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Appendix N
Draft A

Remedy Selection Process for Remaining 100 Area Source Operable Unit Waste Sites

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APPENDIX N

REMEDY SELECTION PROCESS FOR REMAINING 100 AREA SOURCE OPERABLE UNIT WASTE SITES

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ACRONYMS

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
COPC	contaminants of potential concern
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
EAF	Experimental Animal Farm
Ecology	Washington State Department of Ecology
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ESD	Explanation of Significant Difference
MCACES	Micro Computer Aided Cost Estimating System
Process Document	*100 Area Source Operable Unit Focused Feasibility Study*
ROD	Record of Decision
RCRA	*Resource Conservation and Recovery Act of 1976*
RL	U.S. Department of Energy Richland Operations Office
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
WAC	*Washington Administrative Code*
WIDS	Waste Information Data System

N1.0 INTRODUCTION

This document has been prepared as an appendix to the *100 Area Source Operable Unit Focused Feasibility Study* (Process Document) (DOE-RL 1995a). The Process Document and its appendices evaluate potential remedial alternatives for waste site groups in the 100 Area of the Hanford Site in accordance with the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA). Previously, the Tri-Parties (U.S. Department of Energy [DOE], Richland Operations Office [RL]; the U.S. Environmental Protection Agency [EPA]; and the Washington State Department of Ecology [Ecology]) issued an Interim Remedial Action Record of Decision (ROD) (EPA 1995) and a subsequent ROD amendment (EPA 1997) requiring cleanup of radioactive liquid waste sites in the 100 Area. Cleanup of these sites began during 1995 and is ongoing.

This document focuses on all 100 Area source operable unit waste sites not previously addressed in the 1995 ROD and the 1997 ROD Amendment. These waste sites, termed the "100 Area Remaining Sites" or "Remaining Sites," include 441 waste sites in 5 reactor areas and in the 100-IU-2 and 100-IU-6 Operable Units of the 100 Area. Waste sites in the 100-N Reactor Area are not included in the Remaining Sites and are planned to be addressed in separate decision documents.

N1.1 OBJECTIVES AND SCOPE

The objectives of this document are twofold. The initial objective is to summarize the waste site categorization process for the 100 Area Remaining Sites. The categorization process involves assigning waste sites to general groupings that relate to the regulatory framework under which each site may best be dispositioned, as determined by representatives of the Tri-Parties. The categories are as follows:

- Sites listed in the 1995 ROD and 1997 ROD Amendment, including proximity sites
- Sites classified or reclassified as "Rejected" in the Waste Information Data System (WIDS)
- Sites for non-CERCLA/*Resource Conservation and Recovery Act of 1976* (RCRA) action under via other regulatory authorities
- RCRA treatment, storage, and disposal (TSD) units
- Burial grounds
- Above-grade facilities (buildings) and structures for decontamination and decommissioning (D&D)
- 100 Area Remaining Sites to be addressed by CERCLA authority.

The second objective is, for those Remaining Sites that have been categorized to be addressed under CERCLA, to present the remedy selection process. This document records the application of this process for inclusion in the Administrative Record, which forms the basis for the development of a CERCLA Proposed Plan and ROD for the 100 Area Remaining Sites.

This document is divided into five sections, as follows:

Section N1.0: Introduction. This section introduces the 100 Area Remaining Sites and presents overall objectives of this document. It also summarizes the background and the results of the application of the CERCLA process to waste sites in the 100 Area.

Section N2.0: Remaining 100 Area Waste Sites. This section provides an overview of the Remaining Sites and their relationship to past activities at reactor areas and associated facilities. It summarizes information on the process history at reactor areas associated with the Remaining Sites and discusses waste site contaminants.

Section N3.0: Waste Site Categorization Process. In this section the categorization process applied to the Remaining Sites by the Tri-Parties is presented and the results are summarized.

Section N4.0: Remedy Selection Process. This section presents information used to evaluate a cleanup remedy for the Remaining Sites that have been categorized to be addressed under CERCLA.

Section N5.0: References. Citations provided to other documents are listed in this section.

N1.2 BACKGROUND

The 100 Area is one of four areas of the Hanford Site that have been included on the EPA's National Priorities List under CERCLA because of soil and groundwater contamination resulting from past operation of nuclear facilities. To organize cleanup efforts under the Superfund Program, the EPA, Ecology, and RL entered into an interagency agreement in May 1989. The *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989), and its amendments, provides a legal and procedural framework for cleanup and regulatory compliance at the numerous hazardous waste sites of the Hanford Site.

The *Hanford Past-Practice Strategy* (DOE-RL 1991) streamlined the past-practice remedial action process with a bias for action through optimizing the use of interim remedial measures. The strategy focused on reaching early decisions to initiate and complete cleanup projects, maximizing the use of existing information, coupled with focused, short time-frame, limited field investigations where necessary. Limited field investigation reports identified waste sites for interim remedial measures that were subsequently included in the 1995 ROD and the 1997 ROD Amendment. The remaining 100 Area waste sites were deferred for later action.

N2.0 REMAINING 100 AREA WASTE SITES

This section provides an overview of the Remaining Sites and their relationship to past activities at reactor areas and associated facilities.

N2.1 PROCESS HISTORY OF REACTOR AREAS

Nine uranium-fueled, graphite-moderated, water-cooled plutonium production reactors were constructed by the U.S. Government along the Columbia River, in the 100 Area of the Hanford Site, during the 20-year period from 1943 to 1963. Their locations are shown in Figure N-1. With the exception of the 100-N Reactor (the last reactor constructed), the process history of the reactors, and hence the associated waste sites and resultant contaminants, were similar. The reactors are retired from service and have been declared surplus by the DOE. All of the reactors and their ancillary facilities are in various stages of D&D to minimize the potential spread of radioactive and nonradioactive contaminants. This process is ongoing, although most of the structures in the 100-BC, 100-D, 100-F, and 100-H Areas have been demolished.

N2.1.1 100-BC Area

The 100-BC Area includes two reactors, 100-B and 100-C, with their associated facilities for water treatment, air filtration, nuclear fuel handling, and effluent disposal, plus laboratories, administrative offices, and various other buildings (Carpenter 1994). A total of 47 buildings were located in this area. Most 100-BC Area buildings have been fully decontaminated and decommissioned. A portion of the 100-BC Area water treatment plant continues in operation to provide potable water to the 200 Area, and the 151-B Electrical Substation continues to provide electrical power.

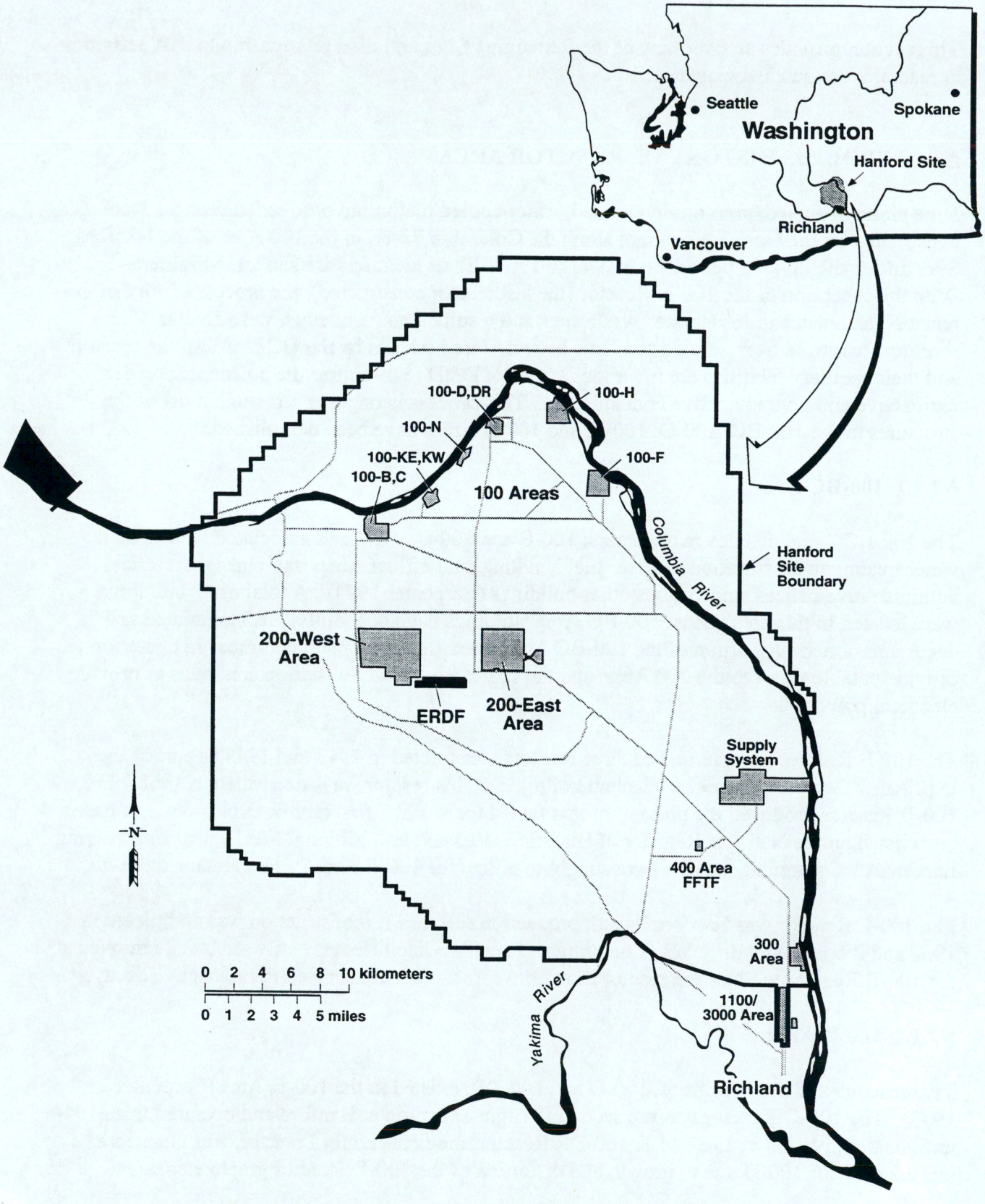
The 100-B Reactor was the first of three reactors constructed in 1943 and 1944 as part of the U.S. Army Corps of Engineers Manhattan Project. This reactor was deactivated in 1968. The 100-B Reactor produced the plutonium that fueled the world's first atomic explosions and has been listed on the National Register of Historic Places and as a National Mechanical Engineering Landmark. Community efforts have sought to utilize the 100-B Reactor as a reactor museum.

The 100-C Reactor was Hanford's sixth production reactor. Its construction was completed in 1952 and it operated until 1969. Contaminated ancillary facilities currently are being removed at the 100-C Reactor to place the reactor in interim safe storage for long-term radioactive decay.

N2.1.2 100-D Area

Two reactors and their facilities, 100-D and 100-DR, existed in the 100-D Area (Carpenter 1993). The 100-D Reactor was the second to begin operation at Hanford and operated from 1944 until its deactivation in 1967. The 100-DR Reactor, the fifth Hanford reactor, was planned as a replacement for 100-D due to growth and distortion of the 100-D Reactor graphite core.

Figure N-1. Map of The Hanford Site Showing the Reactors in the 100 Area and the Environmental Restoration Disposal Facility.



However, when it was determined that the graphite distortion in 100-D could be controlled, facilities were installed to operate both reactors simultaneously. The 100-DR Reactor operated from 1950 to 1964.

N2.1.3 100-F Area

The 100-F Reactor was the third Hanford Site reactor built to manufacture plutonium during World War II (Deford 1994). The 100-F Reactor operated from 1945 to 1965, when it was retired. Adjacent to the 100-F Reactor site was the Experimental Animal Farm (EAF), which operated from 1945 to 1976 to study the effects of exposure of ionizing radiation on fish, plants, and animals. The earliest animal research in the 100-F Area began in 1945, exposing fish to varying concentrations of reactor cooling water effluent to determine potential effects of effluent discharge on aquatic life in the Columbia River. Studies involving sheep and swine began in the late 1940's and in 1952, respectively. Most of this work involved 20-year lifetime exposure studies. Pilot studies were also conducted using milk cows, chickens, ducks, and miniature goats. Radioecology experiments with plants and ionizing radiation studies on beagles were also conducted at the EAF. Cereal grains, alfalfa, potted plants, and other crops were grown in greenhouses in soil containing controlled amounts of strontium-90 and cesium-137. Deford (1994) provides a summary of the EAF facilities and its operational history.

N2.1.4 100-H Area

The 100-H Reactor was the fourth constructed at Hanford, beginning operations in 1949 and continuing until its deactivation in 1965 (Deford and Einan 1995). Subsequently, water clarification basins (the 183-H clearwells) were used as solar evaporation basins for liquid process wastes and non-routine chemical wastes from the 300 Area. The solar evaporation basins received wastes from 1973 through 1985 and were regulated under RCRA as TSD facilities until their D&D was completed in 1996.

N2.1.5 100-K Area

The two 100-K Area reactors, 100-KE and 100-KW, were constructed during the Korean conflict as part of a large cold war expansion effort at Hanford (Carpenter and Cote 1994). They were the largest reactors built as of their startup date, in 1955, and operated at more than twice the thermal power limits of the six earlier reactors until their deactivation in 1970 and 1971. Facilities in the 100-K Area have continued to be used for a variety of purposes since decommissioning of the 100-KE and 100-KW Reactors, including storage of spent nuclear fuel in the reactor fuel storage basins and rearing of fish in the cooling water settling basins.

N2.1.6 100-N Reactor Area

Waste sites in the 100-N Reactor Area received contaminants from different types of processes than the other reactor areas. Beginning operations in 1963, the 100-N Reactor was designed to be able to either produce plutonium exclusively or produce plutonium with the production of electric power. The cooling water for the reactor core was designed to be recycled instead of using water from the Columbia River as a once-through coolant. It also operated at much higher

pressures and temperatures than the other Hanford reactors. Waste sites associated with N Reactor operations will be addressed by separate CERCLA decision documents and are not considered for disposition in the 100 Area remaining sites process.

N2.1.7 100-IU-2 and 100-IU-6 Operable Units

The 100-IU-2 and 100-IU-6 Operable Units are the former locations of temporary housing camps for Hanford construction workers, temporary construction support facilities for the Manhattan Project, and former townsites that preceded Hanford operations. While most activities in these areas ceased early in the 1950's, it was not until the 1970's that virtually all of the facilities were removed. Many of the waste sites in these operable units are remnants of the pre-Manhattan Project towns of White Bluffs and Hanford, which were located, respectively, north and south of the 100-F Area. In general the sites within these operable units consist of surface debris, municipal solid and sanitary waste dumps, oil spills, building foundations, waste construction materials, and ash piles. Thus, the types of sites and expected contaminants are substantially different from those associated with operable units around the production reactors where liquid and solid radioactive wastes and industrial chemicals were disposed to the soil.

N2.2 WASTE SITE CONTAMINANTS

All the 100 Area reactor operations (except those in 100-N Area) were virtually identical, leading to similar releases of contaminants at similar waste sites (effluent disposal facilities, cribs, French drains, spills, pipelines, burn pits, solid waste sites, etc.) (EPA 1995). Limited field investigations at similar sites in different reactor areas showed similar contaminant characteristics in engineered structures and soils where liquid and solid wastes were disposed. Similar sites that received similar discharges are assumed to have similar types of contaminants of potential concern (COPCs). Process knowledge and any available data were used to identify COPCs for individual remaining sites.

Based on their functions in the reactor processes, facilities and their associated waste sites and contaminants in the 100 Area can divided into four categories:

- Reactor cooling water treatment and supply
- Reactor products and effluent handling
- Reactor support facilities
- Miscellaneous 100 Area activities indirectly supporting reactor area processes.

N2.2.1 Contaminants Introduced During Water Treatment

A continuous supply of high-quality cooling water was essential to reactor operations, preventing reactor core damage from the heat generated by fission reactions. Water obtained from the Columbia River was extensively treated before passing through the reactors as a once-through coolant. Settling, chemical treatment, filtering, and pH management were utilized to purify and prepare the water. Use and spillage of water treatment chemicals (sodium dichromate,

manganese compounds, copper compounds, alum, ammonium nitrate, sulfuric acid, and caustic soda) and their impurities (arsenic, mercury) resulted in the contamination of facilities and soil.

N2.2.2 Contaminants from Reactor Products and Effluent Handling

Cooling water circulated in a single pass through the process tubes of the first eight Hanford reactors and through tubes imbedded in the reactors thermal shield, biological shields, and horizontal control rods. The liquid, solid, and gaseous materials exiting the reactor buildings contained water treatment chemicals and radioactive contaminants. Transfer, discharge, and handling of irradiated and contaminated materials and equipment resulted in contaminants being spread to structural materials (concrete, metal, wood) and to environmental media (soil and groundwater).

The limited field investigation reports for the 100 Area source operable units (DOE-RL 1993a, 1993b, 1994b, 1994c, 1994d, 1994f, 1994g, 1995a [Appendices J and K], 1995c) reported the following COPCs:

- Radionuclides - americium-241 carbon-14, cesium-137, cobalt-60, europium-152, europium-154, nickel-63, plutonium-238, plutonium-239/240, radium-226, strontium-90, thorium-228, tritium, uranium-233/234, and uranium-238

- Nonradionuclide inorganics - antimony, arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, nitrate, nitrite, and zinc

- Nonradionuclide organics - benzo(a)pyrene, chrysene, pentachlorophenol, polychlorinated biphenyls, and trichloroethene.

N2.2.3 Contaminants from Support Facilities

Disposal of wastes from the support facilities for reactor operations contributed in many ways to the cleanup problems associated with the 100 Area Remaining Sites. Sanitary sewage from all operations was discharged to septic tanks. Investigations of the contents of several septic tanks have found heavy metals and (in one case) low levels of radioactivity, apparently due to decontamination of workers being done by washing in sinks and showers. Combustible wastes from all operations were routinely burned in burn pits until disposal of these materials in landfills began during the 1970's. Some burn pits remain devoid of vegetation today, more than 20 years after the practice of open burning ceased. Burning routinely included all nonradioactive, combustible wastes, including office wastes, paint, and chemical solvents. Laboratories that analyzed reactor process water, reactor effluent, reactor off gases, and other streams utilized numerous chemicals and produced effluents contributing to the contamination of French drains and other waste sites.

N2.2.4 Contaminants from Miscellaneous 100 Area Activities

The prior uses of some portions of the 100 Area were restricted to residential and light industrial activities. These areas, primarily in the 100-IU-2 and 100-IU-6 Operable Units, contain

significant numbers of waste sites with various solid wastes, sanitary wastes, and chemical residues from pre-1950's household, farming, or light industrial disposal practices. Other miscellaneous activities include biological experimentation (limited to facilities in the 100-F Area) and military installations for defense and security of the Hanford Site.

N3.0 WASTE SITE CATEGORIZATION PROCESS

This section describes the waste site categorization process applied to the Remaining Sites. The waste site categorization process was developed and implemented by representatives of the Tri-Parties to define the regulatory path forward for all Remaining Sites that are identified in WIDS. The WIDS database is used by the Tri-Parties to inventory and track waste sites at the Hanford Site in accordance with Subsection 3.5 of the Tri-Party Agreement (Ecology et al. 1989).

N3.1 DESCRIPTION OF CATEGORIZATION PROCESS

N3.1.1 Overview

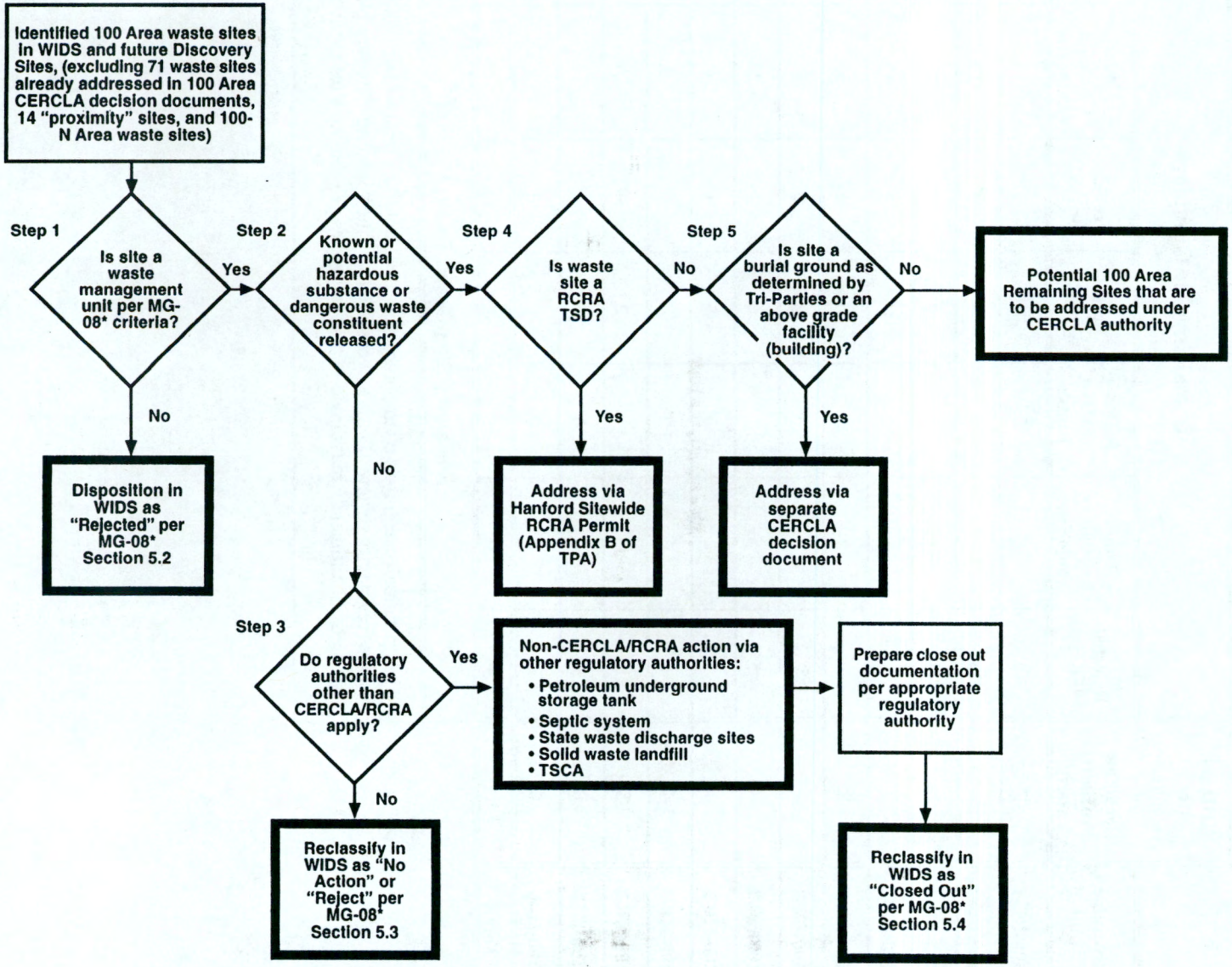
The process used to categorize the 100 Area Remaining Sites is summarized in Figure N-2. The process involved five steps, subjecting all Remaining Sites to a series of questions (shown in diamonds in Figure N-2). Depending on how each question was answered, each site was assigned to a particular endpoint or category (shown in boxes on Figure N-2). Table N-1 is a companion to Figure N-2 and provides additional information about specific steps in the categorization process. The categorization process is consistent with draft Tri-Party Agreement Handbook Management Guideline MG-08, "Maintenance of the Waste Site Information Data" (DOE-RL 1997), currently under review by the Tri-Parties.

N3.1.2 Scope

All waste sites in the WIDS database to date were subjected to the categorization process. All candidate waste sites were initially entered into WIDS with a "Discovery Site" classification. This WIDS classification was maintained until sufficient information was obtained to determine whether the site was a waste management unit per draft Tri-Party Agreement Handbook Management Guideline MG-08 (DOE-RL 1997).

In future years, additional Discovery Sites are anticipated to be found, during remedial design and remediation of 100 Area waste sites. These additional sites will undergo the same categorization process to be included in the remediation process proposed for the future Remaining Sites ROD.

