were deposited at these sites. The documentation says nothing was detected in the soil samples – therefore the site is clean. No elevated sulfate observed in the groundwater are probably the result of discharging Sulfuric Acid and is not of major concern or major health problem for the concentration observed. The water will still meet general house hold and irrigation uses (Davis and DeWiest, Hydrogeology). The elevated Sulfate will only provide and odor or taste that is not harmful. I respectfully requested that the money currently being spent on RCRA groundwater monitoring of 120-N-1 and 2 be refocused to something more constructive like removing 1500 drums of uranium and oil in the 300 Area.

   Response: While the 120-N-1 and 120-N-2 TSD units are subject to RCRA closure requirements, the groundwater underlying these units is currently being monitored as part of the on-going CERCLA program. The current groundwater monitoring regimen will be followed until a final action for groundwater remediation is determined. The proposed plan for continued groundwater monitoring does not call for the expenditure of any additional resources than are currently being expended to meet CERCLA monitoring requirements.

3. **Comment:** Page 2-3, 116-N-1, 116-N-3, and UPR-100-N-31. As is provided in DOE/RL-96-39 the modeling performed indicates that Strontium-90 will not significantly reach the Columbia River. And as was provided in earlier analysis more remediation of Strontium-90 occurs through natural attenuation than through pump and treat systems (i.e., .1 Ci remove from pump and treat and 2.2 Ci from natural attenuation- decay). The natural attenuation provides 96% of the Strontium-90 remediation in the 100-N Area – Ecology and DOE need to explain why such efforts are being taken to expend such monetary resources for such little return of 5% of the Strontium-90 – it will still take 270-300 years potentially to remediate this site with either of these two technologies? Respectfully request the cessation of the 100 N Area expenditure on pump and treat of $1,000,000 per year and refocus the money on solving the 200 Area Carbon tetrachloride plume which is of real concern as demonstrated in BHI's model predictions of contaminant plumes (BHI-00608 and BHI-00469) and is observed by the rate of spending in the Annual groundwater reports (i.e., 1997, 1996, 1995, 1994). With the current pump and treat and further analysis there appears to b a 2.55 Ci per year contribution to the Columbia River as calculated from the 1996 average Strontium-90 in the Columbia River and average flow of 4500 cubic meters per second (Table Annual average Sr-90 Dose) and not the claimed .063 Ci/yr flux. Request Ecology reconcile these differences in Flux.

   Response: It is unclear what the commentor's calculation of 2.55 Ci/yr

represents. However, this number appears to be the average number of curies/year in the Columbia River. The 0.063 Ci/year is calculated by taking the concentrations of groundwater at the river shore and multiplying the concentration by the total flux of water discharging through the contaminated zone into the river for each year. It is agreed that the current pump-and-treat system will not significantly reduce the clean-up time over natural attenuation. The purpose of the current pump-and-treat system is to accomplish the following:

(1) remove Sr-90 from the groundwater,
(2) reduce the flow of water through the aquifer (by reducing the flow of water, it also reduces the amount of Sr-90 being released to the river),
(3) and collect data for either additional remedial alternatives and/or help set an alternative concentration limit for this site.

4. **Comment:** Provide the cost estimate for the Barrier Wall – Passive Remedial action. The earlier analyses are missing from these current document. Ecology's earlier estimate demonstrate pump and treat cost approximately $300,000,000 more than the Barrier Wall which makes pump and treat less effective.

Response: The estimated cost of a permeable reactive barrier is $28,000,000 (DOE/RL-96-11). However, a constructibility test for installation of an impermeable barrier showed that the required sheet pile could not be installed using drive techniques.

5. **Comment:** The current approach of putting out these four documents (DOE/RL-96-102, DOE/RL-97-30, DOE-RL-96-30, and DOE/RL-95-111) is very confusing. Request Ecology and DOE provide one single document that provide a clear plan for Remedial Actions for 100 N Area. It is very unclear what was evaluate and against what to determine what is the right approach to remediate groundwater at 100 N Area. In reviewing these documents it appears previous analysis are not now considered. Please provide the detail written analysis that has lead Ecology to recommended alternative on continued pump and treat.