Figure N-2 100 Area Remaining Sites Waste Site Categorization Process.



* TPA Handbook Procedure MG-08, Maintenance of the Waste Site Data System (in preparation)

Table N-1. 100 Area Remaining Sites Groupings.

Operable Unit	ROD and ROD Amendment Sites (including Proximity Sites)	Remaining Site Groupings						
		Rejected Sites	Other Regulatory Authorities	RCRA TSD Units	Burial Grounds	Facilities for D&D	Under CERCLA Authority	Pending (Temporary Category)*
100-BC-1	17	5	6	0	3	3	16	4
100-BC-2	4	3	0	0	8	2	12	1
100-DR-1	26	5	1	1	8	2	22	2
100-DR-2	3	4	3	2	11	2	12	1
100-FR-1	12	9	0	0	0	1	35	3
100-FR-2	2	2	0	0	8	0	8	0
100-HR-1	8	5	1	1	0	1	20	1
100-HR-2	1	3	2	0	5	1	4	2
100-KR-1	4	0	0	0	0	0	0	1
100-KR-2	8	13	11	1	2	39	28	5
100-IU-2	0	37	6	0	0	0	19	0
100-IU-6	0	13	6	0	0	0	9	0
Totals	**85**	**99**	**36**	**5**	**45**	**51**	**185**	**20**
		Remaining Sites Grand Total: 441 sites						

*The "pending" category is a temporary category. It will be removed after this document receives regulatory review. During agency reviews the "pending" sites are planned to be discussed and ultimately reassigned to new categories, leaving no sites in the "pending" category.

N3.1.3 Stepwise Process

Step 1 asks the question: "Is the site a waste management unit per draft Tri-Party Agreement Handbook Management Guideline MG-08 criteria?" Those sites determined not to be waste management units were placed in the "Rejected" category. This category indicated that candidate waste sites had been determined by the Tri-Parties to not pose a risk to human health and the environment and, therefore, were not waste management units and not within the scope of the Tri-Party Agreement. Sites determined to be waste management units were classified as "Accepted" in WIDS. All Remaining Sites classified as "Accepted" were subjected to Steps 2 through 5 to identify those Remaining Sites that would be addressed in a CERCLA decision document.

Step 2 asks the question: "Were known or potential hazardous substances or dangerous wastes or constituents released or potentially released at the site?" Remaining Sites for which there were no known or potential releases of hazardous substances or dangerous wastes or constituents will not be addressed through the CERCLA process and will be addressed in Step 3. If a known or potential hazardous substance or dangerous waste or constituent had been released or potentially released at a site, the site will be addressed in Step 4.

Step 3 asks the question: "Do other regulatory authorities apply?" Some sites should be addressed through a regulatory authority other than CERCLA, such as the *Washington Administrative Code* (WAC) septic system regulations, or the WAC petroleum underground storage tanks regulations, etc., as described in Figure N-2. If no other authority was recognized, these sites were classified as "Rejected" in WIDS. If, however, other regulatory authorities did apply, the sites were dispositioned to a non-CERCLA authority. Following future completion of actions required by the non-CERCLA regulatory authorities, such sites may be categorized as "Closed Out" in the WIDS database after preparation and agreement on documentation with the appropriate regulatory authorities.

Step 4 asks the question: "Is the waste site a RCRA TSD unit?" All sites that are TSD units are addressed in accordance with RCRA. All TSD units will be addressed under the *Hanford Facility Resource Conservation and Recovery Act Permit for Treatment, Storage, and Disposal of Dangerous Waste* (Hanford Sitewide Permit), but may be integrated with actions taken under CERCLA. All sites that are not TSD units will be addressed in Step 5.

Step 5 asks the question: "Is the site a burial ground as defined by the Tri-Parties Burial Ground Task Team or an above-grade facility (building)?" Those sites that are solid waste burial grounds or above-ground facilities (structures and buildings) will be addressed via separate CERCLA decision documents. The Tri-Parties have agreed to disposition 100 Area burial grounds in a separate Proposed Plan and ROD because remedy evaluation must consider significant issues of future land use, worker safety, remediation costs, and use of institutional controls. The 100 Area burial grounds are sites that were used for near-surface disposal of heterogeneous solid wastes containing hazardous constituents (radioactive and/or nonradioactive). The burial grounds are significantly different from other 100 Area waste sites because they are typically larger and were principally used for disposal of irradiated equipment from the reactors. Also, the burial grounds did not receive contaminated liquids, soil, or

chemicals that could be mobilized to contaminate environmental media. The Tri-Parties have decided that the nature and extent of burial grounds supports the need for a thorough evaluation of remedies in addition to Remove/Treat/Dispose to determine if more appropriate remedies exist for these types of waste sites.

Intact structures and buildings are planned to be decontaminated and decommissioned and removed through preparation of appropriate Environmental Engineering/Cost Analyses (EE/CA) under CERCLA. While the cleanup, demolition, and removal of structures and buildings will be addressed in separate documents, the schedule and sequence of these activities will be integrated with the remediation of the 100 Area Remaining Sites because, in many cases, waste site remedial action can occur only after structures and buildings are removed. All waste sites that either are not burial grounds or above-grade facilities are waste sites to be addressed under CERCLA authority.

N3.2 RESULTS OF CATEGORIZING REMAINING SITES

Subjecting the 100 Area Remaining Sites to the waste site categorization process presented in Figure N-2 resulted in waste sites being assigned to the following groupings:

- Sites listed in the 1995 ROD and 1997 ROD Amendment, including proximity sites

- Remaining Sites Categories
  - Sites classified or reclassified as "Rejected" in WIDS
  - Sites for non-CERCLA/RCRA action under via other regulatory authorities
  - RCRA TSD units
  - Burial grounds
  - Above-grade facilities (buildings) and structures for D&D
  - 100 Area Remaining Sites to be addressed by CERCLA authority.

A total of 441 waste sites were reviewed and categorized. The results of this process are summarized numerically in Table N-1. The 100 Area Remaining Sites to be addressed under CERCLA are listed in Attachment NA, Tables NA-1 and NA-2. These sites are the subject of discussion in Section N4.0 of this document, which describes the proposed remedy selection process.

N4.0 REMEDY SELECTION PROCESS: USE OF THE PLUG-IN APPROACH

The remedy selection process for the 100 Area Remaining Sites will use an innovative approach called the Plug-in Approach to enhance the efficiency and effectiveness of remedial actions in the 100 Areas. This approach is summarized in Figure N-3. The Plug-in Approach allows multiple, similar, but separate sites at a facility to make use of the same remedy. Under this approach, the agencies select a standard remedy that applies to a given set of characteristics at a number of sites rather than to an individual waste site. The Tri-Parties have determined that all the sites in Tables NA-1 and NA-2 are candidates for plug-in to the standard remedy by comparing physical and chemical characteristics of a waste site to a "site profile" to which the standard remedy applies. Candidate sites that contain concentrations of contaminants exceeding remedial action goals may be remediated or "plugged-in" using the standard remedy. In this manner, cleanup actions at candidate sites can proceed without re-evaluating the same remedy through the entire CERCLA process (i.e., through development of separate remedial investigation/feasibility studies, proposed plans, and RODs). If the comparison shows that the site meets the remedial action goals, the site will require no further action under CERCLA. For sites that cannot be "plugged-in" to the standard remedy due to differing characteristics, remedial actions will be determined through a separate CERCLA process (e.g., ROD Explanation of Significant Difference [ESD], ROD Amendment, EE/CA).

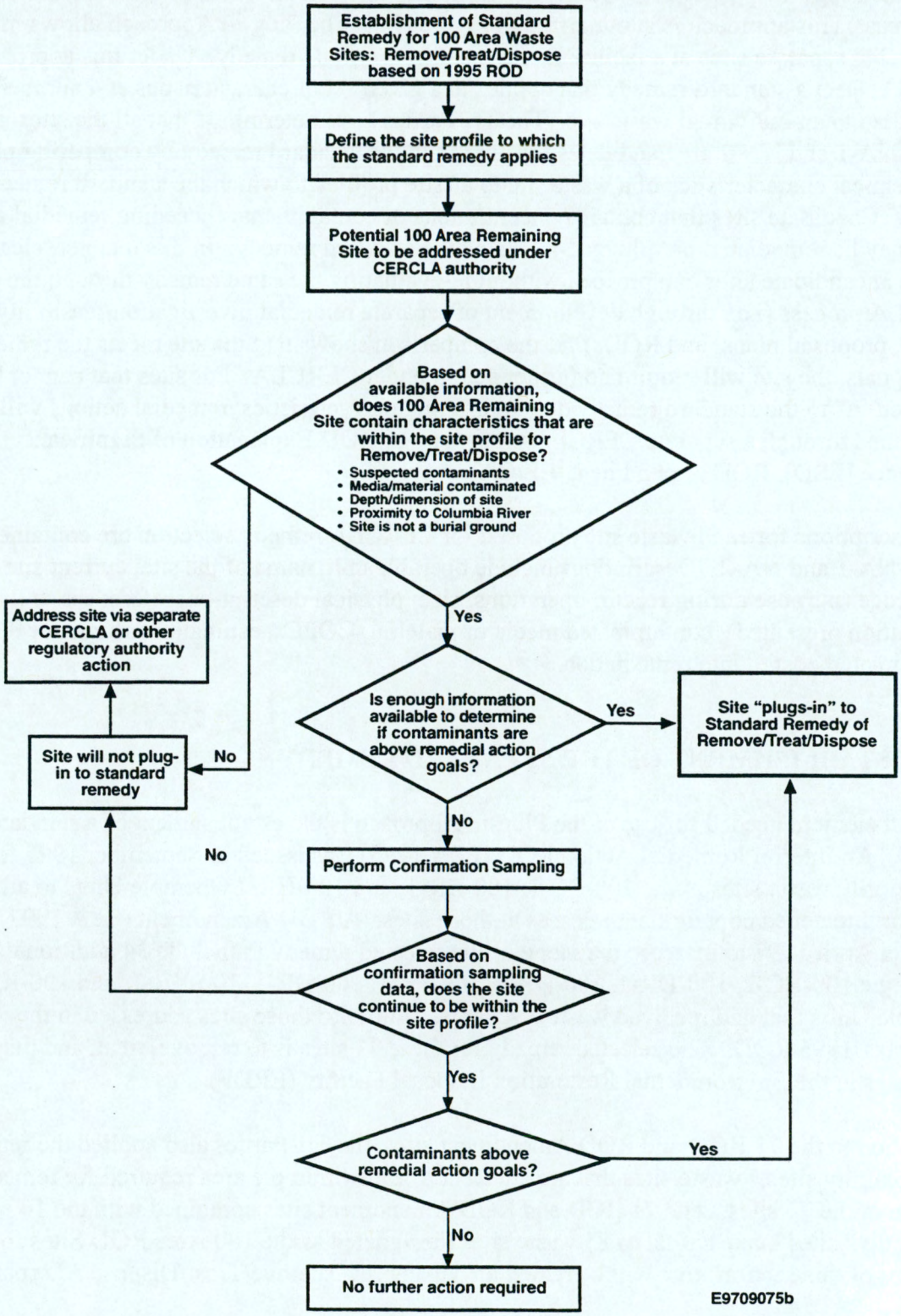
Site descriptions for each waste site proposed for CERCLA remedy selection are contained in Tables NA-1 and NA-2. Descriptions include operable unit, name of the site, current site knowledge (purpose during reactor operations; size; physical description; references to the information presented), contaminated media or material, COPCs, estimated volume for disposal, and estimated cost of site remediation.

N4.1 ESTABLISHMENT OF THE STANDARD REMEDY

The first element needed for use of the Plug-in Approach is the establishment of a standard remedy. An Interim Remedial Action ROD (EPA 1995) was issued in September 1995 for 37 high-priority waste sites in the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units to address actual or threatened contaminant releases at those sites. A ROD Amendment (EPA 1997) was issued in April 1997 to increase the scope of the selected remedy to include 34 additional waste sites in the 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-HR-1, 100-KR-1, and 100-KR-2 Operable Units that had received waste discharges similar to those sites addressed in the September 1995 ROD. The selected remedy for these 71 sites is to remove, treat, and dispose of the wastes in the Environmental Restoration Disposal Facility (ERDF).

In addition to the 71 ROD and ROD Amendment sites, the Tri-Parties also applied the remedy to 14 "proximity sites," waste sites that are adjacent to and within the area required for remediation of some of the 71 sites. The 71 ROD and ROD Amendment sites combined with the 14 "proximity" sites make a total of 85 waste sites (designated as the 100 Area ROD Sites for the purposes of this section) that will be remediated using the Remove/Treat/Dispose Alternative.

Figure N-3. Application of the Plug-in Approach to 100 Area Remaining Sites.



N4.1.1 Description of the Remove/Treat/Dispose Alternative

The Remove/Treat/Dispose Alternative, as it is being currently implemented in the 100 Area, generally includes the following steps:

- Remove contaminated soil, structures, and debris from 100 Area source waste sites using the "observational approach." The observational approach utilizes analytical screening during remediation to guide the extent of excavation (EPA 1995). Remediation proceeds until it can be demonstrated through a combination of field screening and confirmation sampling that cleanup goals have been achieved.

- Treat the waste as required to meet applicable waste disposal criteria.

- Dispose of contaminated materials in the ERDF.

- Backfill excavated areas and revegetate.

Interim remedial measures are to be conducted at the 71 waste sites and 14 proximity sites to reduce potential future threats to human health and the environment from these waste sites. The depth of remediation may take into account appropriate site-specific balancing factors including reduction of risk by decay of short-lived (half-life less than 30.2 years) radionuclides (EPA 1995), protection of human health and the environment, remediation costs, sizing of the ERDF, worker safety, presence of ecological and cultural resources, the use of institutional controls, and long-term monitoring costs. The DOE will control access and use of the Hanford Site for the duration of the cleanup. Institutional controls and long-term monitoring is required for sites where wastes are left in place above cleanup levels. It is expected that no additional remedial measures will be required at these sites.

N4.1.2 Remedial Action Objectives and Goals

Remedial action objectives for implementation of this alternative were delineated in Section VII of the 1995 ROD. These objectives are summarized below:

- Protect human and ecological receptors from exposure to contaminants in soils, structures, and debris by dermal exposure, inhalation, or ingestion of radionuclides, inorganics, or organics.

- Control the sources of groundwater contamination to minimize the impacts to groundwater resources, protect the Columbia River from further adverse impacts, and reduce the degree of groundwater cleanup that may be required under future actions.

- To the extent practicable, return soil concentrations to levels that allow for unlimited future use and exposure. Where it is not practicable to remediate to levels that will allow for unrestricted use in all areas, institutional controls and long-term monitoring will be required.

The final land use for the 100 Area has not been established. The 1995 ROD established that the remedial action objectives are for "unrestricted use," and this goal is assumed for the 100 Area Remaining Sites remedy selection process as well. Remedial action objectives and cleanup goals will be re-evaluated if future land use and groundwater use determinations are inconsistent with current goals.

Remedial action goals that will be used to meet the remedial action objectives are also defined in Section VII of the 1995 ROD. Risk-based remedial action goals for the implementation of the Remove/Treat/Dispose Alternative will include, but are not limited to, the following:

- Draft EPA national dose standard of 15 mrem/year above natural background
- *Model Toxics Control Act* (MTCA) Method B cleanup standards
- Maximum contaminant levels (drinking water standards)
- Ambient water quality criteria (river protection standards)
- Draft DOE standards for terrestrial animals.

N4.1.3 Establishment of Remove/Treat/Dispose as a Standard Remedy

The remedy selection process that resulted in Remove/Treat/Dispose becoming the preferred alternative involved evaluation and comparison of this alternative with other remedial action alternatives (as modified in the 1997 ROD Amendment) using CERCLA criteria. The other alternatives were:

- No Action
- Institutional Controls
- Containment
- In Situ Treatment.

The 100 Area ROD Sites encompass diverse waste unit types, contaminants, and depths. The Remove/Treat/Dispose remedy, and its utilization of the observational approach, has been demonstrated to remediate these sites to meet the goal of unrestricted land use in a cost-effective manner. Because of its success and application to a diversity of waste sites, the Tri-Parties propose to establish the Remove/Treat/ Dispose Alternative as the standard remedy for those 100 Area Remaining Sites that share characteristics that are similar to 100 Area ROD Sites. As such, remedial action objectives and remedial action goals as prescribed in the 1995 ROD will also apply to the 100 Area Remaining Sites.

N4.2 SITE PROFILE FOR PLUG-IN OF 100 AREA REMAINING SITES

The next element needed for use of the Plug-in Approach is a site profile that will determine which sites may plug-in to the standard remedy. Sites must be physically and chemically similar to those for which Remove/Treat/ Dispose has been previously selected. If the characteristics of the 100 Area Remaining Site match these predefined characteristics, and contaminant concentrations exceed remedial action goals, the site can be plugged-in to the standard remedy.

N4.2.1 Site Profile Characteristics

The characteristics that form the basis for similarity for each remaining site are identified below:

- Type of contaminants (radiological, chemical)
- Type of contaminated environmental media (soil)
- Type of contaminated waste material (concrete, metal, wood)
- Predicted depth of contamination
- Sites in proximity to the Columbia River.
- Site is not a burial ground as determined by the Tri-Party Burial Ground Task Team.

Specific contaminant, media, material, and depth characteristics contained in the earlier 100 Area ROD Sites were tabulated from information contained in Appendices E through M of the Process Document (DOE-RL 1995a). Examples of common contaminants at these sites include heavy metals; various radionuclides such as uranium, plutonium, and cesium; and various organic constituents such as acetone and phenol. Environmental media and waste material contaminated by these constituents include soil, metal waste, concrete, asbestos, and miscellaneous debris. Depth of contamination at 100 Area ROD Sites varied from surface structures with superficial contamination to structures such as cribs and reverse wells with potential for much deeper contamination. The 100 Area Remaining Sites characteristics shown in Tables NA-1 and NA-2 are considered by the Tri-Parties to be similar to those in the 100 Area ROD Sites and to fit the site profile for the standard remedy of Remove/Treat/Dispose. Characteristics of the 100 Area burial grounds have been developed by the Tri-Party Burial Ground Task Team and are summarized in Section N3.1.3 of this document.

N4.2.2 Determination of Site Plug-in to Standard Remedy

The determination that a Remaining Site can plug-in to the standard remedy was based on the above site profile characteristics. Some or all of the contaminants or affected media or material at a Remaining Site may not be the same as those described for the earlier ROD sites. However, given the nature of the contaminants, media, or material, the Tri-Parties have determined that the characteristics of the sites are consistent with the 100 Area ROD Sites such that they would be candidates for the standard remedy of Remove/Treat/ Dispose. Examples of "similar" contaminants include immobile constituents (e.g., selenium, nickel) or mobile constituents of relatively low volume (e.g., ethylene glycol, sulfates), neither of which are expected to be present deep in the soil column and thus can be readily excavated from the site.

Where not enough information is available on a Remaining Site to define the type of contaminant, media, or material present, but where it is anticipated to meet the site profile, a determination has been made by the Tri-Parties that the site will be a candidate to plug-in to the standard remedy contingent upon the acquisition of further information. Although it is considered to be unlikely, should information be obtained during remedial design or actual remediation for any of the Remaining Sites that fall outside the site profile characteristics, the remediation of that site will be reevaluated under a separate CERCLA process (e.g., ROD ESD, ROD Amendment, EE/CA).

N4.2.3 Remove/Treat/Dispose Sites

The sites described in Table NA-1 were determined to have sufficient analytical or other data to conclude that contamination exists above remedial action goals. These sites meet the site profile and, therefore, the standard remedy of Remove/Treat/Dispose is proposed by the Tri-Parties. These sites are in the 100-BC-1, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-KR-2, and 100-IU-6 Operable Units.

N4.2.4 Confirmation Sampling Sites

Confirmation sampling is expected to be required for a significant number of 100 Area Remaining Sites for which there is not sufficient existing information for the Tri-Parties to determine if remedial action goals are exceeded. These sites are listed in Table NA-2. When sufficient additional information is obtained through confirmation sampling, the sites will either be plugged-in to the standard remedy or closed out without remedial action, provided that data show that the site is not contaminated above remedial action goals. Should the additional data show that the site contains contaminants, contaminated media, or other physical characteristic that fall outside the site characteristic profile, and will not plug-in to the standard remedy, the Tri-Parties will reevaluate the site as a separate CERCLA action through processes such as a ROD ESD, ROD Amendment, or EE/CA. Sites that could be regarded as clean, based on earlier determinations (e.g., facility demolition sites closed on the basis of previous radiological contaminant level calculations and burn pits where soil gas testing found no solvents), are expected to undergo confirmation sampling. If contaminants of concern exceed remedial action goals, these sites would also be remediated using the standard remedy.

N4.2.5 Estimated Costs

Costs have been estimated for Remaining Sites that are to be addressed under CERCLA authority. Two approaches were used to develop cost estimates. Sites proposed for remediation using the standard remedy, Remove/Treat/Dispose, were estimated using the Micro-Computer Aided Cost Estimating System (MCACES). Cost estimates for sites requiring confirmation sampling were developed using a Microsoft Excel spreadsheet. A detailed explanation of the models used to generate the cost estimates, including a discussion of cost elements and assumptions, is presented in Attachment NB. Resulting cost estimates are summarized in Attachment NB.

The total estimated remediation costs for those sites proposed for Remove/Treat/Dispose is $30,210,167. Estimated data acquisition costs for those sites requiring confirmation sampling is $8,092,503. Combined remediation and confirmation sampling costs total $38,302,670. Cost estimates are considered to be accurate within a range of +50% to -30%.

The final estimated cost for addressing all Remaining Sites is dependent upon the number of Remaining Sites requiring confirmation sampling that, through collection of additional data following a CERCLA decision document, are determined to have contaminant concentrations that exceed remedial action goals. Such sites will be "plugged-in" to the standard remedy, be

remediated using the standard remedy and, as a result, will incur costs in addition to confirmation sampling costs.

At this time, it is not possible to determine what proportion of sites requiring confirmation sampling will also require remediation using the standard remedy. However, it is expected that the number will not exceed 50% of the total number of Remaining Sites requiring confirmation sampling. If 50% of the sites requiring confirmation sampling are subsequently determined to also require remediation using the standard remedy, it is estimated that such actions would result in additional costs of $49,881,902. Therefore, the total costs for Remaining Sites (excluding burial grounds and 100-N Area sites) to be addressed under CERCLA authority is estimated to be $88,184,572, which is the sum of the following estimated costs:

- Costs for sites proposed for remediation using the standard remedy ($30,210,167)
- Costs for sites requiring confirmation sampling ($8,092,503)
- Costs for that portion of confirmation sampling sites (assumed to be 50%) that are subsequently determined to also require remediation using the standard remedy ($49,881,902).

N4.2.6 Petroleum Remediation Sites

Petroleum sites are exempt from CERCLA statutory requirements. If present in the 100 Areas, as verified through confirmation sampling, petroleum sites will be remediated to meet the cleanup standards established by the State of Washington MTCA Cleanup Regulations (WAC 173-340). While petroleum site remediation does not require an alternatives analysis and remedy selection process under CERCLA authority, they are included in the 100 Area Remaining Sites evaluation to inform the public of remedial actions planned at these sites. The candidate petroleum sites that are included as part of the 100 Area Remaining Sites (Table NA-2) are anticipated to be relatively shallow sites that can be remediated using the standard remedy of Remove/Treat/Dispose where MTCA cleanup standards are exceeded. However, should further investigation of these sites through confirmation sampling conclude deep contamination or contamination to groundwater, the Tri-Parties will reevaluate other potential remedial alternatives. Should confirmation sampling conclude that CERCLA contaminants are also present at a petroleum site, they will be managed using the CERCLA Plug-in Approach.

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Appendix G, *100-DR-1 Operable Unit Focused Feasibility Study Report*, Rev. 0

Appendix H, *100-FR-1 Operable Unit Focused Feasibility Study Report*, Draft Rev. 0

Appendix I, *100-BC-2 Operable Unit Focused Feasibility Study Report*, Draft Rev. 0A

Appendix J, *100-DR-2 Operable Unit Focused Feasibility Study*, Rev. 0

Appendix K, *100-KR-2 Operable Unit Focused Feasibility Study*, Draft A. (Includes the 100-KR-2 Limited Field Investigation as Attachment 1.)