Response: With regard to the approach for publishing documents for the 100-N Area remedial actions, it should be noted that both the RCRA and CERCLA regulatory processes require a detailed evaluation of alternatives in the form of a corrective measures study (RCRA) or a feasibility study (CERCLA). The alternatives recommended as a result of these studies are presented to the public in a proposed permit modification (RCRA) or a proposed plan (CERCLA). In order to provide the public with convenient access to the greatest amount of information and to minimize the expense of producing both RCRA and CERCLA documents for proposed actions in the 100-N Area, the RCRA and CERCLA procedural requirements were integrated. The proposed plans, along with the appropriate corrective measures studies, were issued to meet the RCRA and CERCLA requirements. Each of the proposed plan documents is accompanied by a summary that describes the integration of RCRA and CERCLA requirements and

discusses other actions that are underway or planned in the 100-N Area. In addition, the issuance of these documents meets two milestones established by the Tri-Party Agreement: M-15-12B required documentation to cover the TSD units and M-15-12C required coverage of the 100-NR-1 and 100-NR-2 source units.

With regard to the analysis associated with continuing the pump-and-treat operations, the current pump-and-treat system is part of Emergency Remedial Action installed in 1995. It is not the final remedy. Data collected during the operation of the pump-and-treat will be used to select the final remedy. That final remedy will also solicit public comments. At present, it is very difficult to remove Strontium-90 adsorbed onto the sediments. As long as Sr-90 adsorbed onto the sediments is in contact with the groundwater, the concentrations in the groundwater will exceed the maximum concentration limit by three orders of magnitude. This is due to the chemical equilibrium between the Strontium-90 on the sediments and in the groundwater.

Heather Trumble Comment

1. **Comment:** As a taxpayer I am concerned that excessive amount of money would be proposed to be spent cleaning up a single site along the river to pristine conditions when I cannot foresee the future need of the public to utilize this specific small area for agricultural or residential use. Even if the 100 N Area is "cleaned UP", these is no sampling protocol which can guarantee the public that it is clean and safe to habitate with no risk. The same applies to the entire Hanford Site. Which I am not knowledgeable about the treaty rights of the tribes, nor the specifics of the MTCA, I feel recreational/industrial use is a reasonable alternative, which adequately reduces the dose to the public, removes the bulk of the source term from near the river, and doesn't cost an exorbitant amount of money.

   Response: See response to General Comment 1 under the HGP comments.

Nez Perce Comments

1. **Comment:** It is difficult to ascertain the impact of these actions upon our people as none of the Native American Scenarios outlined in the Columbia River Comprehensive Impact Assessment (CRCIA) were assessed.

   Response: The future land use for the Hanford Site has not yet been determined. To provide a basis for evaluating the various remediation technologies, two land-use scenarios were used. One reflects a conservative approach in which the land would be used extensively (i.e., rural residential) and the other reflects a less conservative approach in which the land would be used in a less intensive way (i.e., ranger/industrial). Once the land use for the entire Hanford site has been determined, past and future actions throughout the site will be assessed to ensure consistency with the intended use.

2. **Comment:** Chromium contamination of the 100-N Area is not being addressed. During Fiscal Year 1968, N reactor operations consumed more than 15,000 lb. of Sodium Dichromate (**Chemical Discharged to the Columbia River from DUN Facilities, Fiscal Year 1968** DUN_4668). Chromium concentrations in groundwater samples from Well 199-N-80 are consistently above drinking water standards of 50 ug/L, but remediation of chromium in groundwater is postponed until the final remedial action.

   Response: Well 199-N-80 was drilled and completed in 1992 to RCRA well standards and is completed in a confined sand unit. This confined sand unit is about 15 ft below the upper unconfined aquifer and is separated from it by a clay layer (Hartman and Lindsey 1993). The chromium values at 199-N-80 are above the drinking water standard (50 g/L) and above the values determined for the upper unconfined aquifer. The upper unconfined aquifer contains the groundwater that can be directly influenced by discharge to 100-N Facilities (1324N/NA, 1301-N and 1325-N) and other surface activities. The only other well that may be screened in the same unit as 199-N-80 is well 199-N-8P. This is a piezometer located within 50 to 75 ft of the river. Samples are collected from this piezometer on an irregular basis. Chromium was not detected in a sample from 199-N-8P collected in April 1992. It is also important to note that wells screened in the uppermost unconfined aquifer (199-N-75), in the bottom of the unconfined aquifer (199-N-69) and adjacent to the river (199-N-8T, 199-N-8S), all within the general areal location of well 199-N-80 do not have chromium values above the drinking water standard. The chromium values at well 199-N-80 appear to be well-specific and not related to overall aquifer water quality. Hartman and Lindsey (1993) comment that high chromium values may be a result of the stainless steel used for the well casing and screen. The potential for deep contamination will be further evaluated as part of the interim action.