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ATTACHMENT NA

TABLES OF 100 AREA REMAINING SITES TO BE ADDRESSED UNDER CERCLA

ATTACHMENT NA

TABLES OF 100 AREA REMAINING SITES TO BE ADDRESSED UNDER CERCLA

TABLES

NA-1. 100 Area Remaining Sites for Remove/Treat/Dispose NA-1
NA-2. Action Sites for Confirmation Sampling NA-7

Table NA-1. Action Sites for Remove/Treat/Dispose. (Page 1 of 6)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Volume for Disposal (LCY [a])	Estimated Cost of Site Remediation
100-BC-1	116-B-7 (1904-B1 Outfall Structure)	Received B Reactor process effluent for discharge to pipelines to the Columbia River. Site consists of an open concrete sump and a concrete spillway from the sump to the river shoreline. Currently enclosed with aviary exclusion wire and cyclone fence. Spillway has been covered with soil to an unknown depth. Outfall structure is 8.2 x 4.3 x 6.4 m deep (27 x 14 x 21 ft deep). (References: Carpenter 1994, DOE-RL 1992e, DOE-RL 1994e, EPA 1996)	Concrete, soil	Cs-137, Co-60, Eu-152, Eu-154, Eu-155, Ni-63, H-3, Sr-90	370	$297,031
	128-B-3 (Coal Ash and Demolition Waste Site)	Formerly used for burning nonradioactive, combustible wastes and disposal of solid building demolition waste. Chemical-stained soil and stressed vegetation visible along the river banks. Vegetation-covered depression 137.2 x 18.3 m (450 x 60 ft). Operated 1944-1968. This site includes former waste site 600-57. (References: Carpenter 1994, DOE-RL 1992e, EPA 1996)	Soil, construction debris	Undetermined organic and inorganic chemicals	17,250	$2,563,677
	132-B-6 (1904-B2 Outfall Structure)	Received B Reactor effluent for discharge to effluent pipelines to the Columbia River. Concrete outfall structure and spillway reduced to grade and covered with clean soil. Underground 1.7-m (66-in) effluent discharge line remains in place. Operated 1954-1969. Surface radionuclide contamination is reported to be present. Site is 8.2 x 4.3 m (27 x 14 ft); total depth assumed to be 6.4 m (21 ft); overburden depth unknown. (References: Carpenter 1994; DOE-RL 1992e, 1994e; EPA 1996)	Concrete, soil	Cs-137, Co-60, Eu-152, Eu-154, Eu-155, Ni-63, H-3, Sr-90	322	$293,941
	132-C-2 (1904-C Outfall Structure)	Received C Reactor effluent and process sewer effluent for discharge effluent pipelines to the Columbia River. Concrete outfall structure and spillway reduced to grade and covered with clean soil. Operated 1952-1969. Surface radionuclide contamination is reported to be present. Site is 16 x 8.2 x 6.4 m deep (52 x 27 x 21 ft deep); overburden depth unknown. (References: Carpenter 1994; DOE-RL 1992e, 1994e; EPA 1996)	Concrete, soil	Cs-137, Co-60, Eu-152, Eu-154, Eu-155, Ni-63, H-3, Sr-90	1,196	$568,318
100-DR-1	100-D-1 (Contaminated Storm Drain)	Received radioactive and hazardous liquid waste leakage from 116-D-7 (107-D) retention basin. Site is a concrete storm drain system, 1 x 1 m (3.3 x 3.3 ft) box (depth unknown) covered with steel plate. It is attached to underground 22.5-cm (9-in.) piping running from the south side of the patrol road to the 1904-D Outfall. (References: Carpenter 1993, EPA 1996)	Concrete, steel, soil	Undetermined radionuclides (beta and gamma)	72	$142,226
	100-D-2 (Lead Sheeting)	Lead sheeting was not removed from concrete pad when pad was buried during demolition of 190-D Building in 1995. Located near the 190-D Annex, 1.2 x 1.2 m (4 x 4 ft). Purpose unknown. (References: Carpenter 1993, EPA 1996)	Lead, concrete	Pb	1	$84,607
	100-D-3 (Silica Gel Burial Site)	Received silica gel from the 115-D/DR drying towers. May also be the site of the 100-D Pluto Crib. Potentially contaminated with radioactive and hazardous materials. Site is in a vegetation-free graveled lot; site dimensions are unknown. (References: Carpenter 1993, EPA 1996)	Soil, silica gel	C-12, radionuclides, inorganic, organic chemicals	477	$213,053

Table NA-1. Action Sites for Remove/Treat/Dispose. (Page 2 of 6)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Volume for Disposal (LCY [a])	Estimated Cost of Site Remediation
100-DR-1 (cont.)	100-D-4 (Sludge Trench near 116-D-7)	Received reactor process effluent containing radioactive and hazardous contaminants from the 116-D-7 (107-D) retention basin during fuel cladding failures. Dimensions unknown. (References: Carpenter 1993, DOE-RL 1992b, WHC 1993)	Soil	Co-60, Cs-137, Eu-152, Eu-155, U-138, Cr VI	8,202	$1,352,450
	100-D-31 (Process Sewer System)	Carried water treatment waste and rainwater runoff to outfall 116-D-5 until 1977. The process sewer drainage was diverted solely to the 120-D-1 D Ponds from 1977 to 1994. Site does not include process sewer for reactor facilities or reactor process effluent. Dimensions unknown. (Reference: WIDS)	Concrete, steel, soil	Cr, Hg, undetermined radionuclides and organic chemicals	5,547	$4,019,263
	116-D-5 (1904-D Outfall Structure)	Received reactor process effluent from the 116-D-7 retention basin from 1944 to 1975. Also received process waste water from 183-D, 184-D, 190-D, 185/189-D, and other miscellaneous facilities. Located 122 m (400 ft) west of the 116-D-7 retention basin on the bank of the Columbia River. The structure is 18.3 x 7.3 m (60 x 24 ft); depth unknown. (References: Carpenter 1993; DOE-RL 1992b, 1994g; EPA 1996; WHC 1993)	Concrete, steel, soil	C-14, Cs-137, Sr-90, U-235, U-238, Pu-239, undetermined inorganic chemicals	1,349	$544,044
	116-DR-5 (1904-DR Outfall Structure)	Received reactor process effluent from the 116-DR-9 retention basin. Located 91 m (300 ft) north of the northwest corner of the 107-D retention basin. Structure is 8.2 x 4.3 m (27 x 14 ft); depth unknown. (References: Carpenter 1993; DOE-RL 1992b, 1994g; EPA 1996; WHC 1993)	Concrete, steel, soil	C-14, Cs-137, Sr-90, U-235, U-238, Pu-239, undetermined inorganic chemicals	322	$278,186
	120-D-2 (186-D Waste Acid Reservoir)	Designated as a waste site because lead flashing was not removed when the facility was demolished in place in 1979. Located at the northeast corner of the 186-D Building; 28 x 28 x 4 m deep (92 x 92 x 14 ft deep) pit constructed of acid-proof brick, waterproof membrane, vitrified pipe, #8 lead flashing, and gunnite. Facility never used (no records found to document use). (References: Carpenter 1993, EPA 1996)	Brick, lead	Pb	7,022	$3,435,363
100-DR-2	100-D-12 (Sodium Dichromate and Acid Unloading Station)	Received sodium dichromate and sulfuric acid solutions in water from flushing and draining of hoses and pipelines connected to railcars and trucks for unloading. Test pits during the 100-DR-2 Limited Field Investigation (LFI) (DOE-RL 1995c, p. D-78) found chromium VI and radionuclides above Hanford Site background. Dimensions unknown. Has adjacent 0.9-m- (3-ft) diameter french drain. (References: Carpenter 1993, DOE-RL 1995c)	Concrete, steel, soil	Cs-137, Eu-152, Th-228, Sulfate, Cr VI	579	$221,499
	116-D-8 (100-D Cask Storage Pad)	Concrete pad and two associated French drains contaminated by radionuclides, potassium borate, and other inorganic chemicals. Dimensions unknown. (References: Carpenter 1993, EPA 1996)	Concrete, steel, soil	Cs-137, Eu-152, Th-228, U-238	5,451	$1,204,367
	116-DR-7 (Inkwell Crib)	Received liquid potassium borate solution contaminated with radionuclides. Site is 1.5 x 1.5 x 3 m deep (5 x 5 x 10 ft deep). One or two 2,082-L (550-gal) storage tanks may also be buried at the site. (References: Carpenter 1993, EPA 1996)	Soil	Cs-137, Eu-152, Th-228, U-238	163	$154,181

Table NA-1. Action Sites for Remove/Treat/Dispose. (Page 3 of 6)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Volume for Disposal (LCY [a])	Estimated Cost of Site Remediation
100-FR-1	116-F-8 (1904-F Outfall Structure)	Received reactor process effluent from the 116-F-14 retention basin. Demolished concrete structure formerly 8.2 x 4.3 x 7.9 m deep (27 x 14 x 26 ft deep). Area is marked with underground radioactive contamination warning signs. Lower part of spillway is exposed and intact. (References: Deford 1994; DOE-RL 1992a, 1994d; EPA 1996)	Concrete, soil, steel	Co-60, Eu-152, Eu-154, Eu-155	402	$331,944
	116-F-15 (108-F Radiation Crib)	Concrete sump in the ground floor of the 108-F Radiobiology Laboratory. Received drainage from lab floor and hood drains. Sump is 0.9 x 0.9 x 0.9 m deep (3 x 3 x 3 ft deep). (References: Deford 1994, Harris 1996)	Concrete, steel	Pu-239, Sr-90, U-238, Pb	2	$85,225
	116-F-16 (PNL Outfall)	Concrete spillway connected to the 116-F-8 Outfall, which received waste water from the 100-F-29 EAF sewers. Most of the spillway has been backfilled, but a portion near the river shoreline is visible. Dimensions are 30.5 x 4.6 m (100 x 15 ft). (References: Deford 1994; DOE-RL 1992a, 1994d; EPA 1996)	Concrete, steel, soil	Sr-90, Cs-137, Pu-239	895	$297,219
	1607-F2 (Septic tank and drain field)	Received sanitary wastes from the 190-F, 105-F, 108-F, and other buildings. Marked with underground radioactive material warning signs. Reinforced concrete septic tank is 8.1 x 3.5 x 4.1 m deep (27 x 12 x 14 ft deep); drain field is 3,107 m^2 (33,408 ft^2). (References: Deford 1994, EPA 1996)	Concrete, tile, pipe, soil	Undetermined radionuclides	24,329	$3,556,835
	1607-F6 (124-F-6 Septic tank and drain field)	Received sanitary sewage from the 146-F and 146-FR Buildings. Site contains of two concrete tanks (each 0.9 m [3 ft] long by 0.9 m [3 ft] diameter), a steel tank 1.9 m (6.25 ft) long by 1.83 m (6 ft) diameter, a drain field, and pipelines. The drain field is 280 m^2 (3,000 ft^2). (References: Deford 1994, EPA 1996)	Concrete, metal, tile, soil	Undetermined organic and inorganic chemicals	2,151	$491,904
100-FR-2	100-F-2 (Strontium Gardens)	PNL ecological study garden formerly used for growing plants in soils containing radionuclides. Site is completely enclosed by a 24 x 9 x 3 m tall (80 x 30 x 10 ft tall) screen structure. (References: Deford 1994; DOE-RL 1995a [Appendix L], 1995c; EPA 1996)	Soil	Cs-137, Sr-90	1,738	$544,863
	120-F-1 (Glass Dump)	Site is an open trench, 10.7 x 2.4 x 1.2 m deep (35 x 8 x 4 ft deep) containing approximately 0.6 m (2 ft) of fluorescent tubes, light bulbs, vacuum tubes, small batteries, and empty chemical bottles. (References: Deford 1994; DOE-RL 1995a [Appendix L], 1995c; EPA 1996)	Debris, soil	Undetermined inorganic chemicals	48	$93,917
100-HR-1	100-H-11 (Expansion Box French Drain E)	The site is a french drain inside a concrete expansion box next to the south wing of the 105-H Reactor. A 1.5-m- (5-ft) diameter effluent line makes a 40-degree turn in the box, and the drain was designed to drain any leaks from the pipe. Dimensions unknown. (References: Deford and Einan 1995, EPA 1996)	Concrete, soil, steel	Undetermined radionuclides	72	$141,487
	100-H-12 (Expansion Box French Drain F)	The site is a french drain inside a concrete expansion box next to the 105-H Reactor. A 1.5-m- (5-ft) diameter effluent line makes a 90-degree turn in the box, and the drain was designed to drain any leaks from the pipe. The manhole access to the box is blocked with lead bricks to shield from a high dose. Dimensions unknown. (References: Deford and Einan 1995, EPA 1996)	Concrete, soil, steel, lead	Pb, undetermined radionuclides	72	$141,487

Table NA-1. Action Sites for Remove/Treat/Dispose. (Page 4 of 6)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Volume for Disposal (LCY [a])	Estimated Cost of Site Remediation
100-HR-1 (cont.)	100-H-13 (French Drain G)	The site is a 1.2-m- (4-ft) diameter vitrified clay pipe with a 6.3-cm (2.5-in.) steel pipe entering from the 105-H Reactor. The purpose of the drain and pipe are not known. (References: Deford and Einan 1995, EPA 1996)	Vitrified clay, steel	Undetermined radionuclides	72	$141,487
	100-H-14 (Surface contamination Zone H)	Surface contamination zone of unknown origin next to the south wall of the 105-H Reactor Building fuel storage basin. Contamination was stabilized with 46 to 61 cm (18 to 24 in.) of soil and marked as subsurface contamination. The source of the contamination and dimensions of the contaminated area are unknown. (References: Deford and Einan 1995, EPA 1996)	Soil	Undetermined radionuclides	1,022	$309,006
	100-H-22 (Effluent Pipeline Leak)	Soil at this site was contaminated by leakage from the 105-H Reactor process effluent pipeline. Sampling in 1971 showed radioactivity of the soil was less than detection levels. Dimensions unknown. (References: Deford and Einan 1995; DOE-RL 1992c, 1993b; EPA 1996)	Soil	Co-60, Eu-152	4,153	$836,181
	100-H-24 (151-H Substation, Laydown Yard)	Sampling of stained soil in 1991 showed polychlorinated biphenyl levels below Toxic Substances Control Act cleanup levels (seven samples). The site is described in WIDS as a demolition landfill from the demolished 151-H electrical substation. Site dimensions are 125 x 84 x 3.4 m deep (410 x 276 x 11 ft deep). (References: DOE-RL 1993b, EPA 1996)	Soil	PCBs	532	$170,704
	100-H-31 (PCB in soil at 105-H Reactor)	Sampling of stained oil in 1991 at this former location of an electrical substation found 1,200 ug/kg of Aroclor-1260 in one soil sample. Dimensions of the waste site are unknown. (References: DOE-RL 1993b, EPA 1996)	Soil	PCBs	72	$140,166
	116-H-5 (1904-H Outfall Structure)	Received H Reactor process effluent for discharge to pipelines to the Columbia River. This site is a former concrete structure that was demolished in place. Dimensions of the structure were 8.2 x 4.3 m (27 x 14 ft); depth unknown. Site is covered with 3 m (10 ft) of soil. (References: Deford and Einan 1995; DOE-RL 1992c, 1993b; EPA 1996)	Concrete, steel, soil	Co-60, Sr-90, Cs-137, Eu-152, Eu-154, Pu-239/240	193	$214,541
	116-H-9 (117-H Crib for drainage of Filter Building Seal Pits)	The site is a gravel-filled crib 6.1 x 6.1 x 4.6 m deep (20 x 20 x 15 ft deep) that received drainage from the 117-H Filter Building seal pits. The drainage entered through an 80-m (263-ft) long 10.2-cm (4-in.) cement-asbestos pipe. Reportedly, the crib received short-lived radionuclides that have decayed. The site was released from radiation controls in 1967, and the 100-HR-1 LFI (DOE-RL 1993b) concluded that the site was "a clean site," but the crib remains listed as a Class V underground injection well. (References: Deford and Einan 1995; DOE-RL 1992c, 1993b; EPA 1996)	Soil, concrete asbestos	Cs-137, Eu-152, Ra-226, Th-228, Th-232, U-238	69	$168,212
	1607-H2 (Septic Tank and Drain Field)	Received sanitary sewage from the 182-H, 183-H, 190-H, and all 1700 maintenance service buildings. Concrete septic tank reported to be 12.2 x 3 x 2.5 m deep (40 x 10 x 8.3 ft deep); drain field is 91.5 x 30.5 m (300 x 100 ft). Septic tank sludge samples showed elevated heavy metal concentrations. (References: Deford and Einan 1995, DOE-RL 1993b, EPA 1996)	Soil, concrete, tile	Ag, As, Ba, Cd, Ar, Cu, Hg, Ni, Pb, Zn, Sulfate, Co-60, Cs-137, Eu-152, Ra-226, Th-228, Th-232	21,722	$3,230,839

Table NA-1. Action Sites for Remove/Treat/Dispose. (Page 5 of 6)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Volume for Disposal (LCY [a])	Estimated Cost of Site Remediation
100-HR-1 (cont.)	1607-H4 (Septic Tank and Drain Field)	Received sanitary sewage from the 181-H River Pumphouse. The size and construction material are unknown; a 1990 ground penetrating radar survey showed underground pipes that ended abruptly, without detecting a septic tank. LFI sampling showed heavy metal contamination around the discharge pipe to the former septic tank. Tank is believed to have been 1.2 x 0.6 x 2.5 m deep (4 x 2 x 8 ft deep). The drain field is believed to be 36 m^2 (384 ft^2). (References: Deford and Einan 1995, DOE-RL 1993b, EPA 1996)	Soil	Ba, Cu, Pb, Zn, Cs-137, Eu-152, Ra-226, Th-228, Th-232, U-233/234, U-238	2,607	$537,296
100-KR-2	100-K-14 (183-KE Acid Neutralization Pit and Overflow French Drain)	Received sulfuric acid overflow from the 183-KE day-use acid tank. The excavation for the drain was 1.5 m (5 ft) wide, 4.6 m (15 ft) deep. It was filled with aggregate to 17.5 cm (7 in.) from the top and covered with a limestone layer 12.5 cm (5 in.) deep. The steel cover of the pit is west of the alum storage tanks, south of the southwest corner of the 183-KE water treatment plant chlorine storage building. (Reference: Carpenter and Cote 1994)	Soil	As, Ba, Cd, Cr, Pb, Hg, Ag, Se, Sulfate	72	$141,942
	100-K-18 (183-KW Caustic Neutralization Pit)	The site is a lined pit used to neutralize caustic solutions before disposal to the process sewer system. The pit is a 2.5 x 2 x 0.9 m deep (8.3 x 6.3 x 3 ft deep) brick-lined concrete box located 2.4 m (8 ft) southwest of the sulfuric acid tank at the 183-KW water treatment plant. (References: Carpenter and Cote 1994, DOE-RL 1994a)	Concrete, brick	As, Ba, Cd, Cr, Pb, Hg, Ag, Se	11	$87,556
	100-K-34 (183-KW Acid Neutralization Pit)	Received sulfuric acid tank transfer and overflow waste for neutralization before draining to the process sewer. The pit is a 2.5 x 2 x 1.5 m deep (8.3 x 6.3 x 5 ft deep) brick-lined concrete box located adjacent to the west outside wall of the 183-KW water treatment plant building and just north of the chlorine storage building. (References: Carpenter and Cote 1994, DOE-RL 1994a)	Concrete, brick	As, Ba, Cd, Cr, Pb, Hg, Ag, Se, Sulfate	16	$90,392
	100-K-53 (100-KE Glycol Underground Pipelines)	Underground 0.5- m- (1.5-ft) diameter steel supply and return pipelines that transported ethylene glycol solutions between the 150-KE heat recovery station (116-KE-5) and the 165-KE Powerhouse. Length of the two parallel pipes is approximately 300 m (1,000 ft) each. (References: Carpenter and Cote 1994, DOE-RL 1992d)	Steel, soil	Ethylene glycol	191	$780,447
	100-K-54 (100-KW Glycol Heat Recovery Underground Pipelines)	Underground 0.5-m- (1.5-ft) diameter steel supply and return pipelines that transported ethylene glycol solutions between the 150-KW heat recovery station (116-KW-4) and the 165-KW Powerhouse. The pipelines originate at 116-KW-4 and end at 165-KW Building north wall. Length of the two parallel pipes is approximately 300 m (1,000 ft) each. (References: Carpenter and Cote 1994, DOE-RL 1994c)	Steel, soil	Ethylene glycol	191	$780,447

Table NA-1. Action Sites for Remove/Treat/Dispose. (Page 6 of 6)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Volume for Disposal (LCY *)	Estimated Cost of Site Remediation
100-KR-2 (cont.)	120-KE-1 (183-KE Filter Water Facility Dry Well)	Received sulfuric acid and sulfuric acid sludge for neutralization before draining to the process sewer system. The site is a brick-lined concrete box 2.5 x 2 x 1.5 m deep (8.3 x 6.3 x 5 ft deep) that contained crushed limestone. During the time this facility operated, sulfuric acid and sludge were contaminated with mercury. Identical to 120-KW-1. (References: Carpenter and Cote 1994, DOE-RL 1994a, EPA 1996)	Soil	As, Ba, Cd, Cr, Pb, Hg, Ag, Se, Sulfate	16	$90,392
	120-KE-2 (183-KE Filter Waste Facility French Drain)	French drain used from 1955 to 1971 for disposal of sulfuric acid sludge removed from sulfuric acid tanks. A 0.9-m- (3-ft) diameter, 1.8-m- (6-ft) long vitrified clay pipe was placed vertically in an excavation 4 m (13 ft) across and 3.4 m (11 ft deep). The bottom 0.3 m (1 ft) of the pipe and bottom 1.5 to 1.8 m (5 to 6 ft) of the excavation were filled with coarse rock. Identical to 120-KW-2. (References: Carpenter and Cote 1994, EPA 1996)	Soil, Clay Pipe	As, Ba, Cd, Cr, Pb, Hg, Ag, Se, Sulfate	122	$150,180
	120-KW-1 (183-KW Filter Water Facility Dry Well)	Received sulfuric acid and sulfuric acid sludge for neutralization before draining to the process sewer system. The site is a brick-lined concrete box 2.5 x 2 x 1.5 m deep (8.3 x 6.3 x 5 ft deep) that contained crushed limestone. During the time this facility operated, sulfuric acid and sludge were contaminated with mercury. Identical to 120-KE-1. (References: Carpenter and Cote 1994; DOE-RL 1994a, 1995a [Appendix K]; EPA 1996)	Soil	As, Ba, Cd, Cr, Pb, Hg, Ag, Se, Sulfate	11	$87,556
	120-KW-2 (183-KW Filter Water Facility French Drain)	French drain used from 1955 to 1971 for disposal of sulfuric acid sludge removed from sulfuric acid tanks. A 0.9-m- (3-ft) diameter, 1.8-m- (6-ft) long vitrified clay pipe was placed vertically in an excavation 4 m (13 ft) across and 3.4 m (11 ft deep). The bottom 0.3 m (1 ft) of the pipe and bottom 1.5 to 1.8 m (5 to 6 ft) of the excavation were filled with coarse rock. Identical to 120-KE-2. (References: DOE-RL 1994a, EPA 1996)	Soil, Clay Pipe	As, Ba, Cd, Cr, Pb, Hg, Ag, Se, Sulfate	122	$150,180
100-IU-6	600-149 (Small Arms Range)	The site was used from the 1940s through the 1950s as a practice range for handguns, rifles, shotguns, machine guns, hand grenades, smoke bombs, and other small arms and incendiary devices. Rubble, wire, lead bullets, and transite piping remnants are scattered about the site. The area containing lead bullets measures approximately 92 x 6 x 1.5 m deep (300 x 20 x 5 ft deep). (References: Deford 1995, DOE-RL 1996)	Soil, lead, transite, misc. debris	Pb	1,278	$278,258
TOTALS					110,504	$30,210,167

NOTE: See Section N5.0 of this appendix for references cited throughout this table.