   Reference: Hartman, M.J., and K.A. Lindsey, 1993, *Hydrogeology of the 100-N Area, Hanford Site, Washington*, WHC-SD-EN-EV-027, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Washington Department of Fish and Wildlife (WDFW) General Comment

1. **Comment:** The 100-N Area has multiple contaminants of concern that must be addressed by the proposed remedial actions of the 100-NR-1/100-NR-2 Operable Units. The 100-NR-2 groundwater operable unit affects the shoreline site of the 100-NR-1 operable unit. Proposed interim actions should not foreclose final remedial actions, which address all contaminants of concern above maximum concentration levels.

   Response: The Tri Parties agree with the comment. The proposed interim action is to continue the existing pump and treat system, which will not preclude a final remedial action.

Washington Department of Fish and Wildlife (WDFW) Specific Comments

1. **Comment:** WDFW concurs with the interim remedial actions for the 100 NR-1 sites.

   Response: Comment accepted.

2. **Comment:** WDFW concurs with the interim remedial action of the Sr-90 pump and treat while an evaluation of the effects of tritium, Sr-90, and hexavalent chromium on aquatic receptors is performed. The pump and treat establishes a hydraulic gradient preventing the other contaminants of concern from reaching the river. Furthermore, the effectiveness of the interim remedial action should be evaluated.

   Response: Comment accepted. The interim remedial action will be evaluated formally at the end of the first five years of operation under the interim record of decision. Informal evaluation of the system will occur throughout its operation and at each yearly budget review cycle.

3. **Comment:** WDFW strongly agrees with the tri-party agencies that "more information must be obtained to determine whether Sr-90 concentrations are causing short- or long-term impacts to these [aquatic] receptors" and that "further evaluation of potential impacts to aquatic and riparian resources is considered a vital part of the proposed interim action". The contaminated groundwater is an exposure pathway to aquatic receptors, and aquatic receptors are currently exposed to contaminants of concern. WDFW requests studies be initiated to evaluate the impacts to aquatic receptors. We are dismayed that studies have not already been initiated.

   Response: Comment accepted. Discussions being held by the Tri-Parties and interested stakeholders under the Innovative Technology Remediation Demonstration project have included the proposal to further evaluate the impacts of the N Area groundwater on the ecological receptors in the area. It is expected that these discussions will lead to field sampling and subsequent impact analysis.

4. **Comment:** Terrestrial cleanup is occurring in the 100 Area. As part of the cleanup effort in the 100-N area, WDFW urges USDOE to initiate a moderate level biological evaluation of contaminants to terrestrial and avian species, and cooperatively work with WDFW, U.S. Fish and Wildlife Service and the Hanford Natural Resource Trustee Council in developing the biological studies. WDFW also would encourage the evaluation be expanded to include the entire 100 Area National Priority List site.

   Response: Ecology, EPA, and USDOE are also members of the Hanford Natural

Resource Trustee Council and expect to work cooperatively with WDFW and others in developing a plan to access impacts of the remedial actions on terrestrial receptors in the 100 Area.

5. **Comment:** WDFW has not been provided adequate information to enable us to make any recommendations toward a final remedy for the 100 NR-2 operable unit and the shoreline site of the 100-NR-1 operable unit.

   Response: This is an interim action aimed at making substantial progress in an area of substantial contamination. The Tri-Parties are not currently in a position to issue a recommendation on a final action.

6. **Comment:** WDFW would like to point out to USDOE project staff that USDOE is a trustee and has responsibilities to the public concerning natural resources. The documents include I&I language identifying commitment of resources for each alternative response action. We believe such commitments are appropriate only after full mitigation, including compensatory mitigation, has been provided. It should be clearly stated that the intent of the I&I statements are being included as important public information, not as an attempt to circumvent natural resource damage liability.