*LCY = Loose Cubic Yards

Table NA-2. Action Sites for Confirmation Sampling. (Page 1 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-BC-1	100-B-3 (Former Hot Thimble Burial Ground)	Undocumented solid waste site. A highly contaminated vertical thimble was removed from the 105-B Reactor Building in 1952 and temporarily buried in a trench at this site. The thimble was later removed and taken to another burial ground. Radioactive and nonradioactive contaminants may remain in the unlined trench, which was approximately 30 x 7.6 x 6.1 m deep (100 x 25 x 20 ft deep). (References: Carpenter 1994, DOE-RL 1992e, EPA 1996)	Soil	H-3, C-14, Co-60, Sr-90, Cs-137, Eu-152, Eu-154, Cd, Hg, Pb, undetermined organic chemicals	$64,655
	100-B-5 (Effluent Vent Disposal Trench)	Site is result of leakage that occurred at a junction box for reactor effluent pipeline. This site is within the larger "Underground Radioactive Material" area extending the length of the effluent pipeline. The site is about 30 x 3 x 3 m deep (100 x 10 x 10 ft deep). (Reference: Carpenter 1994)	Soil	Undetermined radionuclides, Cr VI	$37,205
	100-B-10 (107-B Basin Leak and Warm Springs)	In February 1949 several warm springs were observed along the Columbia River below the 100-B Area Retention Basin. The springs were attributed to leaks in the 116-B-11 retention basin. Samples of the water in 1949 showed 4 nCi/L beta activity. Dimensions unknown. (Reference: DOE-RL 1992e)	Soil	Undetermined radionuclides, Cr VI	$31,950
	116-B-15 (Cleanout Percolation Pit)	Received treated water from the 105-B Fuel Storage Basin cleanup project. Contaminated water was processed through filters and an ion exchange system before discharge. Site is an open excavated pit 30.5 x 15.2 x 1.8 m deep (100 x 50 x 6 ft deep) with cobble and soil walls. (References: Carpenter 1994, DOE-RL 1992e)	Soil	Co-60, Sr-90, Cs-137, Eu-155, U-238, Cr VI	$35,499
	120-B-1 (Battery Acid Sump)	Site is a concrete-lined sump, cleaned in 1986, immediately adjacent to the 105-B Reactor Building. Sump was formerly used for disposal of waste battery acid, solvents, and ethylene glycol. Dimensions not stated. (References: Carpenter 1994, DOE-RL 1992e, EPA 1996)	Concrete, soil	Cr VI, Pb, Hg, ethylene glycol, undetermined organic chemicals	$50,283
	128-B-2 (100-B Burn Pit No. 2)	Used for burning of nonradioactive, combustible wastes, including office wastes, paint, and chemical solvents. Unlined pit 137.2 x 15.2 x 9.1 m deep (450 x 50 x 30 ft deep). (References: Carpenter 1994, DOE-RL 1992e, EPA 1996)	Soil, concrete, misc. debris	Undetermined organic and inorganic chemicals	$86,276
	132-B-1 (108-B Tritium Separation Facility)	Facility originally designed for mixing and adding chemicals for treatment of reactor cooling water. Later converted to tritium recovery. Building demolished to 3 m (10 ft) below grade; any contaminated rubble left in situ. The site is 45 x 10 m (150 x 32 ft),depth unknown. (References: Carpenter 1994, DOE-RL 1992e, EPA 1996)	Soil, concrete	Tritium (H-3)	$37,631
	132-B-3 (108-B Ventilation Exhaust Stack Site)	Stack and foundation were decontaminated, decommissioned, and demolished using explosives in 1983. Allowable residual contaminant level (ARCL) report calculations predicted 2.2 mrem/yr exposure from a radionuclide inventory of 21 mCi. Burial trench 9.1 x 76 x 5.5 m deep (30 x 250 x 18 ft deep). Trench and rubble covered with clean fill. (References: Carpenter 1994, EPA 1996)	Concrete, steel liner, soil	Undetermined radionuclides	$54,420

Table NA-2. Action Sites for Confirmation Sampling. (Page 2 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-BC-1 (cont.)	132-B-4 (117-B Filter Building)	Building was decontaminated, decommissioned, and demolished in situ. ARCL report calculations predicted less than 1 mrem/yr exposure from a radionuclide inventory of 92 nCi. Rubble was buried from 1 to 5 m deep (3.3 to 16 ft deep) under clean fill. Building was originally reinforced concrete 18.3 x 12 m (59 x 39 ft) and 10.7 m (35 ft) high, with only 2.4 m (8 ft) above grade. (References: Carpenter 1994, EPA 1996, DOE-RL 1993a)	Concrete, soil	H-3, C-14,Sr-90, Cs-137, Pu-239/240	$63,376
	132-B-5 (115-B/C Gas Recirculation Facility)	Building was decontaminated, decommissioned, and demolished in situ. ARCL report calculations predicted 17 mrem/yr exposure. The facility contained vacuum and pressure seal pits and tunnels. The site is 51 x 30 x 3.4 m deep (168 x 98 x 11 ft deep). (References: Carpenter 1994, EPA 1996, DOE-RL 1993a)	Concrete, soil	H-3, C-14, Co-60, Sr-90, Cs-137, Eu-152, Pu-239	$48,608
	1607-B2 (124-B-2 Septic System)	Received sanitary wastes from office buildings, 105-B Reactor, and 190-B Pumphouse. Reinforced concrete septic tank and tile drain field. Top visible, has two steel manhole covers on concrete slab. Site is reported to be 7.6 x 3.5 x 4 m deep (25 x 11.5 x 13 ft deep). Drain field is 90 x 23 m (300 x 75 ft). (References: Carpenter 1994, EPA 1996)	Concrete, soil, steel, tile	Undetermined organic and inorganic chemicals	$52,339
	1607-B7 (124-C-1 Septic System)	Received sanitary sewage from 183-B Water Treatment Plant. Reinforced concrete septic tank and tile drain field. Tank is 1.8 x 1 x 2.5 m deep (6 x 3 x 8 ft deep); drain field is 71 m^2 (768 ft^2). (References: Carpenter 1994, EPA 1996)	Concrete, tile, soil	Undetermined organic and inorganic chemicals	$37,631
100-BC-2	100-B-1[a] (Surface Chemical Dumping Area)	Undocumented solid and liquid waste site and laydown yard. Area approximately 45.7 x 30.5 m (150 x 100 ft) containing several surface dump sites. Depth of contamination unknown. Site reportedly smells of oil and other petrochemicals. Affected soils are vegetation-free. (Reference: Carpenter 1994)	Soil, concrete, miscellaneous debris	Petroleum hydrocarbons; Undetermined organic and inorganic chemicals	$52,943
	100-C-3 (119-C Sample Building French Drain)	Received water coolant from the heat exchanger for the air sampler and effluent from the building swamp cooler and floor drain. Site is a small French drain (approximately 0.6 m [2 ft] diameter) associated with the 119-C Sample Building. (Reference: Carpenter 1994)	Soil, unknown construction materials	Undetermined organic and inorganic chemicals	$38,200
	100-C-7 (183-C Filter Building Demolition Waste)	Building demolished with concrete contaminated with sodium dichromate left in place, along with steam pipe covered with asbestos. Remaining concrete backfilled to minimum of 1 m (3 ft). Site leveled to match existing terrain. Site is 93 x 88 x 3 m deep (305 x 290 x 10 ft deep). (Reference: WIDS)	Concrete, soil, steel, asbestos	Sodium dichromate	$105,800
	116-C-3 (Chemical Waste Tanks)	Two below ground storage tanks which may have never been used. The tanks were installed to receive caustic waste from the metal examination facility and may be filled with water. Both tanks are 3.7 m (12 ft) diameter x 3.7 m (12 ft) deep. (References: Carpenter 1994, EPA 1996)	Steel, soil	Undetermined organic and inorganic chemicals	$45,038

Table NA-2. Action Sites for Confirmation Sampling. (Page 3 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-BC-2 (cont.)	116-C-6 (Percolation Pit)	Received treated water from the 105-C Fuel Storage Basin cleanup project. Contaminated water was processed through filters and an ion exchange system before discharge. Site is an unlined, "L"-shaped, open excavated pit with side lengths of 30.5 m, 30.5 m, 13.7 m, 16.8 m, and 15.2 m; total area of 674 m^2 (side lengths of 100 ft, 100 ft, 45 ft, 50 ft, 55 ft; total area of 7,250 ft^2). (Reference: Carpenter 1994)	Soil	Co-60, Sr-90, Cs-137, Eu-155, U-238, Cr VI	$37,205
	128-C-1 (100-C Burning Pit)	Used for burning nonradioactive combustible materials and disposal of noncontaminated equipment and other solid waste. Site is 68.6 x 38 m (225 ft x 125 ft) and reportedly contains short-lived radionuclides. (References: Carpenter 1994, DOE-RL 1994f)	Soil, concrete, miscellaneous debris	Undetermined organic and inorganic chemicals	$56,583
	132-C-1 (105-C Reactor Stack Burial Ground)	Stack and foundation were decontaminated, decommissioned, and demolished using explosives in 1983. ARCL report calculations predicted 4.4 mrem/yr exposure from a radionuclide inventory of 2.8 millicuries. Site is an unmarked, vegetation-free cobble-covered field 61 m (200 ft) long, 9.2 m (30 ft) wide, and 4.6 m (15 ft) deep. (References: Carpenter 1994, DOE-RL 1994f)	Concrete	Co-60, Sr-90, Cs-137, Eu-154, Pu-238, Pu-239/240	$42,053
	132-C-3 (117-C Filter Building Site)	Building was decontaminated, decommissioned, and demolished in situ in 1988. ARCL report calculations exist. Rubble was buried from 1 to 5 m deep (3.3 to 16 ft) under clean fill. Building was originally reinforced concrete 18 x 12 m (59 x 39 ft) and 10.7 m (35 ft) high, with only 2.4 m (8 ft) above grade. (References: Carpenter 1994; DOE-RL 1994f, 1993c)	Concrete, soil	H-3, C-14, Sr-90, Cs-137, Eu-154, Eu-152, Pu-239/240	$63,376
	1607-B8 (Septic Tank and Drain Field)	Received sanitary sewage from 190-C Pumphouse. 1,325-L (350-gal) steel septic tank and tile drain field. Septic tank dimensions are 1.8 x 0.9 x 2.5 m deep (6 x 3 x 8.3 ft deep). Drain field is 59 m^2 (640 ft^2). (References: Carpenter 1994, EPA 1996)	Steel, tile, soil	Undetermined organic and inorganic chemicals	$37,631
	1607-B9 (Septic Tank and Drain Field)	Received sanitary sewage from 105-C Reactor. 9,085-L (2,400-gal) septic tank and tile drain field. Septic tank dimensions are 4.3 x 0.9 x 2.5 m deep (14 x 3 x 8.3 ft deep). Drain field is 408 m^2 (4390 ft^2). (References: Carpenter 1994, EPA 1996)	Concrete, tile, soil	Undetermined organic and inorganic chemicals	$37,631
	1607-B10 (Septic Tank and Drain Field)	Received sanitary sewage from headhouse of 183-C Water Treatment Plant. 1,325-L (350-gal) steel septic tank and tile drain field. Site dimensions are 4.6 x 9.1 m (15 x 30 ft), depth assumed to be 2.5 m (8.3 ft). Drain field is 59 m^2 (640 ft^2). (Reference: EPA 1996)	Steel, tile, soil	Undetermined organic and inorganic chemicals	$37,631
	1607-B11 (Septic Tank and Drain Field)	Received sanitary sewage from 183-C Filter Building and Pump Room. 1,325-L (350-gal) steel septic tank and tile drain field. Site dimensions are 4.6 x 9.1 m (15 x 30 ft), depth assumed to be 2.5 m (8.3 ft). Drain field is 59 m^2 (640 ft^2). (References: Carpenter 1994, EPA 1996)	Steel, tile, soil	Undetermined organic and inorganic chemicals	$37,631

Table NA-2. Action Sites for Confirmation Sampling. (Page 4 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-DR-1	100-D-8 (105-DR Process Sewer Outfall)	Received waste water from water treatment facilities, including chemical discharges from spills in the treatment facilities. Potential contamination from the 100-D Area Cask Pad storm drains. Site is upstream of the 181-D Pumphouse. Structure was demolished in 1978, and covered to blend with the riverbank appearance. Dimensions unknown. (Reference: Carpenter 1994)	Concrete, soil	Undetermined radionuclides and organic chemicals	$53,126
	100-D-9[a] (Fuel oil tanks for 184-DA boiler house)	Former location of boiler fuel oil tanks removed during decontamination and decommissioning (D&D) of the 184-DA boiler house. Site was excavated in 1994 to confirm tanks removal and determine that no soil contamination existed. Dimensions unknown. (Reference: Carpenter 1994)	Soil	Petroleum hydrocarbons; Undetermined organic and inorganic chemicals	$40,347
	100-D-24 (119-D Sample Building French Drain)	Site drawing H-1-19810 shows an "existing dry well" located south of the 119-D Sample Building (demolished) that received drainage from a floor drain. A 5-cm (2-in) drain pipe 0.9 m (3 ft) below grade connected the building to the dry well. The site is not marked or posted, lies in a cobble-covered field, and cannot be distinguished. Dimensions unknown. (Reference: WIDS)	Soil	Undetermined radionuclides, inorganic and organic chemicals	$54,831
	100-D-30 (Sodium Dichromate Soil Contamination)	Sodium dichromate soil contamination found after demolition of the 190-D Building. Also called 185-D NaCr Trench. Dimensions given are 93 x 1 m (304 x 3.3 ft). Site may be covered with 3 m (10 ft) of clean soil and rubble backfill from 190-D Building demolition. (Reference: WIDS)	Soil	Sodium dichromate	$37,789
	116-D-10 (105-D Fuel Storage Basin Cleanout Percolation Pits)	Received treated water from the 105-D Fuel Storage Basin cleanup project. Contaminated water was processed through filters and an ion exchange system before discharge. After an unplanned release, the two pits were excavated, contaminated soil was removed, and the site surveyed, released, and backfilled. West pit was 10.7 x 6.7 x 0.9 m deep (35 x 22 x 3 ft deep), under the backfill. East pit was 15.2 x 7.3 x 1.2 m deep (50 x 24 x 4 ft deep). (References: Carpenter 1994, EPA 1996)	Soil	Undetermined radionuclides	$37,631
	128-D-2 Burning Pit	Received noncontaminated graphite blocks and other solid wastes during reactor construction. Located about 180 m (600 ft) northeast of the 128-D-1 burn pit. Site is approximately 73 x 73 m (240 x 240 ft). No definite boundaries. Concrete and metallic debris exposed. Currently used to dispose of tumbleweeds. (References: Carpenter 1994, EPA 1996)	Soil, concrete, metals	Undetermined inorganic and organic chemicals	$103,569
	130-D-1[a] (1716-D Gasoline Storage Tank Site)	Former location of a steel underground gasoline storage tank (removed during 1989). Tank was part of the former 1706-D fuel station that operated from 1944 to 1968 and was used for storage of leaded gasoline. After removal of the tank, the site was backfilled without removal of contaminated soil. Dimensions unknown. (Reference: Carpenter 1994)	Soil	Petroleum hydrocarbons; Undetermined organic and inorganic chemicals	$40,347

Table NA-2. Action Sites for Confirmation Sampling. (Page 5 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-DR-1 (cont.)	132-D-1 (115-D/DR Gas Recirculating Facility)	Building was decontaminated, decommissioned, and demolished in situ in 1985-1986. ARCL report calculations exist. Site consisted of a building with vacuum and pressure seal pits and tunnels to the 105-D and 105-DR Reactor Buildings. Site is 51 x 30 x 3.4 m deep (168 x 98 x 11 ft deep). Buried under at least 1 m (3.3 ft) of backfill. (References: Carpenter 1994, EPA 1996, DOE-RL 1994g)	Concrete, metal	H-3, C-14, Co-60, Sr-90, Cs-137, Eu-152, Pu-239	$51,910
	132-D-2 (117-D Filter Building)	Building was decontaminated, decommissioned, and demolished in situ in 1986. ARCL report calculations exist. The site is 18 x 12 x 8.2 m deep (59 x 39 x 27 ft deep). Contaminated rubble is buried a minimum of 1 m (3.3 ft) deep, except for seal pit rubble, which is buried under minimum of 5 m (16.4 ft) clean fill. (References: Carpenter 1994, EPA 1996, DOE-RL 1994g)	Concrete, soil	H-3, C-14, Co-60, Sr-90, Cs-137, Eu-152, Pu-239	$65,934
	132-D-3 (1608-D Waste Water/Effluent Pumping Station)	Building was decontaminated, decommissioned, and demolished in situ in 1986-1987. ARCL report calculations exist. Received water from reactor building drains (primarily fuel storage basin overflows) containing low-level radionuclides and decontamination chemicals. Pumped water from collection pits to 105-D Reactor process effluent pipelines. Site is 6.1 x 6.1 x 9.8 m deep (20 x 20 x 32 ft deep). (References: Carpenter 1994, EPA 1996, DOE-RL 1994g)	Concrete, soil	C-14, Sr-90, Tc-99, Ra-226, U-235, U-238, Pu-239, Am-241, undetermined organic chemicals	$57,391
	628-3 (Burn Pit)	Used for burning of nonradioactive, combustible wastes, including construction debris and chemical solvents. Depression in site center shows signs of severe plant stress and soil discoloration. Site is approximately 76 x 12.2 m (250 x 40 ft) and poorly defined. Site is littered with burned wood, nails, metal pipes, rebar, and glass debris. (References: Carpenter 1994, EPA 1996)	Soil, miscellaneous debris	Undetermined organic and inorganic chemicals, asbestos	$111,596
	1607-D4 (Septic Tank and Drain Field)	Received sanitary sewage from the 115-D/DR Gas Recirculation Building. Reinforced concrete tank is 1.2 x 0.6 m (4 x 2 ft), buried about 2.5 m (8 ft) deep. Tile drain field is 36 m^2 (384 ft^2). (References: Carpenter 1994, EPA 1996, DOE-RL 1994g)	Concrete, tile, soil	Cs-137, Eu-152, undetermined organic and inorganic chemicals	$42,749
	1607-D5 (Septic Tank and Drain Field)	Received sanitary sewage from the 181-D River Pumphouse. Reinforced concrete tank is 1.2 x 0.6 m (4 x 2 ft), buried about 2.4 m (8 ft) deep. Tile drain field is 36 m^2 (384 ft^2). (References: Carpenter 1994, EPA 1996)	Concrete, tile, soil	Undetermined organic and inorganic chemicals	$42,749
	UPR-100-D-1[a] (Oil Soaked Soil)	Site is a small depression 0.6 m (2 ft) in diameter surrounded by oil-soaked soil. Natural vegetation partly obscures the site located east of the former location of the 190-D Building and south of a paved road. (Reference: Carpenter 1994)	Soil	Petroleum hydrocarbons; Undetermined organic chemicals	$34,362

Table NA-2. Action Sites for Confirmation Sampling. (Page 6 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-DR-2	100-D-13 (1607-DR3 Septic Tank and Drain Field)	Received sanitary sewage from temporary construction facilities and overflow from the water towers at 100-D and 100-DR Reactors. Site is described as an Imhoff tank with open pit drain field. Tank is reinforced concrete 8.2 x 3.8 x 7.3 m deep (27 x 13 x 24 ft deep); open pit drain field is 18.2 x 18.2 m (60 x 60 ft). (Reference: Carpenter 1994)	Concrete, soil, pipes	Undetermined radionuclides	$35,499
	100-D-15 (Solid Waste Burial Site/ Borrow Pit)	Received debris and miscellaneous waste described as non-radioactive and non-hazardous, including paint cans, solvent cans, and construction materials. Waste material has been dumped at two locations in a large borrow pit southeast of the 100-DR reactor facilities (Gravel Pit #21). (Reference: WIDS)	Concrete, metal, miscellaneous debris	Undetermined organic and inorganic chemicals	$111,596
	100-D-23 (119-DR Building French Drain)	Site drawing H-1-19810 shows an "existing dry well" that received floor drainage and effluent from evaporative cooler in the 119-D Sample Building (demolished). The site is not marked or posted, lies in a cobble-covered field, and cannot be distinguished. Dimensions unknown. (Reference: WIDS)	Soil	Undetermined radionuclides, inorganic and organic chemicals	$54,831
	100-D-27 (151-D Substation Transformer Leak)	Mineral oil containing less than 50 ppm PCBs leaked from Transformer #A401C at the 151-D electrical substation. The transformer was repaired, and facility was powerwashed, all contaminated material was shoveled into seven 55 gallon drums, and the site backfilled with clean gravel. (Reference: WIDS)	Soil, gravel	PCBs	$40,347
	100-D-28 (190-DR Septic System)	Received sanitary sewage from the 190-DR Building. Described as a 2,725-L (720-gal) steel septic tank and clay tile drain field southwest of 190-DR Building. Tank is 1.8 x 1.8 x 2.5 m deep (6 x 6 x 8.3 ft deep); drain field is 122 m^2 (1,317 ft^2). (Reference: WIDS)	Steel, tile, soil	Undetermined organic and inorganic chemicals	$37,631
	116-DR-8 (117-DR Seal Pit Crib)	Received water contaminated with radioactive wastes from the 117-DR Building containment system and seal pits. Released from radiological controls prior to 1967 (Dorian and Richards [1978]). Located about 76 m (250 ft) south of DR exclusion area fence and directly east of the 118-DR-1 burial ground. Crib is 3 x 3 x 5.2 m deep (10 x 10 x 17 ft deep), buried 1.2 m (4 ft) deep. Facility is registered as an injection well. Operated 1960-1964. (References: Carpenter 1994, EPA 1996, DOE-RL 1995c)	Soil	H-3, C-14	$39,054
	116-DR-10 (105-DR Fuel Storage Basin Cleanout Percolation Pond)	Received treated water from the 105-DR Fuel Storage Basin cleanup project. Contaminated water was processed through filters and an ion exchange system before discharge. In 1984 contaminated soil was removed and site was released using ARCL methodology. Pit has been backfilled and graded to match the terrain of the area. Site is 24.4 x 15.2 m (80 x 50 ft); depth of excavation is unknown. (References: Carpenter 1994, EPA 1996, DOE-RL 1995c)	Soil	Undetermined radionuclides	$35,499
	128-D-1 (100-D/DR Burning Pit)	Used for burning of an estimated 40,000 m^3 of nonradioactive combustible materials such as paint waste, office waste, and chemical solvents. Disposal site was used from 1944-1967. Site was 30.5 x 30.5 x 3 m deep (100 x 100 x 10 ft deep). Radioactively contaminated materials were found at the site in 1951 and removed. (References: Carpenter 1994, EPA 1996, DOE-RL 1995c)	Soil, asbestos, miscellaneous debris	Undetermined radionuclides, inorganic and organic chemicals	$54,286