   Response: The language included in the documents speaks to the commitment of resources such as diesel fuel, backfill, and expendable equipment. The intent was to provide relevant information, as it became available.

7. **Comment:** The Corrective Measures Study is deficient due to a lack of environmental analysis, and as such, it is premature to consider final remedial alternative(s) and/or corrective action(s). Studies need to be initiated to evaluate impacts from tritium, Sr-90, and hexavalent chromium to aquatic receptors.

   Response: The Corrective Measures Study is sufficient to support the interim actions proposed.

Alton Haymaker, General Comment

1. **Comment:** Of the two alternatives I prefer alternative support, not remedial.

   Response: It is assumed that the commentor misunderstood the range of alternatives evaluated and the alternative recommended for implementation. Alternative support was not evaluated as part of this study, nor was a specific alternative called out as remedial.

Washington State Department of Health (DOH) General Comments

1. **Comment:** We are pleased that work is starting on this unit because we believe that 100-N is currently the main area of the Hanford Site where the public can

receive radiation exposure from Hanford pollutants. The evaluation of the cleanup levels based on various land uses and controls coincides with the approach that DOH has recommended in it's Hanford Guidance for Radiological Cleanup. DOH hopes that remediation of this area can proceed on schedule and using a sound technical basis that will give priority to those areas that have a current measurable dose impact on the public.

Response: Comment accepted. The Tri-Parties have agreed to proceed with the remediation of the N Area using the schedule included with the corrective measures study.

DOH Specific Comments

1. **Comment:** The rural residential scenario used to evaluate future potential risks is sometimes referred as an unrestricted use scenario (for example, DOE/RL-97-30, page 13). This scenario also is implied to not preclude any future land use (for example, DOE/RL-96-102, page 4). Since this scenario restricts the use of 100-N Area groundwater, terms other than 'unrestricted use' or 'not precluding any future land use' would be more appropriate when referring to this scenario.

   Response: The term rural residential scenario is defined in DOE/RL-97-30, page 3, paragraph 4 and in DOE/RL-96-102, page 3, paragraph 8 as a scenario which includes restrictions on groundwater use, including a follow-on statement that drinking and irrigation water would need to be supplied from an offsite source (additional details of the scenarios are provided in Appendix F of the CMS.)

2. **Comment:** Reference is made to a 15 mrem/y dose standard for cleanup of sites contaminated with radioactivity. This cleanup level is sometimes referred to as an EPA standard, other times as an EPA draft standard, and other times as EPA guidance. For members of the public not familiar with radiation regulations, use o the term 'EPA standard' implies an EPA regulation with legally binding requirements. Since this EPA cleanup level has not been promulgated and has been withdrawn from consideration for promulgation, it would be more appropriate to consistently refer to it as EPA guidance.

   Response: Comment accepted. Consistently referring to the 15mrem/y dose standard for cleanup as an EPA guidance would be appropriate. This guidance is included under the category of 'to be considered' in the regulatory applicability section of the corrective measures studies and proposed plans and will be used to define the interim cleanup standards applicable to the proposed actions.

3. **Comment:** DOE/RL-96-102, page 19, Receptor Pathway Descriptions
   The text states that 'access control by the DOE currently prevents potential exposure to contaminated groundwater emanating at 100-N-Springs'. This is not the case at times of very low river stage, where ample dry land is exposed above the water line but below the marked radiation zones. This land is below the

river's high water mark and is accessible to humans.

Response: Warning signs at the N-Springs, which face the river, are intended to inform the potential trespasser of the dangers in the area. In addition, the Hanford Patrol and remediation personnel are in the area and are keenly aware of the contamination present at N Springs and the need to prevent intruder access.

4. **Comment:** The documents discuss cases where radiological contaminants either exist or may exist at concentrations above cleanup standards at depths greater than 4.6 meters below grade (for example, DOE/RL-97-30, page 8, and DOE/RL-96-102, page 12). Are these cleanup standards the soil concentrations corresponding to 15 mrem/y from contaminants in the first 4.6 meters below grade, for example those listed in Table 3, page 12 of DOE/RL-97-30?