Table NA-2. Action Sites for Confirmation Sampling. (Page 7 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-DR-2 (cont.)	132-DR-1 (1608-DR Wastewater/ Effluent Pumping Station)	Building was decontaminated, decommissioned, and demolished in situ in 1987. Received water from reactor building drains (primarily fuel storage basin overflows) containing low-level radionuclides and decontamination chemicals. Pumped water from collection pits to 105-DR Reactor process effluent pipelines. Site is 11 x 10.4 x 8.5 m deep (36 x 34 x 28 ft deep). (References: Carpenter 1994, EPA 1996, DOE-RL 1995c)	Concrete, soil	Undetermined radionuclides, organic and inorganic chemicals	$53,553
100-FR-1	100-F-4 (108-F Building 12-in. French Drain)	Vertical 0.3-m- (1-ft) diameter vitrified clay pipe adjacent to south wall of the 108-F Building. A 1.3-cm (½-in.) steel pipe enters the drain from the 108-F Building. No record of dates of operation, waste type, or quantity. (References: Deford 1994, EPA 1996)	Clay and steel pipes	Undetermined organic and inorganic chemicals	$37,205
	100-F-7[a] (1705-F Building Fuel Storage Tank)	Location of a steel underground fuel oil storage tank for the 1705-F Building Heater Room (building was demolished in 1975). It is not known if the tank was removed when the building was demolished. Dimensions unknown. (Reference: Carpenter 1994)	Soil	Undetermined organic and inorganic chemicals	$42,480
	100-F-9 (First French Drain at East End of 105-F Storage Room)	Vertical 0.9-m- (3-ft) diameter concrete pipe buried to unknown depth with upper surface 5 cm (2 in.) above grade. Located adjacent to the northeast corner of the 105-F Miscellaneous Storage Room of the 105-F Reactor. The upper surface is a few inches above grade and is gravel filled. No record of dates of operation, waste type, and quantity. Drain has a 2.5-cm (1-in.) steel pipe coming from the 105-F Building. (Reference: Deford 1994)	Concrete, soil	Undetermined organic and inorganic chemicals	$37,205
	100-F-10 (Second French Drain at East End of 105-F Storage Room)	Vertical 0.9-m- (3-ft) diameter concrete pipe buried to unknown depth with upper surface 5 cm (2 in.) above grade. Located adjacent to the southeast corner of the 105-F Miscellaneous Storage Room of the 105-F Reactor. The upper surface is a few inches above grade and is gravel filled. No record of dates of operation, waste type, and quantity. Drain has a 2.5-cm (1-in.) steel pipe coming from the 105-F Building. (References: Deford 1994, EPA 1996)	Concrete, soil	Undetermined organic and inorganic chemicals	$37,205
	100-F-11 (108-F Building 18-in. French Drain)	Vertical 0.5-m- (1.5-ft) diameter concrete pipe (length unknown) adjacent to northwest corner of the electrical substation on west wall of 108-F Building. No record of dates of operation, waste type, and quantity. The drain surface is a few inches above grade, has no cover, and is filled with gravel. (References: Deford 1994, EPA 1996)	Concrete, soil	Undetermined organic and inorganic chemicals	$37,205
	100-F-12 (36-in. French Drain at 105-F Building)	Vertical 0.9-m- (3-ft) diameter concrete pipe of unknown length standing 5 cm (2 in.) above grade with a steel lid. Located at the northeast corner of the 105-F Reactor. No record of dates of operation, waste type, or quantity. (References: Deford 1994, EPA 1996)	Concrete, steel, soil	Undetermined organic and inorganic chemicals	$37,205
	100-F-16 (108-F Building 30-in. French Drain)	Vertical 0.8-m- (2.5-ft) diameter steel pipe of unknown length adjacent to south wall of 108-F Building east porch. No record of dates of operation, waste type, or quantity. (Reference: Deford 1994)	Steel, soil	Undetermined organic and inorganic chemicals	$37,205

Table NA-2. Action Sites for Confirmation Sampling. (Page 8 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-FR-1 (cont.)	100-F-18 (Former Condensate Tank at 105-F)	Received condensate from the 105-F Fan House and discharged to a drain field. Tank and piping were removed during demolition of the fan house in 1994, but drain field may remain in place. No record of dates of operation, waste type, or quantity. (Reference: Deford 1994)	Steel	Undetermined organic and inorganic chemicals	$49,729
	100-F-23 (141-F Drywell)	Received liquid wastes from the 141-C Building. During removal of the 141-C Building foundation, the adjacent soil was found to be contaminated and removed; the drywell (within 3.5 m [10 ft] of the building) may have been removed at that time. There is no current evidence of a drywell at the site, but the site is located within an area posted as "Underground Radioactive Material." (Reference: WIDS)	Soil	Undetermined radionuclides	$49,714
	100-F-24 (145-F Drywell/ French Drain)	The drywell received liquid animal wastes, and may have been removed or covered with backfill during the demolition of the 145-F Facility, which was buried in place. (Reference: WIDS)	Soil	Undetermined organic and inorganic chemicals	$54,831
	100-F-25 (146-FR Drywells/ French Drains	There is no evidence of drywells or French drains in the area. The units may have been removed or covered with backfill during removal of the nearby 146-FR slab in 1975. No record of dates or operation, waste type, or quantity. (Reference: WIDS)	Unknown	Undetermined organic and inorganic chemicals	$42,749
	100-F-29 (EAF Process Sewer Pipelines)	This unit contains the many process sewer lines at the Experimental Animal Farm site. When the buildings were removed, the underground lines were left in place. The unit excludes the Reactor and Water Treatment effluent lines. (References: Deford 1994, DOE-RL 1992a)	Concrete, clay, metal	I-131, Sr-90, Cs-137, U-235, U-238, Pu-239/240	$108,753
	100-F-31 (144-F Sanitary Sewer System)	The site is the septic system receiving sanitary sewage from the 144-F Building. Site drawings do not indicate if system also received animal wastes with human wastes. The septic system may have been removed during the D&D of 144-F in 1977. (Reference: WIDS)	Soil	Undetermined radionuclides and inorganic chemicals	$39,337
	100-F-33 (1705-F Fish Farm)	May have received unplanned releases of water containing process effluent from the fish ponds. No releases are known, but the ponds were unlined, unreinforced concrete, and they and their piping may have leaked. Water from the ponds was discharged to the PNL Outfall via the 147-F Pumphouse. The pond structures were removed in 1975 and the site backfilled. (Reference: DOE-RL 1992a)	Soil	Undetermined radionuclides	$35,499
	100-F-34 (Biology Facility French Drain)	Believed to have received waste water from the 1705-F Radiobiology Laboratory or Fish Ponds. The site is a 0.7-m- (29-in.) diameter clay pipe, approximately 0.6 m (2 ft) deep. (Reference: WIDS)	Clay pipe, soil	Undetermined organic and inorganic chemicals	$42,749
	116-F-7 (117-F French Drain)	Received drainage from the confinement exhaust systems filter seal pits in the 117-F Building during 1960-1965. Radionuclides received had a short half-life and have decayed until they are no longer of concern. Site was released from radiation zone status. The piping system contained some asbestos-concrete pipes. (Reference: Deford 1994)	Concrete, asbestos, soil, clay	Undetermined radionuclides	$37,205

Table NA-2. Action Sites for Confirmation Sampling. (Page 9 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-FR-1 (cont.)	116-F-12 (148-F French Drain)	Received an estimated 10,000 L of effluent pump prime water from the lift station between 1944 and 1964. Drain is 0.9-m (36-in.) diameter by 1.8-m (6-ft) deep (constructed of clay or concrete pipe). Liquids discharged to the drain percolated into the soil. Contaminants, if any, are unknown. (Reference: Deford 1994)	Concrete, clay, soil	Undetermined organic and inorganic chemicals	$32,656
	128-F-2 (100-F Burning Pit)	Irregularly shaped depression used for burning nonhazardous office waste, vegetation, paint, solvents, and other combustibles. Received some hardware and machinery. The site was buried with clean soil in preparation for drilling test well F5-42 in 1992. Pit was 45.7 x 18.3 x 3 m deep (150 ft x 60 ft x 10 ft deep). (References: Deford 1994, EPA 1996)	Soil	Undetermined organic chemicals	$40,347
	132-F-1 (Chronic Feeding Barn Site)	Feeding Barn was a 455-m^2 (4,900-ft^2) concrete block building with concrete animal pens; main housing facility for sheep and other livestock used in radiological dose studies. The facilities were cleaned out and washed down regularly; drains were connected to sewer 100-F-29. Operated 1950-1980. Demolished sometime after 1980 and buried in place. May still contain residual radiological contamination; there are no records of decommissioning activities. Sampled in 1992 (WHC-SD-EN-TI-128, Rev 0). (References: DOE-RL 1994d, EPA 1996)	Soil, concrete	Sr-90, Cs-137, Pu-239	$44,186
	132-F-3 (115-F Gas Recirculating Facility Site)	Building D&D'd in situ in 1984. ARCL report calculations exist. Dimensions are 53.3 x 30.5 x 4 m deep (175 x 100 x 13 ft deep). The area was covered with clean backfill to an average depth of 2.1 to 2.7 m (7 to 9 ft). Site is now a gravel lot, free of debris. (References: Beckstrom 1984, Deford 1994, DOE-RL 1994d, EPA 1996)	Concrete, metal pipes, soil	H-3, C-14, Co-60, Sr-90, Cs-137	$51,984
	132-F-4 (116-F Reactor Stack Demolition Site)	Stack and foundation were decontaminated, decommissioned, and demolished using explosives in 1983. ARCL report calculations predicted 12.5 mrem/yr exposure using radionuclide assays before decontamination. The burial trench is 61 x 6.1 x 4.6 m deep (200 x 20 x 15 ft deep). Rubble was covered with 1 m (3 ft) of soil. (References: Beckstrom 1984, Deford 1994, EPA 1996)	Concrete	H-3, C-14, other beta and gamma emitting radionuclides	$44,186
	132-F-5 (117-F Filter Building Site)	Received and filtered ventilation air from the work areas of the 105-F Reactor Building and discharged it to the 116-F Stack. Building was decontaminated, decommissioned, and demolished in situ in 1984. ARCL report calculations exist. Rubble was buried under 1 m (3.3 ft) of clean soil. Site dimensions are 18.3 x 12.2 x 8.2 m deep (60 x 40 x 27 ft deep). (References: Deford 1994, EPA 1996)	Concrete	C-14, Co-60, Cs-137, Sr-90, Eu-154, Eu-152	$65,934
	132-F-6 (1608-F Waste Water Pumping Station Site)	Pumped waste water containing trace amounts of low-level radionuclides and decontamination chemicals from drains and sumps in the 105-F Reactor Building into the process effluent pipeline. Dimensions are 15.2 x 15.2 x 10.4 m deep (50 x 50 x 34 ft deep); demolished and buried under 5 m (16 ft) of clean fill. (References: Deford 1994, EPA 1996)	Concrete	H-3, C-14, Co-60, Sr-90, Cs-137, Eu-152, Eu-154, undetermined inorganic chemicals	$57,391

Table NA-2. Action Sites for Confirmation Sampling. (Page 10 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-FR-1 (cont.)	141-C (Large Animal Barn and Biology Laboratory)	This facility was a steel building on a concrete pad, covering 431 m^2 (4,640 ft^2). The building, concrete foundation, footings, and adjacent contaminated soil were removed and disposed of to the 200 Area Burial Ground. Underground pipes were left in place. Fifty soil samples were taken after demolition was completed to demonstrate release under AEC Regulatory Guide 1.86. (Reference: EPA 1996)	Metal pipes	I-131, Sr-90, Cs-137, Pu-239	$42,053
	1607-F3 (124-F-3 Septic System)	Received sanitary sewage from the 182-F Pump Station, 183-F Water Treatment Plant, and 151-F Substation. Reinforced concrete septic tank 2.6 x 1.3 x 3.4 m deep (8.5 x 4.5 x 11 ft deep). The drain field is 244 m^2 (2,624 ft^2). (References: Deford 1994, EPA 1996)	Concrete, clay tile, soil	Undetermined organic and inorganic chemicals	$42,749
	1607-F4 (124-F-4 Septic System)	Received sanitary sewage from the 115-F Gas Recirculation Building. Dimensions of the reinforced concrete septic tank are 1.2 x 0.6 x 2.5 m deep (4 x 2 x 8.3 ft deep). The drain field is 36 m^2 (384 ft^2). (References: Deford 1994, EPA 1996)	Concrete, clay tile, soil	Undetermined organic and inorganic chemicals	$42,749
	1607-F5 (124-F-5 Septic System)	Received sanitary sewage from the 181-F Pumphouse. Dimensions of the reinforced concrete septic tank are 1.2 x 0.6 x 2.5 m deep (4 x 2 x 8.3 ft deep), the drain field is 36 m^2 (384 ft^2). (References: Deford 1994, EPA 1996)	Concrete, clay tile, soil	Undetermined organic and inorganic chemicals	$42,749
	1607-F7 (124-F-7 Septic System)	Received sanitary sewage from the 141-M Building. Dimensions of the septic tank are not known. The drain field is estimated to be 170 m^2 (1,830 ft^2). (References: Deford 1994, EPA 1996)	Unknown	Undetermined organic and inorganic chemicals	$42,749
	UPR-100-F-1 (141-C to 141-M Sewer Line Leak)	Spill of 64,352 L (17,000 gal) of animal pen wash water occurred when a process sewer line from the 141-C Hog Barn plugged and overflowed adjacent to the building in 1971. Spill site, 12.2 x 12.2 m (40 x 40 ft), is located within the permanent protective concrete monuments surrounding the Experimental Animal Farm. (Reference: Deford 1994)	Soil	Sr-90, Pu-239	$35,499
	UPR-100-F-3 (Mercury Spill at 146-F Fish Lab)	Received mercury spilled on the floor of the 146-FR Fish Lab (since demolished). All material was "squeegeed" out the door of the building and was reported to have been cleaned up and removed. Contamination was limited to a 3 x 3 m (10 x 10 ft) area of surface soil near the northeast corner of the building. Building site is now a cobble-covered field. (Reference: Deford 1994)	Soil	Hg	$37,789
100-FR-2	100-F-14 (Vent Pipe)	A 10-cm (4-in.) pipe extends 1 m (3.3 ft) above grade. Ground penetrating radar indicates that the vent is attached to a tank (probably concrete) that received wastes from a nearby demolished carpenter shop. Dimensions unknown. (References: Bergstrom and Mitchell 1995, Deford 1994, EPA 1996)	Metal pipe, concrete	Undetermined organic and inorganic chemicals	$97,381
	100-F-28 (Septic System)	The site is a septic tank and drain field for a small building not near any contaminated facilities. The assumed size of the unit is 18.3 x 18.3 m (60 x 60 ft). (Reference: WIDS)	Unknown	Undetermined organic and inorganic chemicals	$37,631

Table NA-2. Action Sites for Confirmation Sampling. (Page 11 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-FR-2 (cont.)	118-F-4 (Silica Gel Burial Ground; 115-F Pit)	Received 270 kg (0.3 tons) of silica gel from the 115-F dryer rooms. Silica gel was disposed to a small unlined disposal pit 3 x 3 x 4.6 m deep (10 x 10 x 15 ft deep). The site appears as an open, unvegetated cobble field. (References: Deford 1994, EPA 1996)	Soil, silica gel	Undetermined radionuclides, inorganic and organic chemicals	$49,729
	128-F-1 (Burning Pit)	Used for burning nonradioactive, combustible materials such as an paint waste, office waste, and chemical solvents. Burning pit is 30.5 x 30.5 x 3 m deep (100 x 100 x 10 ft deep). Located east of the 126-F-1 Ash Pit . Operated 1945-1965. Site has been backfilled. (References: Deford 1994; DOE-RL 1992a, 1995b; EPA 1996)	Soil, miscellaneous debris	Undetermined organic and inorganic chemicals	$46,325
	128-F-3 (PNL Burning Pit)	Used for burning materials from the Experimental Animal Farm. Shallow pit 30.5 x 30.5 m (100 x 100 ft), 30.5 m (100 ft) east of the 100-F ash pit. Pit was backfilled with coal ash. No records available on materials burned. (References: Deford 1994, EPA 1996)	Ash, soil	Undetermined organic and inorganic chemicals	$54,286
	1607-F1 (124-F-1 Septic System)	Received sanitary sewage from the 1701-F Badge House, 1709-F Fire Station, and 1720-F Administrative Office. The reinforced concrete septic tank is 4.3 x 2.1 x 3.4 m deep (14 x 7 x 11 ft deep). The drain field is 968 m^2 (21,600 ft^2). (References: Deford 1994, EPA 1996)	Concrete, vitrified pipe, soil	Undetermined organic and inorganic chemicals	$37,631
100-HR-1	100-H-3[a] (1716-H Gasoline Storage Tank Site)	Location of a steel underground gasoline storage tank for an automotive service station that operated from 1949-1965. The automotive service area included gas pumps with underground storage tanks and possibly an oil pit. No records could be located to determine whether the fuel tanks have been removed. Dimensions unknown. (Reference: Deford and Einan 1995)	Soil	Petroleum hydrocarbons; Undetermined organic and inorganic chemicals	$42,480
	100-H-4 (1717-H Hot Shop French Drain)	Site of a former maintenance building that was decontaminated and decommissioned in the 1970's. French drain was apparently used for disposal of low-level radioactive materials. Dimensions unknown. (References: Deford and Einan 1995, EPA 1996)	Soil	Undetermined radionuclides and organic chemicals	$53,126
	100-H-7 (French Drain A)	Vertical 0.76-m- (2.5-ft) diameter vitrified clay pipe (length unknown) located 5.5 m (18 ft) east of the 105-H Reactor Building. No record of dates of operation, waste type, or quantity. A 6.3-cm (2.5-in.) steel pipe from the reactor is in line with the drain, suggesting a connection. (References: Deford and Einan 1995, EPA 1996)	Soil, vitrified clay	Undetermined radionuclides	$37,631
	100-H-8 (French Drain B)	Gravel-filled vertical 0.91-m- (3-ft) diameter concrete pipe with a steel cover (length unknown) located 9.1 m (30 ft) east of the 105-H Reactor Building. No record of dates of operation, waste type, or quantity. (References: Deford and Einan 1995, EPA 1996)	Concrete, soil	Undetermined organic and inorganic chemicals	$37,631
	100-H-9 (French Drain C)	Vertical 0.6-m- (2-ft) diameter concrete pipe (length unknown) located 27 m (90 ft) west of the northwest corner of the 105-H Reactor Building. No record of dates of operation, waste type, or quantity. (References: Deford and Einan 1995, EPA 1996)	Concrete, soil	Undetermined organic and inorganic chemicals	$37,631

Table NA-2. Action Sites for Confirmation Sampling. (Page 12 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-HR-1 (cont.)	100-H-10 (French Drain D)	Vertical 1.2-m- (4-ft) diameter vitrified clay pipe with steel lid (length unknown) located 7.6 m (25 ft) north of the 105-H Reactor Building. No record of dates of operation, waste type, or quantity. (Reference: Deford and Einan 1995)	Concrete, soil	Undetermined organic and inorganic chemicals	$37,631
	126-H-2 (183-H Clearwells; Disposal Pit)	Two 228.6 x 41.1 x 5.5 m (750 ft x 135 ft x 18 ft) deep reinforced concrete basins at the site of the former 183-H Water Treatment Facility. The basins were historically used to store clean reactor coolant water. Eastern half currently holds D&D rubble (west half is still intact). Waste from the 183-H Solar Evaporation Basins that was disposed here is suspected of being contaminated with radionuclides. (Reference: Deford and Einan 1995)	Concrete, steel, miscellaneous debris	Undetermined radionuclides and inorganic chemicals	$164,543
	132-H-1 (116-H Reactor Exhaust Stack Burial Site)	Stack and foundation were decontaminated, decommissioned, and demolished using explosives in 1983. ARCL report calculations exist. Low-level smearable contamination was present on concrete at the time of demolition. The burial trench was 67 x 7.6 x 3 m deep (220 x 25 x 10 ft deep). Rubble was covered with 1 m (3 ft) of soil. (References: Deford and Einan 1995, DOE-RL 1995b, EPA 1996)	Concrete	C-14, H-3, Cs-137, Co-60, Eu-152, Eu-154, Eu-155	$44,186
	132-H-3 (1608-H Waste Water Pumping Station Site)	Received waste water containing trace amounts of low-level radionuclides and decontamination chemicals from drains and sumps in the 105-H Reactor Building and pumped these wastes into the process effluent pipeline. Dimensions are 11 x 10.4 x 9.7 m deep (36 x 34 x 32 ft deep), buried under clean fill. (References: Deford and Einan 1995, DOE-RL 1995b, EPA 1996)	Concrete, soil	Pb, undetermined radionuclides	$74,890
100-HR-2	128-H-1 (Burning Pit)	Used for burning nonradioactive, combustible materials such as an paint waste, office waste, and chemical solvents. Burning pit is 91.5 x 91.5 x 3 m deep (300 x 300 x 10 ft deep). Pit has been partially backfilled with soil and ash. Some debris remains at the site. (References: Deford and Einan 1995; DOE-RL 1993d, 1994b; EPA 1996)	Soil, miscellaneous debris	Undetermined organic chemicals	$88,852
	128-H-2 (Burning Pit)	Used for burning nonradioactive, combustible materials such as an paint waste, office waste, and chemical solvents. Burning pit is 52 x 41.2 m (170 x 135 ft), depth unknown. (References: Deford and Einan 1995; DOE-RL 1993d, 1994b; EPA 1996)	Soil	Undetermined organic chemicals	$49,326
	132-H-2 (117-H Filter Building Site)	Received and filtered ventilation air from the work areas of the 105-H Reactor Building and discharged it to the 116-H Stack. Building was decontaminated, decommissioned, and demolished in situ in 1984. ARCL report calculations exist. Site dimensions are 18.3 x 12.2 x 9.6 m deep (60 x 40 x 32 ft deep). Rubble was buried under 5 m (16 ft) of clean fill. The site also includes the original location of the 116-H-4 Pluto Crib, which was excavated in 1960 and moved to a different location. (References: Deford and Einan 1995, DOE-RL 1993d, EPA 1996)	Concrete	H-3, C-14, Co-60, Cs-137, Sr-90, Eu-152, Eu-154, Pu-239/240	$72,331
	1607-H1 (Septic Tank and Drain Field)	Received sanitary sewage from the 151-H and 105-H Buildings at an estimated flow rate of 503 L/day (140 gal/day). The concrete septic tank is 4.6 x 1.7 x 4.4 m deep (15 x 5.5 x 14.5 ft deep); the tile field is reported to be 17.1 x 15.2 m (56 x 50 ft). (References: Deford and Einan 1995, DOE-RL 1994b, EPA 1996)	Concrete, soil, tile	Undetermined organic and inorganic chemicals	$37,631

Table NA-2. Action Sites for Confirmation Sampling. (Page 13 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-KR-2	100-K-13 (Liquid Waste Site [French Drain])	Used for disposal of "gray water" waste during construction activities. Located west of 166-KW oil storage tank. This isolated French drain is 1.5 m (5 ft) in diameter, constructed of concrete, and 0.5 m (1.5 ft) above grade. The french drain is now (1997) covered by a metal caisson to protect it during construction of a nearby facility. (References: Carpenter and Cote 1994; DOE-RL 1994a, 1995a [Appendix K]; EPA 1996)	Soil, concrete	Undetermined organic and inorganic chemicals	$38,411
	100-K-29 (183-KE Sandblasting Site)	Red garnet was used as sandblasting grit at this site to clean steel components from the 183-KE settling basins for painting. An area west of the 183-KE water treatment facility approximately 50 x 30 m (160 x 96 ft) is delineated by the presence of red garnet. (References: Carpenter and Cote 1994, DOE-RL 1994a)	Soil, red garnet sandblast grit	Undetermined organic and inorganic chemicals	$49,745
	100-K-30 (183-KE Sulfuric Acid Tank Site [West])	Site of a horizontal tank that was used for storage of sulfuric acid for water treatment. Unknown when removed. Concrete bases and aboveground piping for the tank remain in place. The site covers an area 10 x 3.7 m (33 x 12 ft). Depth and type of contamination (if any) is unknown. No information is available regarding disposal of sludge that the tank may have contained. (References: Carpenter and Cote 1994, DOE-RL 1994a, EPA 1996)	Soil, concrete	As, Ba, Cd, Cr, Pb, Hg, Ag, Se, Sulfate	$45,038
	100-K-31 (183-KE Sulfuric Acid Tank Site [East])	Site of a horizontal tank that was used for storage of sulfuric acid for water treatment. Unknown when removed. Concrete bases and aboveground piping for the tank remain in place. The site covers an area 10 x 3.7 m (33 x 12 ft). Depth and type of contamination (if any) is unknown. No information is available regarding disposal of sludge that the tank may have contained. (References: Carpenter and Cote 1994, DOE-RL 1994a)	Soil, Concrete	As, Ba, Cd, Cr, Pb, Hg, Ag, Se, Sulfate	$45,038
	100-K-32 (183-KW Sulfuric Acid Tank Site [East])	Site of a horizontal tank that was used for storage of sulfuric acid for water treatment. Unknown when removed. Concrete bases and aboveground piping for the tank remain in place. The site covers an area 10 x 3.7 m (33 x 12 ft). Depth and type of contamination (if any) is unknown. No information is available regarding disposal of sludge that the tank may have contained. (References: Carpenter and Cote 1994, DOE-RL 1994a, EPA 1996)	Soil, concrete	As, Ba, Cd, Cr, Pb, Hg, Ag, Se, Sulfate	$45,038
	100-K-33 (183-KW Sulfuric Acid Tank Site [West])	Site of a horizontal tank that was used for storage of sulfuric acid for water treatment. Unknown when removed. Concrete bases and aboveground piping for the tank remain in place. The site covers an area 10 x 3.7 m (33 x 12 ft). Depth and type of contamination (if any) is unknown. No information is available regarding disposal of sludge that the tank may have contained. (References: Carpenter and Cote 1994, DOE-RL 1994a, EPA 1996)	Soil, concrete	As, Ba, Cd, Cr, Pb, Hg, Ag, Se, Sulfate	$45,038
	100-K-35 (183-KE Acid Neutralization Pit)	Received sulfuric acid tank transfer and overflow waste for neutralization before draining to the process sewer. The pit is a 2.5 x 2 x 1.5 m (8.3 x 6.3 x 5 ft) deep brick-lined concrete box located adjacent to the west outside wall of the 183-KE water treatment plant building and just north of the chlorine storage building. (References: Carpenter and Cote 1994, DOE-RL 1994a)	Concrete, brick	As, Ba, Cd, Cr, Pb, Hg, Ag, Se, Sulfate	$39,921

Table NA-2. Action Sites for Confirmation Sampling. (Page 14 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-KR-2 (cont.)	100-K-36 (1706-KE Chemical Storage Facility Dry Well)	Received spillage from transfer of sodium hydroxide and sulfuric acid at the 1706-KE Chemical Storage Facility. The French drain consists of a 0.5 m (18 in) diameter, 1.2 m (4 ft) long vitrified clay pipe. A white crystalline material, believed to be sodium carbonate, can be seen on the drain, which is located east of the 1706-KE Building. (References: Carpenter and Cote 1994, DOE-RL 1994a)	Soil, vitrified clay pipe	Undetermined organic and inorganic chemicals	$38,200
	100-K-46 (119-KE French Drain)	Received sample waste, janitorial waste, and drainage from the evaporative cooler for the 119-KE Sample Building. The 0.3 m (1 ft) diameter French drain was covered with crushed rock after removal of the 130-KE-1 Emergency Diesel Oil Storage Tank. Located about 8 m (24 ft) east of the 105-KE Reactor Building and 3 m (10 ft) south of the 119-KE Sample Building. (References: Carpenter and Cote 1994, DOE-RL 1994a, EPA 1996)	Soil, vitrified clay pipe	Undetermined organic and inorganic chemicals; possible radionuclides	$42,749
	100-K-48[a] (100-KE Oil Contamination Areas)	Site of Bunker C fuel oil spillage from rail car off-loading procedures at the 130-KE-2 (166-KE) oil storage tank. The oil has been absorbed by soil and sand forming a hard asphalt-like covering on the surface.	Soil	Petroleum hydrocarbons; undetermined organic chemicals	$88,852
	100-K-49[a] (100-KW Oil Contamination Areas)	Site of Bunker C fuel oil spillage from rail car off-loading procedures at the 130-KW-2 (166-KW) oil storage tank. The oil has been absorbed by soil and sand forming a hard asphalt-like covering on the surface.	Soil	Petroleum hydrocarbons; undetermined organic chemicals	$88,852
	120-KE-3 (183-KE Filter Water Facility Trench, 100-KE-3)	Received sulfuric acid sludge from sulfuric acid storage tanks; sludge contained mercury. The sludge has been removed. The trench was 12.2 m (40 ft) long by 0.9 m (3 ft) wide and 0.9 m (3 ft) deep and lined with sand to allow the sludge water slurry to drain. Operated 1955-1970. (References: Carpenter and Cote 1994; DOE-RL 1994a, 1995a [Appendix K]; EPA 1996)	Soil	As, Ba, Cd, Cr, Pb, Hg, Ag, Se, Sulfate	$32,656
	120-KE-6 (183-KE Sodium Dichromate Tank)	Site of a vertical steel tank 5.8 m (19 ft) in diameter that was used for storage of sodium dichromate solution for water treatment at 183-KE. Unknown when removed. Concrete base and piping for the tank remain in place. No known releases, but residual dichromate possible in soil from years of loading and handling. Operated 1955 to 1971. (References: Carpenter and Cote 1994, DOE-RL 1994a, EPA 1996)	Soil, concrete	Cr	$39,921
	120-KW-5 (183-KW Sodium Dichromate Tank)	Site of a vertical steel tank 5.8 m (19 ft) in diameter that was used for storage of sodium dichromate solution for water treatment at 183-KW. Unknown when removed. Concrete base and piping for the tank remain in place. No known releases, but residual dichromate is possible in the soil because of years of loading and handling. Operated 1955 to 1971. (References: Carpenter and Cote 1994, DOE-RL 1994a, EPA 1996)	Soil, concrete	Cr	$39,921

Table NA-2. Action Sites for Confirmation Sampling. (Page 15 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-KR-2 (cont.)	130-K-2[a] (1717-K Waste oil storage tank)	Site of a former underground tank that stored used motor oil. Tank was removed in July 1989. No evidence was found to indicate leakage from the tank, as reported in logbook WHC-N-270. Location is adjacent to the 1717-K Building. Operated 1955-1972. (References: Carpenter and Cote 1994, DOE-RL 1994a, EPA 1996)	Soil	Petroleum hydrocarbons; undetermined organic chemicals	$103,067
	130-KE-1 (105-KE Emergency Diesel Oil Storage Tank)	Site of two 7,571-L (2,000-gal) emergency diesel oil storage tanks that were removed in 1992. No evidence of leakage was found. However, insulating material covering the tank exteriors showed detectable radioactive contamination when removed. The contaminated insulating material was disposed with the tanks. Location is adjacent to the 105-KE Reactor ventilation stack. Operated 1955 to 1971. (References: Carpenter and Cote 1994, DOE-RL 1994a, EPA 1996)	Soil	Undetermined radionuclides	$49,303
	130-KW-1 (105-KW Emergency Diesel Oil Storage Tank)	Site of two 7,571-L (2,000-gal) emergency diesel oil storage tanks that were removed in 1992. No evidence of leakage was found. However, radioactive contamination was discovered on the exterior of the tanks. The tanks were disposed as contaminated. The site was cleaned and closed under the Underground Storage Tank Program (no radioactivity was left at the site). Location is adjacent to the 105-KW Reactor ventilation stack. Operated 1955 to 1970. (References: Carpenter and Cote 1994, DOE-RL 1994a, EPA 1996)	Soil	Undetermined radionuclides	$49,303
	600-29 (100-K Construction Laydown Area)	46-acre site used as the laydown area for the construction of 105-KE Reactor during 1952-1954. Site contains surface chemical dumping areas with oil-stained soil and distressed vegetation.. (Reference: Carpenter and Cote 1994)	Soil	Undetermined organic chemicals	$241,663
	UPR-100-K-1 (105-KE Fuel Storage Basin Leak)	Received water leaking from cracks in the 105-KE Reactor Fuel Storage Basin. The water is contaminated with radionuclides from accumulated sludge and leaking fuel elements in the Fuel Storage Basin. (References: Carpenter and Cote 1994, DOE-RL 1994a, EPA 1996)	Soil	H-3, C-14, Co-60, Sr-90, Cs-137, Eu-152, Eu-154, U-235, U-238, Pu-238, Pu-239/240	$37,205
100-IU-2	600-5[a] (Waste Oil Dump, Asphalt Heliport)	The site is a circular area of heavy oil or asphalt about 4.6 m (15 ft) in diameter, and a ditch covered with similar material about 7.6 m (25 ft) long, 37 cm (15 in.) wide, and 2.5 cm (1 in.) deep. A 10-cm- (4-in.) diameter pipe is in the center of the pad and flush with the surface. Homestead-type trash is scattered in the area. (References: Carpenter 1995, DOE-RL 1996)	Soil	Petroleum hydrocarbons; undetermined organic chemicals	$40,347
	600-52 (White Bluffs Surface Basin)	This site is a depression, 85 by 40 m (280 by 130 ft), adjacent to the pickling acid crib. Material in the crib may have washed into the depression, although previous sampling in the depression for the pickling acid crib ERA showed no contaminants at levels of concern. The depression may have also been used as a surface drain field for the While Bluffs Ice House. Some demolition debris is in the area. (References: Carpenter 1995; DOE-RL 1996, 1993e)	Soil	Cr, Zn	$59,792

Table NA-2. Action Sites for Confirmation Sampling. (Page 16 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-IU-2 (cont.)	600-99 (J.A. Jones #2)	The site contained minor construction debris used by the J.A. Jones construction company, including wood, concrete, and metals. The site was exhumed and contents taken to a 200 Area burial ground in 1971. The dimensions are 9.1 x 9.1 m (30 x 30 ft). (References: Carpenter 1995, DOE-RL 1996)	Soil	Undetermined organic and inorganic chemicals	$42,480
	600-120 (Spare Parts Burn Pit)	The site is a burn pit that was used for industrial and commercial wastes, and has been backfilled with coal ash. Dimensions unknown. (References: Carpenter 1995, DOE-RL 1996)	Ash, soil	Undetermined organic and inorganic chemicals	$97,381
	600-124 (Burn Site and Paint Disposal Area)	The area is littered with debris, such as burned wood, roofing materials, glass, nails, chips of dried paint, and paint cans. (References: Carpenter 1995, DOE-RL 1996)	Soil, miscellaneous debris	Undetermined organic and inorganic chemicals	$111,596
	600-127[a] (Fuel Storage Area)	A low soil berm ~ 55 x 35 m (182 x 116 ft) surrounds two loading docks. The soil is covered by a layer of coal ash. Fuel storage tanks may have been held in this area. The soil under the coal ash and adjacent to the berm is discolored, probably from petroleum contamination (oils and gasoline). (References: Carpenter 1995, DOE-RL 1996)	Soil, ash	Petroleum hydrocarbons; Undetermined organic chemicals	$49,326
	600-128[a] (Oil and Oil Filter Dump Site)	The site, about 2 m (6.6 ft) in diameter, contains oil and oil filters. (References: Carpenter 1995, DOE-RL 1996)	Soil	Petroleum hydrocarbons; Undetermined organic chemicals	$40,347
	600-131 (Special Fabrication Shop and Warehouse)	The site is the remnants of a fabrication shop, boilerhouse, warehouse, loading dock/well, and water station. The area is graveled and littered with debris. Solvents and oils were typically used in similar facilities. (References: Carpenter 1995, DOE-RL 1996)	Concrete, soil, transite, miscellaneous debris	Undetermined organic and inorganic chemicals	$103,067
	600-132 (Construction Contractor Shop Landfill)	This site is a large (~165 x 112 m [545 x 370 ft]) open-pit landfill that was contaminated and cleaned out. A notation in an old logbook suggests a potential for radioactive wastes (source unknown), but it is unknown if additional characterization work was done. Another employee reported that the site was used for disposal of oils and solvents. (References: Carpenter 1995, DOE-RL 1996)	Soil	Undetermined radionuclides, inorganic and organic chemicals	$128,060
	600-135 (Spare Parts Machine Shop Landfill and Pit)	Two pits make up this site; one is a borrow pit later used for waste disposal (unknown wastes) and partly backfilled. The purpose of the second pit (~90 x 40 m [300 x 130 ft]) is unknown. (References: Carpenter 1995, DOE-RL 1996)	Soil, miscellaneous debris	Undetermined organic and inorganic chemicals	$128,654

Table NA-2. Action Sites for Confirmation Sampling. (Page 17 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-IU-2 (cont.)	600-139[a] (Automotive Repair Shop)	The site has scattered debris, such as battery caps, gaskets, oil stains, and lenses from tail lights. Dimensions are about 30 x 20 m (100 x 66 ft). (References: Carpenter 1995, DOE-RL 1996)	Soil, miscellaneous debris	Petroleum hydrocarbons; Undetermined organic chemicals	$42,480
	600-176 (White Bluffs Paint Disposal Area)	Excess paint materials were disposed of by dumping them on the ground. Dried paint chips remain at the site. (References: Carpenter 1995, DOE-RL 1996)	Soil, paint chips	Undetermined organic chemicals	$103,067
	600-181[a] (White Bluffs Oil Dump)	A large quantity of oils have been dumped on the surface in an area about 17 x 15 m (56 x 50 ft). (References: Carpenter 1995, DOE-RL 1996)	Soil	Petroleum hydrocarbons; Undetermined organic chemicals	$40,347
	600-188 (White Bluffs Waste Disposal Trench 2)	The site is an open trench with industrial wastes filling about one-third of the trench. Empty 208-L (55-gal) drums and discolored soil remain in the 90 x 40 m (300 x 132 ft) site. (References: Carpenter 1995, DOE-RL 1996)	Soil, miscellaneous debris	Undetermined organic and inorganic chemicals	$70,027
	600-189 (White Bluffs Warehouse Facility French Drains)	Two French drains remain in a former warehouse area. The area contains debris and evidence of oil or chemical dumping. The French drains may have received storm water runoff from the warehouses. (References: Carpenter 1995, DOE-RL 1996)	Soil	Undetermined organic and inorganic chemicals	0$48,577
	600-190 (White Bluffs Warehouse Tar/ Paint Disposal Area)	Tar and paints appear to have been dumped at the site. The site also contains warehouse sites and associated french drains, concrete foundations, valve boxes, and miscellaneous debris. (References: Carpenter 1995, DOE-RL 1996)	Soil, concrete, debris	Undetermined organic chemicals	$103,067
	600-199 (White Bluffs Ash Covered Concrete Pad)	A concrete foundation pad has been covered with coal ash. (References: Carpenter 1995, DOE-RL 1996)	Concrete, ash	Undetermined organic and inorganic chemicals	$94,538
	600-201 (White Bluffs Paint and Solid Waste Disposal Site)	The site contains miscellaneous debris such as glass, metal shavings, canvas, and dried paint. (References: Carpenter 1995, DOE-RL 1996)	Soil, miscellaneous debris	Undetermined organic chemicals	$103,067
	628-1 (White Bluffs Burn Pit)	Approximately 1/4 acre has stressed vegetation. The burn pit is covered with sand and gravel. (References: Carpenter 1995, DOE-RL 1996)	Soil	Undetermined organic chemicals	$43,340

Table NA-2. Action Sites for Confirmation Sampling. (Page 18 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-IU-6	600-3 (Hanford Townsite Dumping Area and Paint Pit)	The site is an old borrow pit, and a large (~490 x 280 m [1,600 x 925 ft]) area of scattered trash. Bulldozer tracks indicate an attempt to bury trash. Parts of the area show signs of burning and stressed vegetation. The site may have been used as railroad maintenance shop disposal yard. (References: Deford 1995, DOE-RL 1996)	Soil, asbestos miscellaneous debris	Undetermined organic and inorganic chemicals	$204,704
	600-107 (Cribs at 213-J&K Gable Mtn Plutonium Storage Vaults)	Two small (2.4 m [8 ft] diameter, 4.6 m [15 ft] deep) gravel-filled concrete culverts on either side of the 213-J and K storage vaults were dug up in 1974 to allow a radiological survey. No contamination was found above background limits, and the excavated material was backfilled. (References: Deford 1995, DOE-RL 1996)	Concrete, soil	Undetermined radionuclides	$37,631
	600-108 (213-J and K Gable Mtn Plutonium Storage Vaults)	The reinforced concrete facility was constructed into the side of Gable Mountain. The vaults are used for soil sample storage and seismic testing. The unit is 12.2 x 3.7 x 2.4 m deep (40 x 12 x 8 ft deep). If the vaults were used to store plutonium at all, it is thought to have been only briefly. However, explosives and hardware contaminated with radioactive sodium were stored there. No smearable radioactivity was detected, and the site has been released from radiation zone status. (References: Deford 1995, DOE-RL 1996)	Concrete	Undetermined radionuclides	$42,053
	600-111 (P-11 Critical Mass Laboratory)	The 2.4 x 2.4 m (8 x 8 ft) facility had concrete walls, cover, and base. It was retired in 1951 after a fire in the adjacent 120 Building caused structural damage. The facility was exhumed in 1974. It had received plutonium waste from the 120 Building. A 3.7-m (12-ft) steel pipe rising from a concrete slab remains at the site. (References: Deford 1995, DOE-RL 1996)	Concrete, soil	Undetermined radionuclides	$44,186
	600-202 (Four Burn and Burial Pits)	Four burn and burial pits are arranged in a rectangle, 150 x 75 x 6 to 12 m deep (500 x 250 x 20 to 40 ft deep). Miscellaneous debris, including glass, metal, and porcelain, are evident at the site. (References: Deford 1995, DOE-RL 1996)	Soil, miscellaneous debris	Undetermined organic chemicals	$152,815
	600-204 (Hanford Townsite Burn and Burial Trench)	The site was used as a burn pit and possibly burial ground. Miscellaneous debris (metal and glass fragments, fire-scarred rock, and cans) is scattered in the bottom. Site dimensions are approximately 45.8 x 6.1 x 1.2 m deep (150 x 20 x 4 ft deep). (References: Deford 1995, DOE-RL 1996)	Soil, miscellaneous debris	Undetermined organic chemicals	$42,480
	600-208 (Hanford Construction Camp Boiler House Ponds)	These are liquid waste disposal ponds serving the steam plants for the Hanford Construction Camp. The wastes in the water would have been "industrial and commercial wastes common to the period," which was considered to be mostly water softener brine. The dimensions of the ponds are 18.3 x 6.1 x 1.5 m deep (60 x 20 x 5 ft deep). (References: Deford 1995, DOE-RL 1996)	Soil	Undetermined organic and inorganic chemicals	$32,656

Table NA-2. Action Sites for Confirmation Sampling. (Page 19 of 19)

Operable Unit	Site Name	Current Site Knowledge	Media/ Material	Potential Contaminants	Estimated Cost of Confirmation Sampling
100-IU-6 (cont.)	UPR-600-16 (Fire and Contamination Spread)	A fire spread plutonium contamination; in 1974 the site was exhumed and released from radiation zone status. The dimensions provided are 55 x 30.5 m (180 x 100 ft). (References: Deford 1995, DOE-RL 1996)	Soil	Plutonium	$48,608
TOTAL					$8,092,503

NOTE: See Section N5.0 of this appendix for references cited throughout this table.

*This site is a petroleum site that is being remediated to cleanup standards established in the *Model Toxics Control Act* Cleanup Regulations (WAC 173-340) and is outside the CERCLA remedy selection process. It is anticipated that this site can be remediated by the Remove, Treat, and Dispose Alternative. However, should petroleum be found at depth in the soil or in groundwater, other remedial alternatives may be selected by the EPA, Ecology, and the DOE.

ATTACHMENT NB

COST ESTIMATE SUMMARIES

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ACRONYMS

bcf	bank cubic foot
COPC	contaminant of potential concern
CS	confirmation sampling (sites)
ERDF	Environmental Restoration Disposal Facility
HP	Health Physics
HPT	Health Physics Technican
LCY	loose cubic yard
lf	linear foot
LLW	low-level waste
MCACES	Micro Computer Aided Cost Estimating System
PM/CM	Project Management/Construction Management
RTD	remove, treat, dispose (sites)

ATTACHMENT NB
COST ESTIMATE SUMMARIES

NB1.0 INTRODUCTION

This attachment presents the methods used to develop the cost models in support of the Remedy Selection Process for Remaining 100 Area Source Operable Unit Waste Sites, as presented in Attachment NA (this document). The models are then used to generate cost estimates for work associated with this document. The estimates are included as attached Tables NB-1 through NB-3.

Two approaches were used to develop cost estimates for the two types of remedies for remaining sites requiring action: (1) remove, treat, dispose (RTD) sites, and (2) confirmation sampling (CS) sites. The RTD site estimates used the Micro Computer Aided Cost Estimating System[1] (MCACES) estimating model, revised to include all costs associated with the remediation with the exception of remedial design costs. The CS site estimates used an estimating model calculated in a Microsoft® Excel™ spreadsheet. Both models are explained in detail in Section NB2.0.

NB2.0 COST ESTIMATE MODELS

NB2.1 REMOVE, TREAT, AND DISPOSE SITES

Remediation costs for the RTD sites were estimated using the MCACES models. The estimated costs for each remedial action work activity for each operable unit are summarized in an Excel spreadsheet (Tables NB-1 and NB-2). Remediation estimates for 43 waste sites in 11 operable units were calculated.

Each RTD site was estimated with an excavation model tailored to a specific subsurface configuration. The various excavation models available in MCACES are:

1. Burial Ground (Small, Medium to Large)
2. Crib/French drain (Small, Medium, and Large)
3. Trench (Small, Medium, and Large)
4. Septic Tank
5. Below grade structure (Small and Medium)
6. Reactor Area Piping (Large).

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[1] Building Systems Design, Inc. (BSD), 1175 Peachtree St., 100 Colony Square, Suite 1600, Atlanta, Georgia 30361-6205

Each RTD site was estimated with the most appropriate of the six models, based on waste site type and site-specific data. Site size categories are as follows:

Small <4,356 SF
Medium 4,357 SF to 87,120 SF
Large >87,120 SF

NB2.1.1 Summary of Model Input Parameters

The major quantity inputs necessary to support the model calculations are as follows:

- Type of site (per Section NB2.1)
- Length, width, and depth of waste site in linear feet (lf)
- Contaminated, uncontaminated, and demolition waste volume in bank cubic feet (bcf)
- Haulage distance for contaminated waste and borrow material.

NB2.1.2 Assumptions Used in Excavation Models

The assumptions used in the MCACES excavation models include the following:

- The model calculations include excavation, sampling, monitoring of the excavation, backfill, and site restoration.
- All contaminated material is assumed to be low-level waste (LLW).
- Field monitoring samples will be collected for every 200 loose cubic yards (LCY) excavated.
- All samples will be analyzed onsite. An additional 5% for quality assurance (QA)/quality control (QC) samples will be analyzed offsite.
- Material will be transported to the Environmental Restoration Disposal Facility (ERDF) in maximum individual loads of 15 LCY each.
- The transport and disposal rate of $53.08/LCY was calculated by the ERDF Subproject based on actual ERDF costs. This cost does not include ERDF life cycle capitol costs.
- Estimates include QA, Safety, project and construction management, and Health Physics (HP) oversight by the ERC team.

NB2.1.3 MCACES Model Details

The MCACES models for excavation calculate 25 quantities from the inputs and use these to price all resources required to setup, sample, excavate, and restore each waste site. The models estimate total base cost plus Bechtel Hanford, Inc. markups and contingency. The following are fixed values used in the models to compute the estimates.

- Soil swell factor - 15%
- Demolition waste swell factor - 60%
- Uncontaminated soil excavation rate
  Small - 56 LCY/hr (the Burial Ground model uses 77 LCY/hr)
  Medium - 112 LCY/hr (the Burial Ground model uses 154 LCY/hr)
  Large - 224 LCY/hr (the Burial Ground model uses 154 LCY/hr)
- Contaminated soil excavation rate
  Small - 37 LCY/hr (the Burial Ground model uses 20 LCY/hr)
  Medium - 70 LCY/hr (the Burial Ground model uses 40 LCY/hr)
  Large - 140 LCY/hr (the Burial Ground model uses 40 LCY/hr)
- Demolition waste excavation rate - 12 LCY/hr (the Burial Ground model uses 16 LCY/hr)
- Sample analysis cost for on-site mobile lab - $400.00/Sample
- Sample analysis cost for off-site lab - $2,000/Sample
- Costs for mobilization/demobilization of non-site specific support facilities (e.g., office trailer, installation of power and telephone) are not included in the site-specific estimates. These costs are estimated to be $153,460 per mobilization/demobilization for each of the five areas in which extensive work will be performed.