Response: The cleanup standards for these actions will be applied from current grade to 4.6 meters below grade. As described on page 16 of DOE/RL-97-30 and page 12 of DOE/RL-96-102 for those sites which have residual contamination above the cleanup standards at a depth greater than 4.6 meters several factors will be considered to determine the extent of additional remediation. These factors include reduction of risk by decay of short-lived radionuclides, protection of human health and the environment, remediation costs, size of ERDF, worker safety, presence of ecological and cultural resources, the use of institutional controls, and long-term monitoring. The cleanup standards are listed in Table 3, page 12 of DOE/RL-97-30 and in Table 2, page 9 of DOE/RL-96-102. The constituent concentrations listed in both tables represent an individual contaminate level equivalent to 15 mrem/y and would therefore result in a more restrictive cleanup concentration when more than one constituent is present at a waste site

5. **Comment:** Exactly how contaminants at depth are dealt with, and how they correspond to the depths of concern for the two exposure scenarios (4.6m for rural residential and 3m for ranger/industrial), is not clear. For example, the discussion in the CMS for the 116-N-1 Trench (DOE/RL-96-39) indicates remediation to 21 feet (6.4m) below grade, or 5 feet below the bottom of the engineered structure (located 16 feet below grade) for both exposure scenarios. The document did not make it clear why remediation to this depth was needed to meet the dose criterion for these scenarios, particularly for the ranger/industrial scenario.

Response: The background information for the excavation depth to five feet below the normally required depth of 4.6 meters for these sites can be found in DOE/RL-96-39, page 4-6, Section 4.5. This section, entitled, Area of Contamination for Radiological Sites, refers to the Limited Field Investigation (DOE/RL 1996b), which documents the results of boreholes drilled along side and through the 1301 crib and trench and the 1325 crib. The samples collected from this event indicate a concentrated layer of radionuclides including plutonium-239-240, approximately 3-5 feet thick at a depth of 20 feet below surrounding grade.

The Tri-Parties have agreed that this layer of concentrated soil could not be left behind and would therefore be part of the planned excavation.

Gerald Pollet Comments

1. **Comment:** The use of an interim action containing 15 mrem/y does not accomplish MTCA cleanup by 2011 as promised by the Tri-Parties.

   Response: The Tri-Party commitment to complete cleanup in the 100 Area is documented in Milestone M-16 of the Tri-Party Agreement. It is anticipated that the milestone completion date of 2018 will be achieved using the agreed upon path forward.

2. **Comment:** 15 mrem/y is inconsistent with MTCA's 1 x 10-5 cumulative risk level for carcinogens.

   Response: The use of 15 mrem/y above background and MTCA is consistent. MTCA provides for the use of reasonable restoration timeframes which would include natural processes in the form of decay. The 15 mrem/y cleanup standard is consistent with EPA guidance for cleanup of radiological contamination at Superfund sites, WDOH Hanford Guidance for Radiological Cleanup and is less than the current NRC standard approved in 1997.

   The Tri-Parties have examined cleanup levels above 15 to 25 mrem/y and found them not protective of human health and the environment at Hanford. Cleanup levels below 15 mrem/y, although perhaps more protective, present substantial difficulties. In many cases, existing field measurement methods cannot accurately measure less than 15 mrem above background. Laboratory quality analyses would be required but will only measure low enough in some cases. Requiring a more stringent cleanup level, unprecedented elsewhere in the DOE complex or in the international community, would significantly increase excavation costs and the areal footprint of ERDF. Further, it is anticipated that the WDOH will adopt the NRC regulation which uses 25 mrem/y as the cleanup standard by July, 2000.

3. **Comment:** The N documents recommend a rural residential cleanup scenario while a native subsistence scenario is more likely.

   Response: The Tri-Parties issued the Interim Action Record of Decision for the 100-BC, DR, and HR operable units using the rural residential land use scenario so as not preclude future land uses as may be determined by the appropriate agencies. The agencies responsible for land use determination have yet to make such a determination on the Hanford site. Therefore, the rural residential scenario being applied at 100-N is consistent with previous actions in absence of other determinations. The Tri-Parties will continue to engage in dialogue with stakeholders concerning the Native American subsistence scenario and other scenarios which may be applicable to the Hanford site cleanup evaluations.