The required resources are calculated using these inputs, and the resource quantities are priced according to the rate tables provided with MCACES. The MCACES models estimate all costs including applicable overhead charges and a contingency of 15.7%. Results of this estimating procedure are discussed in Section NB3.0.

NB2.2 CONFIRMATION SAMPLING SITES

Cost estimates for the CS sites were evaluated with an Excel spreadsheet model. Estimates for 142 waste sites in 11 operable units were calculated, and the results are listed in Table NB-3. The following describes the basis for this approach.

Several of the calculations are dependent on the character of the wastes thought to be at the site. Predominantly liquid waste sites follow the sampling strategy presented in the approved Sampling and Analysis Plan for the 100 Areas (DOE/RL-96-22). The non-liquid waste site approach is described in Section 2.1.3.

NB2.2.1 Summary of Model Input Parameters

The quality and quantity of information available for the CS sites varies greatly. The most complete information to date is summarized in the Waste Information Database System (WIDS) and other sources, and presented in Tables NA-1 and NA-2 (this document). Information pertinent to this cost estimate includes:

- Dimensions of the site (length, width, depth)
- General character of the waste (liquid or solid)
- Contaminants of potential concern (COPCs).

Where data regarding location or dimensions of a site are poor or nonexistent, certain assumptions were necessary to arrive at a sampling basis for the site. These are discussed below. The estimate includes funding for a geophysical survey of the site if essential information is lacking.

NB2.2.2 Confirmation Sampling Site Model Details

The following describes the basic formulae used in the calculations. Confirmation Sampling Site model estimates are presented in Section NB3.0.

NB2.2.2.1 Area of Waste Site. The calculation of area is straightforward except where data are lacking. In these cases, liquid waste sites are assumed to be $\leq$10,000 ft^2 (930 m^2), and non-liquid waste sites are assumed to be >85,000 ft^2 (7,900 m^2). These assumptions have a direct bearing on number of samples necessary for confirmation, as discussed in the following.

NB2.2.2.2 Number of Samples. Calculation of the number of samples necessary to confirm each site follows two different procedures, depending if the site is predominantly a liquid disposal site or a non-liquid site.

For liquid waste sites, which includes french drains and septic tanks, the sampling scheme follows the approved Sampling and Analysis Plan for the 100 Areas (DOE-RL 1996). This plan calls for the waste site to be divided into 10,000-ft^2 units. Four composite samples of four sub-samples (aliquots) each will be collected from each unit. The four sample locations are chosen randomly, and four vertical samples at each location are collected and composited. The default value of four samples is assigned to waste sites whose dimensions are unknown, because most liquid waste sites are french drains or similar structures with areas $\leq$10,000 ft^2. This value is used for estimating purposes only; the sites with a paucity of historical information will be surveyed before sampling is performed to more accurately define the boundaries.

For non-liquid waste sites the sampling strategy follows an alternative statistical method. A minimum of 6 and a maximum of 20 samples will be collected from each site, dependent on total area. Six samples will be collected from sites that are $\leq$10,000 ft^2 in area. Above this size, the following statistical formula is used to determine the number of samples:

$$n = (Z_{1-\alpha/2}\eta/d_r)^2$$

where:

n = number of samples

$Z_{1-\alpha/2}$ = standard normal deviate that cuts off $(100\alpha/2)\%$ of the upper tail of the standard normal distribution

η = the coefficient of variation, = standard deviation/mean

d_r = relative error, $(|x-\mu|/\mu)$, where x is the estimated mean and μ is the true mean.

This formula is used where a reliable estimate of the standard deviation is not available, as discussed in Gilbert (1987, p. 33). The coefficient of variation is used because it is usually less variable than the standard deviation. Because no analytical data are available for these sites, some assumptions are necessary. These assumptions are as follows:

- The coefficient of variation, η, equals 0.5 for smaller sites, and is calculated to increase by 10% as the area doubles over10,000 ft^2. This is to account for the expected increase of variability as the area increases.

- The relative error, d_r, equals 0.25

- The confidence level, $1-\alpha$, equals 20%.

With these assumptions, the number of samples, n, is based on a 20% chance of getting a set of data for which the relative error exceeds 25% for smaller sites. The same statement holds for larger sites, but because the coefficient of variation will be larger (e.g., 0.6 for a 30,000-ft^2 site), the number of samples will be greater.

Using the above formula and parameters, the maximum number of samples (20) corresponds to a surface area of approximately 85,000 ft^2. On this basis, waste sites with unknown dimensions are assigned a total surface area of >85,000 ft^2.

NB2.2.2.3 Cost of Analyses. Analytical costs are based on the number of samples and the COPCs. Costs per sample were based on six samples in the delivery group with a 45-day

turnaround time. Individual sample costs would be expected to decrease with a larger total number of samples. Analytical costs used in the spreadsheet are as follows, based on current laboratory rates for a group of six samples and standard (45-day) turnaround time:

Radionuclides (α- and γ-spec):	$800
Organics (volatile organic analysis and semivolatile organic analysis):	$600
Metals:	$300

NB2.2.2.4 Site Survey. For sites with poorly known or unknown dimensions or subsurface detail, a geophysical investigation will be necessary to define the sampling effort and support closeout. Costs of this survey are a minimum of $1,500 for areas <10,000ft^2. For larger sites, $0.05/ft^2 is added to the base $1,500 charge.

NB2.2.2.5 Excavation Costs. These values were based on the assumption that each sample consists of vertical composite samples, and excavation or drilling would be necessary to collect the sample aliquots. It was assumed that a backhoe can be used to collect samples up to 15 ft beneath the surface, and that drilling must be used for samples at a depth of greater than 15 ft. For sites ≤15 ft (4.6 m) deep an allowance of $1500/sample is used, as used in the approved site closure model. For sites deeper than 15 ft a charge of $150/ft ($490/m) was used, which approximates the cost for hollow-stem auger drilling and sample retrieval.

NB2.2.2.6 Project Management/Construction Management (PM/CM). Anticipated hours/day for various personnel are listed in Table NB-4. Labor rates were taken from the approved site closure estimate for fiscal year 1997. A minimum of 4 days/site is applied to each site for planning, mobilization, sampling, and demobilization. For sites less than 15 ft deep, PM/CM is based on a duration of 4 days for up to 10 samples and 6 days for over 10 samples. For deeper sites that will be sampled by drilling, a drilling rate of three boreholes/day was applied and the PM/CM estimated based on total drilling duration.

NB2.2.2.7 Miscellaneous. These charges include 2 HPTs/day of sampling and a per-sample charge for sampling and packaging equipment. For sites less than 15 ft deep, 1 day is charged for the HPTs for up to 10 samples, and 2 days is charged for greater than 10 samples. For the deeper sites, the three borehole/day duration was computed for HPT charges.

NB2.2.2.8 Planning and Closeout (P&C). These charges are on a per-site basis, with the hours and charges for each task listed in Table NB-4. These tasks include the preparation and approval of required pre-job documents and a closeout report for each site. The closeout report will include a statistical analysis of the sampling results.

NB2.2.2.9 Adders. These are the standard rates for direct distributables, G&A, and contingency (18.09%, 4.04%, and 15.70%, respectively), calculated on a compound basis in the order given.

NB3.0 RESULTS OF THE MODELS

Estimates for the RTD sites were compiled from the MCACES output sheets and are summarized in Table NB-1. This summary lists provides subtotals for each component of the model as well as the total estimate for each waste site. Subtotals for each operable unit are provided in Table NB-2. The total estimate for remediation of the RTD sites is $30,210,167.

Estimates for the CS sites model are presented in Table NB-4. The total for all sites is detailed for analyses, site investigation, excavation, PM/CM, miscellaneous, P&C, and adders. The total estimate for remediation of the CS sites is $8,092,503. The total estimate for RTD and CS sites is $37,871,250.

NB4.0 REFERENCES

DOE-RL, 1996, *100-BC-1, 100-DR-1 and 100-HR-1 Sampling and Analysis Plan*, DOE/RL-96-22, Rev. 0, U. S. Department of Energy, Richland Operations Office, Richland, Washington.

Gilbert, R.O., 1987, *Statistical Methods for Environmental Pollution Monitoring*, Van Nostrand Reinhold Company, New York, New York, 320 p.

Table NB-1. Summary of Remove, Treat, Dispose Estimates for All Operable Units.

100 Area Remaining Sites - SUMMARY

MCACES Estimates (Remove, Treat, Dispose Option)

100BC, 100DR, 100FR, 100HR, 100KR, 100-IU-6

Operable Units		Contaminated Soil, LCY	Labor	Equip.	Mat/ Supp.	Disposal	Other*	Direct Totals	S/C O/H & Profit	BHI Dir. Dist	BHI G&A	Conting.	Totals
1	100BC	19138	$854,539	$226,251	$24,547	$1,147,749	$250,818	$2,503,904	$115,462	$473,843	$124,965	$504,793	$3,722,967
2	100DR	29185	$2,526,501	$659,752	$79,289	$3,901,220	$706,057	$7,872,819	$324,167	$1,482,831	$391,064	$1,578,358	$11,649,239
3	100FR	29565	$1,204,539	$317,654	$39,368	$1,654,716	$411,591	$3,627,868	$173,989	$687,758	$181,343	$730,949	$5,401,907
4	100HR	30586	$1,468,216	$363,665	$60,616	$1,654,506	$491,125	$4,038,128	$206,249	$767,803	$202,382	$816,844	$6,031,406
5	100KR	752	$978,039	$111,656	$78,332	$40,552	$366,080	$1,574,659	$85,132	$300,253	$78,929	$320,119	$2,359,092
6	100IU	1278	$72,136	$10,537	$5,856	$67,836	$30,420	$186,785	$8,966	$35,410	$9,339	$37,758	$278,258
	Totals	110504	$7,103,970	$1,689,515	$288,008	$8,466,579	$2,256,091	$19,804,163	$913,965	$3,747,898	$988,022	$3,988,821	$29,442,869
	Mobilization Costs		$67,030	$51,437	$34,993			$153,460	Number of Mob/Demob Locations: 5				$767,298
												Grand Total	$30,210,167

Qualifications & Assumptions

1. SUBCONTRACT O/H & PROFIT INCLUDES FIELD OVERHEAD, HOME OFFICE OVERHEAD, PROFIT, BOND, AND B&O TAX.
2. ERC TEAM WAGE RATES PER, "ERC & HAMTC DIRECT LABOR WAGE RATES FY 1997", DATED 8/20/96 (BASED ON, "FY 96 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990)
3. 'DD AND G&A ARE PER, "FY 97 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990).
4. ALL WAGE RATES INCLUDE 4% OVERTIME.
5. MATERIAL SALES TAX, CURRENT RATE 8%. SALES TAX NOT APPLIED TO EQUIPMENT (OWNER OPERATOR). SALES TAX WOULD APPLY IF IT IS RENTAL EQUIPMENT.
6. COSTS AT 1997 DOLLARS.
7. PRIME SUBCONTRACTOR WAGE RATES, PAYROLL ADDS AND FRINGES, PER "BUILDING TRADES FY 1997 PRIME SUBCONTRACTOR DIRECT LABOR WAGE RATES" REV. DATE 4/11/97.
8. PRIME CONTRACTOR MARKUP, PER "PRIME CONTRACTOR (SUBCONTRACTOR TO ERC TEAM) MARKUP TABLE FOR BUILDING TRADES", REV. DATE 11/21/95.
9. CONTINGENCY WAS SET AT 15.7% WITHIN THE MODELS REFLECTING THE RISK ANALYSIS PERFORMED FOR THE 1997 BASELINE FOR THE REMEDIAL ACTION SITES.

* INCLUDES ANALYTICAL CHARGES, SITE-SPECIFIC MOB/DEMOB

Table NB-2a. Summary of Remove, Treat, Dispose Estimates for the 100-BC Area.

100 Area Remaining Sites

MCACES Estimates (Remove, Treat, Dispose Option)

100BC

Name	Contaminated Soil, LCY	Labor	Equip.	Mat/ Supp.	Disposal	Other	Direct Totals	S/C O/H & Profit	BHI Dir. Dist	BHI G&A	Conting.	Totals
1 116-B-7 Outfall Structure	370	$93,171	$19,330	$5,363	$47,560	$31,967	$197,391	$11,649	$37,816	$9,973	$40,202	$297,031
2 128-B-3 Coal Ash and Demolition W. Site	17250	$522,102	$151,966	$8,171	$915,630	$132,720	$1,730,589	$72,911	$326,255	$86,042	$347,880	$2,563,677
3 132-B-6 Outfall Structure (1904-B2)	322	$93,351	$19,582	$5,365	$44,959	$31,914	$195,171	$11,695	$37,422	$9,869	$39,784	$293,941
4 132-C-2 Outfall Structure	1196	$145,915	$35,373	$5,648	$139,600	$54,217	$380,753	$19,207	$72,350	$19,081	$76,927	$568,318
Totals	19138	$854,539	$226,251	$24,547	$1,147,749	$250,818	$2,503,904	$115,462	$473,843	$124,965	$504,793	$3,722,967

Qualifications & Assumptions

1. SUBCONTRACT O/H & PROFIT INCLUDES FIELD OVERHEAD, HOME OFFICE OVERHEAD, PROFIT, BOND, AND B&O TAX.
2. ERC TEAM WAGE RATES PER, "ERC & HAMTC DIRECT LABOR WAGE RATES FY 1997", DATED 8/20/96 (BASED ON, "FY 96 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990)
3. 'DD AND G&A ARE PER, "FY 97 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990).
4. ALL WAGE RATES INCLUDE 4% OVERTIME.
5. MATERIAL SALES TAX, CURRENT RATE 8%. SALES TAX NOT APPLIED TO EQUIPMENT (OWNER OPERATOR). SALES TAX WOULD APPLY IF IT IS RENTAL EQUIPMENT.
6. COSTS AT 1997 DOLLARS.
7. PRIME SUBCONTRACTOR WAGE RATES, PAYROLL ADDS AND FRINGES, PER "BUILDING TRADES FY 1997 PRIME SUBCONTRACTOR DIRECT LABOR WAGE RATES" REV. DATE 4/11/97.
8. PRIME CONTRACTOR MARKUP, PER "PRIME CONTRACTOR (SUBCONTRACTOR TO ERC TEAM) MARKUP TABLE FOR BUILDING TRADES", REV. DATE 11/21/95.
9. CONTINGENCY WAS SET AT 15.7% WITHIN THE MODELS REFLECTING THE RISK ANALYSIS PERFORMED FOR THE 1997 BASELINE FOR THE REMEDIAL ACTION SITES.

* INCLUDES ANALYTICAL CHARGES, SITE-SPECIFIC MOB/DEMOB

Table NB-2b. Summary of Remove, Treat, Dispose Estimates for the 100-DR Area.

100 Area Remaining Sites

MCACES Estimates (Remove, Treat, Dispose Option)

100DR

Name	Contaminated Soil, LCY	Labor	Equip.	Mat/ Supp.	Disposal	Other	Direct Totals	S/C O/H & Profit	BHI Dir. Dist	BHI G&A	Conting.	Totals
1 100-D-1 Silica Gel Burial Ground	72	$47,356	$9,429	$4,964	$4,512	$26,752	$93,013	$7,041	$18,100	$4,773	$19,299	$142,226
2 100-D-2 Lead Sheeting	1	$24,346	$1,277	$4,369	$212	$26,046	$56,250	$3,270	$10,766	$2,840	$11,481	$84,607
3 100-D-3 Silica Gel Burial Site	477	$69,614	$12,594	$5,218	$25,372	$28,405	$141,203	$8,677	$27,113	$7,150	$28,910	$213,053
4 100-D-4 Liquid Waste Site Trench	8202	$299,192	$82,759	$6,671	$435,362	$86,691	$910,675	$40,751	$172,111	$45,391	$183,522	$1,352,450
5 100-D-31 Process Sewer System	5547	$942,900	$270,949	$24,864	$1,242,072	$226,520	$2,707,305	$121,207	$511,676	$134,944	$544,131	$4,019,263
6 116-D-5 Outfall Structure (1904-D)	1349	$136,329	$33,569	$5,619	$135,354	$53,487	$364,358	$18,518	$69,264	$18,266	$73,638	$544,044
7 116-DR-5 Outfall Structure (1904-DR)	322	$86,650	$18,036	$5,317	$43,897	$30,851	$184,751	$11,025	$35,415	$9,340	$37,655	$278,186
8 120-D-2 Waste Acid Reservoir (186-D)	7022	$537,285	$141,544	$5,901	$1,572,442	$97,360	$2,354,532	$62,531	$437,247	$115,314	$465,739	$3,435,363
9 100-D-12 Sod. Dich./Sulf. Acid Unload. Sta.	579	$69,794	$12,733	$5,214	$30,786	$28,517	$147,044	$8,778	$28,187	$7,434	$30,056	$221,499
10 116-D-8 100-D Cask Storage Pad	5451	$258,445	$69,528	$6,126	$402,559	$74,818	$811,476	$36,119	$153,330	$40,437	$163,005	$1,204,367
11 116-DR-7 Inkwell Crib	163	$54,590	$7,334	$5,026	$8,652	$26,610	$102,212	$6,250	$19,622	$5,175	$20,922	$154,181
Totals	29185	$2,526,501	$659,752	$79,289	$3,901,220	$706,057	$7,872,819	$324,167	$1,482,831	$391,064	$1,578,358	$11,649,239

Qualifications & Assumptions

1. SUBCONTRACT O/H & PROFIT INCLUDES FIELD OVERHEAD, HOME OFFICE OVERHEAD, PROFIT, BOND, AND B&O TAX.
2. ERC TEAM WAGE RATES PER, "ERC & HAMTC DIRECT LABOR WAGE RATES FY 1997", DATED 8/20/96 (BASED ON, "FY 96 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990)
3. DD AND G&A ARE PER, "FY 97 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990).
4. ALL WAGE RATES INCLUDE 4% OVERTIME.
5. MATERIAL SALES TAX, CURRENT RATE 8%. SALES TAX NOT APPLIED TO EQUIPMENT (OWNER OPERATOR). SALES TAX WOULD APPLY IF IT IS RENTAL EQUIPMENT.
6. COSTS AT 1997 DOLLARS.
7. PRIME SUBCONTRACTOR WAGE RATES, PAYROLL ADDS AND FRINGES, PER "BUILDING TRADES FY 1997 PRIME SUBCONTRACTOR DIRECT LABOR WAGE RATES" REV. DATE 4/11/97.
8. PRIME CONTRACTOR MARKUP, PER "PRIME CONTRACTOR (SUBCONTRACTOR TO ERC TEAM) MARKUP TABLE FOR BUILDING TRADES", REV. DATE 11/21/95.
9. CONTINGENCY WAS SET AT 15.7% WITHIN THE MODELS REFLECTING THE RISK ANALYSIS PERFORMED FOR THE 1997 BASELINE FOR THE REMEDIAL ACTION SITES.

* INCLUDES ANALYTICAL CHARGES, SITE-SPECIFIC MOB/DEMOB

Table NB-2c. Summary of Remove, Treat, Dispose Estimates for the 100-FR Area.

100 Area Remaining Sites

MCACES Estimates (Remove, Treat, Dispose Option)

100FR

Name	Contaminated Soil, LCY	Labor	Equip.	Mat/ Supp.	Disposal	Other	Direct Totals	S/C O/H & Profit	BHI Dir. Dist	BHI G&A	Conting.	Totals
1 116-F-8 Outfall Structure (1904-F)	402	$114,150	$26,344	$5,623	$21,391	$51,467	$218,975	$14,660	$42,266	$11,146	$44,897	$331,944
2 116-F-15 Radiation Crib in 108-F Building	2	$24,540	$1,292	$4,483	$106	$26,185	$56,606	$3,378	$10,851	$2,825	$11,565	$85,225
3 116-F-16 PNL Outfall Structure	895	$91,958	$20,335	$5,558	$47,507	$31,325	$196,683	$12,504	$37,842	$9,980	$40,210	$297,219
4 1607-F-2 Septic Tank and Drain Field	24329	$696,038	$207,314	$7,912	$1,314,473	$172,841	$2,398,578	$104,761	$452,856	$119,430	$481,210	$3,556,835
5 1607-F-6 Septic Tank and Drain Field	2151	$126,286	$29,618	$5,622	$115,396	$51,926	$328,848	$17,350	$62,627	$16,517	$66,562	$491,904
6 100-F-2 Strontium Gardens	1738	$125,244	$30,354	$5,536	$153,295	$51,618	$366,047	$17,398	$69,364	$18,293	$73,761	$544,863
7 120-F-1 Glass Dump	48	$26,323	$2,397	$4,634	$2,548	$26,229	$62,131	$3,938	$11,952	$3,152	$12,744	$93,917
Totals	29565	$1,204,539	$317,654	$39,368	$1,654,716	$411,591	$3,627,868	$173,989	$687,758	$181,343	$730,949	$5,401,907

Qualifications & Assumptions

1. SUBCONTRACT O/H & PROFIT INCLUDES FIELD OVERHEAD, HOME OFFICE OVERHEAD, PROFIT, BOND, AND B&O TAX.
2. ERC TEAM WAGE RATES PER, "ERC & HAMTC DIRECT LABOR WAGE RATES FY 1997", DATED 8/20/96 (BASED ON, "FY 96 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990)
3. 'DD AND G&A ARE PER, "FY 97 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990).
4. ALL WAGE RATES INCLUDE 4% OVERTIME.
5. MATERIAL SALES TAX, CURRENT RATE 8%. SALES TAX NOT APPLIED TO EQUIPMENT (OWNER OPERATOR). SALES TAX WOULD APPLY IF IT IS RENTAL EQUIPMENT.
6. COSTS AT 1997 DOLLARS.
7. PRIME SUBCONTRACTOR WAGE RATES, PAYROLL ADDS AND FRINGES, PER "BUILDING TRADES FY 1997 PRIME SUBCONTRACTOR DIRECT LABOR WAGE RATES" REV. DATE 4/11/97.
8. PRIME CONTRACTOR MARKUP, PER "PRIME CONTRACTOR (SUBCONTRACTOR TO ERC TEAM) MARKUP TABLE FOR BUILDING TRADES", REV. DATE 11/21/95.
9. CONTINGENCY WAS SET AT 15.7% WITHIN THE MODELS REFLECTING THE RISK ANALYSIS PERFORMED FOR THE 1997 BASELINE FOR THE REMEDIAL ACTION SITES.

* INCLUDES ANALYTICAL CHARGES, SITE-SPECIFIC MOB/DEMOB

Table NB-2d. Summary of Remove, Treat, Dispose Estimates for the 100-HR Area.

100 Area Remaining Sites

MCACES Estimates (Remove, Treat, Dispose Option)

100HR

Name	Contaminated Soil, LCY	Labor	Equip.	Mat/ Supp.	Disposal	Other	Direct Totals	S/C O/H & Profit	BHI Dir. Dist	BHI G&A	Conting.	Totals
1 100-H-11 Expansion Box French Drain E	72	$48,141	$8,783	$4,964	$3,875	$26,759	$92,522	$7,043	$18,010	$4,713	$19,199	$141,487
2 100-H-12 Exp. Box Fr. Dr. F & Lead Shielding	72	$48,141	$8,783	$4,964	$3,875	$26,759	$92,522	$7,043	$18,010	$4,713	$19,199	$141,487
3 100-H-13 French Drain G	72	$48,141	$8,783	$4,964	$3,875	$26,759	$92,522	$7,043	$18,010	$4,713	$19,199	$141,487
4 100-H-14 Surface Contamination Zone H	1022	$94,936	$18,662	$5,352	$54,248	$32,633	$205,831	$11,548	$39,325	$10,371	$41,931	$309,006
5 100-H-22 Contaminated by Eff. Line Leakage	4153	$213,496	$55,986	$6,606	$220,441	$63,562	$560,091	$28,148	$106,412	$28,064	$113,466	$836,181
6 151-H Electrical Substation	532	$49,618	$7,938	$4,971	$28,239	$22,263	$113,029	$7,057	$21,725	$5,729	$23,164	$170,704
7 100-H-31 PCB in Soil at 105-H Reactor	72	$51,660	$9,342	$4,964	$3,822	$21,758	$91,546	$7,059	$17,837	$4,704	$19,020	$140,166
8 116-H-5 1904 Outfall Structure	193	$79,741	$15,482	$5,322	$10,298	$30,313	$141,156	$9,839	$27,314	$7,204	$29,028	$214,541
9 116-H-9 Crib	69	$65,049	$9,573	$5,125	$3,875	$27,559	$111,181	$7,153	$21,406	$5,646	$22,826	$168,212
10 1607-H-2 Septic Tank and Drain Field	21722	$639,117	$188,290	$7,770	$1,183,578	$159,558	$2,178,313	$95,582	$411,348	$108,484	$437,112	$3,230,839
11 1607-H-4 Septic Tank and Drain Field	2607	$130,176	$32,043	$5,614	$138,380	$53,202	$359,415	$18,734	$68,406	$18,041	$72,700	$537,296
Totals	30586	$1,468,216	$363,665	$60,616	$1,654,506	$491,125	$4,038,128	$206,249	$767,803	$202,382	$816,844	$6,031,406

Qualifications & Assumptions

1. SUBCONTRACT O/H & PROFIT INCLUDES FIELD OVERHEAD, HOME OFFICE OVERHEAD, PROFIT, BOND, AND B&O TAX.
2. ERC TEAM WAGE RATES PER, "ERC & HAMTC DIRECT LABOR WAGE RATES FY 1997", DATED 8/20/96 (BASED ON, "FY 96 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990)
3. 'DD AND G&A ARE PER, "FY 97 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990).
4. ALL WAGE RATES INCLUDE 4% OVERTIME.
5. MATERIAL SALES TAX, CURRENT RATE 8%. SALES TAX NOT APPLIED TO EQUIPMENT (OWNER OPERATOR). SALES TAX WOULD APPLY IF IT IS RENTAL EQUIPMENT.
6. COSTS AT 1997 DOLLARS.
7. PRIME SUBCONTRACTOR WAGE RATES, PAYROLL ADDS AND FRINGES, PER "BUILDING TRADES FY 1997 PRIME SUBCONTRACTOR DIRECT LABOR WAGE RATES" REV. DATE 4/11/97.
8. PRIME CONTRACTOR MARKUP, PER "PRIME CONTRACTOR (SUBCONTRACTOR TO ERC TEAM) MARKUP TABLE FOR BUILDING TRADES", REV. DATE 11/21/95.
9. CONTINGENCY WAS SET AT 15.7% WITHIN THE MODELS REFLECTING THE RISK ANALYSIS PERFORMED FOR THE 1997 BASELINE FOR THE REMEDIAL ACTION SITES.

* INCLUDES ANALYTICAL CHARGES, SITE-SPECIFIC MOB/DEMOB

Table NB-2e. Summary of Remove, Treat, Dispose Estimates for the 100-KR Area.

100 Area Remaining Sites

MCACES Estimates (Remove, Treat, Dispose Option)

100KR

Name	Contaminated Soil, LCY	Labor	Equip.	Mat/ Supp.	Disposal	Other	Direct Totals	S/C O/H & Profit	BHI Dir. Dist	BHI G&A	Conting.	Totals
1 100-K-14 Acid Neutralization Pit (183-KE)	72	$48,199	$8,940	$4,964	$3,928	$26,760	$92,791	$7,092	$18,069	$4,729	$19,261	$141,942
2 100-K-18 Caustic Neutralization Pit (183-KW)	11	$25,095	$1,576	$4,523	$690	$26,197	$58,081	$3,544	$11,147	$2,903	$11,881	$87,556
3 100-K-34 Acid Neutralizaton Pit (183-KW)	16	$25,799	$2,242	$4,584	$955	$26,203	$59,783	$3,836	$11,508	$2,999	$12,266	$90,392
4 100-K-53 Glycol Heat Rec. Undgrnd P'lines (100KE)	191	$364,153	$37,672	$22,576	$10,138	$90,446	$524,985	$24,046	$99,320	$26,193	$105,903	$780,447
5 100-K-54 Glycol Heat Rec. Underground P'lines	191	$364,153	$37,672	$22,576	$10,138	$90,446	$524,985	$24,046	$99,320	$26,193	$105,903	$780,447
6 120-KE-1 Filter Water Facity Dry Well (183-KE)	16	$25,799	$2,242	$4,584	$955	$26,203	$59,783	$3,836	$11,508	$2,999	$12,266	$90,392
7 120-KE-2 Filter Waste Facility Fr. Dr. (183-KE)	122	$49,873	$9,868	$5,001	$6,529	$26,814	$98,085	$7,594	$19,117	$5,005	$20,379	$150,180
8 120-KW-1 Filter Water Facility Dry Well (183-KW)	11	$25,095	$1,576	$4,523	$690	$26,197	$58,081	$3,544	$11,147	$2,903	$11,881	$87,556
9 120-KW-2 Filter Waste Facility Fr. Drn. (183-KW)	122	$49,873	$9,868	$5,001	$6,529	$26,814	$98,085	$7,594	$19,117	$5,005	$20,379	$150,180
Totals	752	$978,039	$111,656	$78,332	$40,552	$366,080	$1,574,659	$85,132	$300,253	$78,929	$320,119	$2,359,092

Qualifications & Assumptions

1. SUBCONTRACT O/H & PROFIT INCLUDES FIELD OVERHEAD, HOME OFFICE OVERHEAD, PROFIT, BOND, AND B&O TAX.
2. ERC TEAM WAGE RATES PER, "ERC & HAMTC DIRECT LABOR WAGE RATES FY 1997", DATED 8/20/96 (BASED ON, "FY 96 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990)
3. 'DD AND G&A ARE PER, "FY 97 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990).
4. ALL WAGE RATES INCLUDE 4% OVERTIME.
5. MATERIAL SALES TAX, CURRENT RATE 8%. SALES TAX NOT APPLIED TO EQUIPMENT (OWNER OPERATOR). SALES TAX WOULD APPLY IF IT IS RENTAL EQUIPMENT.
6. COSTS AT 1997 DOLLARS.
7. PRIME SUBCONTRACTOR WAGE RATES, PAYROLL ADDS AND FRINGES, PER "BUILDING TRADES FY 1997 PRIME SUBCONTRACTOR DIRECT LABOR WAGE RATES" REV. DATE 4/11/97.
8. PRIME CONTRACTOR MARKUP, PER "PRIME CONTRACTOR (SUBCONTRACTOR TO ERC TEAM) MARKUP TABLE FOR BUILDING TRADES", REV. DATE 11/21/95.
9. CONTINGENCY WAS SET AT 15.7% WITHIN THE MODELS REFLECTING THE RISK ANALYSIS PERFORMED FOR THE 1997 BASELINE FOR THE REMEDIAL ACTION SITES.

* INCLUDES ANALYTICAL CHARGES, SITE-SPECIFIC MOB/DEMOB

Table NB-2f. Summary of Remove, Treat, Dispose Estimates for the 100-IU-6 Operable Unit.

100 Area Remaining Sites
MCACES Estimates (Remove, Treat, Dispose Option)
100-IU-6

Site Name	Contaminated Soil, LCY	Labor	Equip.	Mat/ Supp.	Disposal	Other	Direct Totals	S/C O/H & Profit	BHI Dir. Dist	BHI G&A	Conting.	Totals
1 600-149 Small Arms Range	1278	$72,136	$10,537	$5,856	$67,836	$30,420	$186,785	$8,966	$35,410	$9,339	$37,758	$278,258
Totals	1278	$72,136	$10,537	$5,856	$67,836	$30,420	$186,785	$8,966	$35,410	$9,339	$37,758	$278,258

Qualifications & Assumptions

1. SUBCONTRACT O/H & PROFIT INCLUDES FIELD OVERHEAD, HOME OFFICE OVERHEAD, PROFIT, BOND, AND B&O TAX.
2. ERC TEAM WAGE RATES PER, "ERC & HAMTC DIRECT LABOR WAGE RATES FY 1997", DATED 8/20/96 (BASED ON, "FY 96 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990)
3. DD AND G&A ARE PER, "FY 97 ALL IN WAGE RATES FOR BHI, CH2MHILL, IT, THI, HAMTC, BUILDING TRADES BY RESOURCE CODE", TRACKING NO. 040990).
4. ALL WAGE RATES INCLUDE 4% OVERTIME.
5. MATERIAL SALES TAX, CURRENT RATE 8%. SALES TAX NOT APPLIED TO EQUIPMENT (OWNER OPERATOR). SALES TAX WOULD APPLY IF IT IS RENTAL EQUIPMENT.
6. COSTS AT 1997 DOLLARS.
7. PRIME SUBCONTRACTOR WAGE RATES, PAYROLL ADDS AND FRINGES, PER "BUILDING TRADES FY 1997 PRIME SUBCONTRACTOR DIRECT LABOR WAGE RATES" REV. DATE 4/11/97.
8. PRIME CONTRACTOR MARKUP, PER "PRIME CONTRACTOR (SUBCONTRACTOR TO ERC TEAM) MARKUP TABLE FOR BUILDING TRADES", REV. DATE 11/21/95.
9. CONTINGENCY WAS SET AT 15.7% WITHIN THE MODELS REFLECTING THE RISK ANALYSIS PERFORMED FOR THE 1997 BASELINE FOR THE REMEDIAL ACTION SITES.

* INCLUDES ANALYTICAL CHARGES, SITE-SPECIFIC MOB/DEMOB

Table NB-3. Parameters and Results for Confirmation Sampling Cost Estimates. (Page 1 of 6)

Operable Unit	Number of Waste Sites	Name of Waste Site	Dimensions (ft)			Liquid		COPCs		Site		#	Individual Costs							Total
			Length	Width	Depth	Waste?	Rad	Organics	Metals	Invest?	Area	Samples	Analyses	Site Invest.	Excavation	PM/CM	Misc.	P & C	Adders	Cost
100-BC-1	100-B-3	Former Hot Thimble Burial Ground	100	25	20	N	Y	Y	Y	Y	2,500	6	0	1500	18000	22500	800	7386	0	$50,186
100-BC-1	100-B-5	Effluent Vent Disposal Trench (unused)	100	10	10	Y	Y		Y	N	1,000	4	0		6000	22500	800	7386	0	$36,686
100-BC-1	100-B-10	107-B Basin Leak. Springs observed along the Columbia River below the B-Area retention basin (116-B-11) in 1949.				Y				N	unknown	4	0		6000	22500	800	7386	0	$36,686
100-BC-1	116-B-15	105-B Fuel Storage Basin Cleanout Percolation Pit	100	50	6	Y	Y			N	5,000	4	0		6000	22500	800	7386	0	$36,686
100-BC-1	120-B-1	105-B Battery Acid Sump				Y		Y	Y	Y	unknown	4	0	10000	6000	22500	800	7386	0	$46,686
100-BC-1	128-B-2	100-B Burn Pit #2	450	50	30	Y		Y	Y	N	22,500	8	0		36000	22565	1333	7386	0	$67,285
100-BC-1	132-B-1	108-B Tritium Separation Facility	150	32		Y	Y			Y	4,800	4	0	1500	6000	22500	800	7386	0	$38,186
100-BC-1	132-B-3	108-B Ventilation Exhaust Stack Site	30	250	18	N	Y			Y	7,500	6	0	1500	16200	22500	800	7386	0	$48,386
100-BC-1	132-B-4	117-B Filter Building	59	120	25	N	Y			Y	7,080	6	0	1500	22500	22500	800	7386	0	$54,686
100-BC-1	132-B-5	115-B/C Gas Recirculation Facility	186	98	11	N	Y			N	18,228	8	0		12000	22500	800	7386	0	$42,686
100-BC-1	124-B-2	Septic Tank System for 105-B Reactor and offices	300	75	10	Y	Y			Y	22,500	8	0	1500	12000	22500	800	7386	0	$44,186
100-BC-1	124-C-1	Septic Tank System for 183-B water treatment plant.	27.7	27.7	10	Y	Y			Y	767	4	0	1500	6000	22500	800	7386	0	$38,186
100-BC-2	100-B-1	Surface Chemical and Solid Waste Dumping Area & Laydown Yard	150	100		N	N	Y	Y	Y	15,000	8	0	1500	12000	22500	800	7386	0	$44,186
100-BC-2	100-C-3	119-C Sample Building French Drain	1	1		Y		Y	Y	Y	1	4	0	1500	6000	22500	800	7386	0	$38,186
100-BC-2	100-C-7	183-C Filter Building/Pumproom Facility foundation and demolition waste	305	290	10	N		Y	Y	Y	88,450	20	0	1500	30000	22500	1600	7386	0	$62,986
100-BC-2	166-C-3	105-C Chemical Waste Tanks (unused)	12	12	12	N		Y	Y	Y	144	6	0	1500	9000	22500	800	7386	0	$41,186
100-BC-2	166-C-6	105-C Fuel Storage Basin Cleanout Percolation Pit	85.1	85.1	6	Y	Y		Y	N	7,242	4	0		6000	22500	800	7386	0	$36,686
100-BC-2	128-C-1	100-C Burning Pit	225	125		N		Y	Y	N	28,125	10	0		15000	22500	800	7386	0	$45,686
100-BC-2	132-C-1	116-C Reactor Stack Burial Ground	200	30	15	N	Y			N	6,000	6	0		9000	22500	800	7386	0	$39,686
100-BC-2	132-C-3	117-C Filter Building Site	59	100	25	N	Y			Y	5,900	6	0	1500	22500	22500	800	7386	0	$54,686
100-BC-2	1607-B8	Septic Tank and Drain Field for 190-C pumphouse	25.3	25.3	10	Y	Y			Y	640	4	0	1500	6000	22500	800	7386	0	$38,186
100-BC-2	1607-B9	Septic Tank and Drain Field for 105-C Reactor Building	80	66.25	10	Y	Y			Y	5,300	4	0	1500	6000	22500	800	7386	0	$38,186
100-BC-2	1607-B10	Septic Tank and Drain Field for 183-C water treatment plant.	75	66.25	10	Y	Y			Y	4,969	4	0	1500	6000	22500	800	7386	0	$38,186

Table NB-3. Parameters and Results for Confirmation Sampling Cost Estimates. (Page 2 of 6)

Operable Unit	Number of Waste Sites	Name of Waste Site	Dimensions (ft)			Liquid		COPCs		Site		#	Individual Costs							Total
			Length	Width	Depth	Waste?	Rad	Organics	Metals	Invest?	Area	Samples	Analyses	Site Invest.	Excavation	PM/CM	Misc.	P & C	Adders	Cost
100-BC-2	1607-B11	Septic Tank and Drain Field for 183-C water filter pumphouse.	75	66.25	10	Y	Y			Y	4,969	4	0	1500	6000	22500	800	7386	0	$38,186
100-DR-1	100-D-8	105-DR Process Sewer Outfall Site; 1907-DR				Y	Y	Y		Y	unknown	4	0	10000	6000	22500	800	7386	0	$46,686
100-DR-1	100-D-9	184-DA Boiler Oil Tank	30	30	15	N	N	Y	N	N	900	6	0		9000	22500	800	7386	0	$39,686
100-DR-1	100-D-24	119D Sample Building French Drain				Y	Y	Y	Y	Y	unknown	4	0	10000	6000	22500	800	7386	0	$46,686
100-DR-1	100-D-30	190-D Sodium Dichromate Soil Contamination, 185-D NaCr Trench	304	3.3	10	N			Y	N	1,003	6	0		9000	22500	800	7386	0	$39,686
100-DR-1	116-D-10	105-D Fuel Storage Basin Cleanout Percolation Pit for water treated by ion exchange and filtration.	354	27	10	Y	Y			Y	9,558	4	0	1500	6000	22500	800	7386	0	$38,186
100-DR-1	128-D-2	Burn Pit Site	240	240		N	Y	Y	Y	Y	57,600	15	0	1500	22500	22500	1600	7386	0	$55,486
100-DR-1	130-D-1	1716-D Gasoline Storage Tank	20	20	15	N	N	Y	N	N	400	6	0		9000	22500	800	7386	0	$39,686
100-DR-1	132-D-1	115-D/DR Gas Recirculating Facility. Former structure demolished in place.	168	98	11	N	Y			Y	16,464	8	0	1500	12000	22500	800	7386	0	$44,186
100-DR-1	132-D-2	117-D Filter Building. Former structure demolished in place.	59	39	27	N	Y			Y	2,301	6	0	1500	24300	22500	800	7386	0	$56,486
100-DR-1	132-D-3	1608-D Waste Water / Effluent Pumping Station. Former structure demolished in place.	20	20	32	Y	Y	Y		Y	400	4	0	1500	19200	22435	267	7386	0	$50,787
100-DR-1	1607-D4	Septic Tank and Drain Field for 115-D/DR Gas Recirculation Bldg.	19.6	19.6	10	Y	Y	Y	Y	Y	384	4	0	1500	6000	22500	800	7386	0	$38,186
100-DR-1	1607-D5	Septic Tank and Drain Field for 181-D pumphouse	19.6	19.6	10	Y	Y	Y	Y	Y	384	4	0	1500	6000	22500	800	7386	0	$38,186
100-DR-1	628-3	Burn Pit				N		Y	Y	Y	unknown	20	0	10000	30000	22500	1600	7386	0	$71,486
100-DR-1	UPR-100-D-1	Oil Soaked Soil	2	2		Y		Y		N	4	4	0		6000	22500	800	7386	0	$36,686
100-DR-2	100-D-13 (124-DR-3; 1607-DR3)	IMHOFF Septic Tank and drain field for temporary construction facilities and water tower overflow.	87	60	10	Y	Y				5,220	4	0		6000	22500	800	7386	0	$36,686
100-DR-2	100-D-15	Solid Waste Burial Site/ Borrow Pit				N	N	Y	Y	Y	unknown	20	0	10000	30000	22500	1600	7386	0	$71,486
100-DR-2	100-D-23	119-DR Building French Drain				Y	Y	Y	Y	Y	unknown	4	0	10000	6000	22500	800	7386	0	$46,686
100-DR-2	100-D-27	151-D Substation Transformer Leak	30	30	15	N	N	Y	N	N	900	6	0		9000	22500	800	7386	0	$39,686
100-DR-2	100-D-28	Septic System for the 190-DR Building.	46	36	10	Y	Y			Y	1,656	4	0	1500	6000	22500	800	7386	0	$38,186
100-DR-2	116-DR-8	117-DR Seal Pit Crib	10	10	17	Y	Y			N	100	4	0		10200	22435	267	7386	0	$40,287

Table NB-3. Parameters and Results for Confirmation Sampling Cost Estimates. (Page 3 of 6)

Operable Unit	Number of Waste Sites	Name of Waste Site	Dimensions (ft)			Liquid		COPCs		Site		#	Individual Costs							Total
			Length	Width	Depth	Waste?	Rad	Organics	Metals	Invest?	Area	Samples	Analyses	Site Invest.	Excavation	PM/CM	Misc.	P & C	Adders	Cost
		105-DR Fuel Storage Basin Cleanout																		
100-DR-2	116-DR-10	Percolation Pond for water treated by ion exchange and filtration.	80	50		Y	Y			N	4,000	4	0		6000	22500	800	7386	0	$36,686
100-DR-2	128-D-1	100 D/DR Burning Pit	100	100	10	N	Y	Y	Y	N	10,000	7	0		10500	22500	800	7386	0	$41,186
100-DR-2	132-DR-1	1608-DR Waste Water / Effluent Pumping Station demolished in place.	36	34	28	Y	Y	Y	Y	N	1,224	4	0		16800	22435	267	7386	0	$46,887
100-FR-1	100-F-4	108-F Building 12-inch French Drain	1	1		Y	Y		Y	N	1	4	0		6000	22500	800	7386	0	$36,686
100-FR-1	100-F-7	Underground Fuel Tank	50	50	15	N	N	Y	N	Y	2,500	6	0	1500	9000	22500	800	7386	0	$41,186
100-FR-1	100-F-9	First French Drain at East End of 105-F Storage Room	3	3		Y	Y		Y	N	9	4	0		6000	22500	800	7386	0	$36,686
100-FR-1	100-F-10	Second French Drain at East End of 105-F Storage Room	3	3		Y	Y		Y	N	9	4	0		6000	22500	800	7386	0	$36,686
100-FR-1	100-F-11	108-F Building 18 inch French Drain	1.5	1.5		Y	Y		Y	N	2	4	0		6000	22500	800	7386	0	$36,686
100-FR-1	100-F-12	36 inch French Drain at 105-F Building	3	3		Y	Y		Y	N	9	4	0		6000	22500	800	7386	0	$36,686
100-FR-1	100-F-16	108-F Building 30-inch French Drain, Undocumented	2.5	2.5		Y	Y		Y	N	6	4	0		6000	22500	800	7386	0	$36,686
100-FR-1	100-F-18	Former underground condensate tank at 105-F Bldg; removed in 1994	3	3		N	Y	Y	Y	N	9	6	0		9000	22500	800	7386	0	$39,686
100-FR-1	100-F-23	141-F Drywell				Y	Y			Y	unknown	4	0	10000	6000	22500	800	7386	0	$46,686
100-FR-1	100-F-24	145-F Drywell/French Drain				Y	Y	Y	Y	Y	unknown	4	0	10000	6000	22500	800	7386	0	$46,686
100-FR-1	100-F-25	146-F Drywell/French Drain	5	5		Y	Y	Y	Y	Y	25	4	0	1500	6000	22500	800	7386	0	$38,186
100-FR-1	100-F-29	100-F Experimental Animal Farm process sewer pipelines				N	Y			Y	unknown	20	0	10000	30000	22500	1600	7386	0	$71,486
100-FR-1	100-F-31	144-F Sanitary Sewer System	40	40	10	Y	Y		Y	Y	1,600	4	0	1500	6000	22500	800	7386	0	$38,186
100-FR-1	100-F-33	1705-F Fish Farm (new listing 5/22/97)				Y	Y			N	unknown	4	0		6000	22500	800	7386	0	$36,686
100-FR-1	100-F-34	Biology Facility French Drain (new listing 6/03/97)	3	3	2	Y	Y	Y	Y	Y	9	4	0	1500	6000	22500	800	7386	0	$38,186
100-FR-1	116-F-7	117-F French Drain	20	20	10	Y	Y		Y	N	400	4	0		6000	22500	800	7386	0	$36,686
100-FR-1	116-F-12	148-F French Drain	3	3	6	Y			Y	N	9	4	0		6000	22500	800	7386	0	$36,686
100-FR-1	128-F-2	100-F Burning Pit	150	60	10	N		Y		N	9,000	6	0		9000	22500	800	7386	0	$39,686
100-FR-1	132-F-1	Chronic Feeding Barn Site	70	70		N	Y			Y	4,900	6	0	1500	9000	22500	800	7386	0	$41,186
100-FR-1	132-F-3	115-F Gas Recirculating Facility Site	175	100	13	N	Y			Y	17,500	8	0	1500	12000	22500	800	7386	0	$44,186
100-FR-1	132-F-4	116-F Reactor Stack Demolition Site	200	20	3	N	Y			Y	4,000	6	0	1500	9000	22500	800	7386	0	$41,186
100-FR-1	132-F-5	117-F Filter Building Site	60	40	27	N	Y			Y	2,400	6	0	1500	24300	22500	800	7386	0	$56,486
100-FR-1	132-F-6	1608-F Waste Water Pumping Station Site	50	50	34	Y	Y		Y	Y	2,500	4	0	1500	20400	22435	267	7386	0	$51,987
100-FR-1	141-C	Large Animal Barn & Biology Laboratory	68	68		N	Y			N	4,624	6	0		9000	22500	800	7386	0	$39,686

Table NB-3. Parameters and Results for Confirmation Sampling Cost Estimates. (Page 4 of 6)

Operable Unit	Number of Waste Sites	Name of Waste Site	Dimensions (ft)			Liquid		COPCs		Site		#	Individual Costs							Total
			Length	Width	Depth	Waste?	Rad	Organics	Metals	Invest?	Area	Samples	Analyses	Site Invest.	Excavation	PM/CM	Misc.	P & C	Adders	Cost
100-FR-1	1607-F3 (124-F-3)	Septic tank and drain field for 182-F pump station, 183-F water treatment plant, and 151-F electrical substation.	60	50	10	Y	Y	Y	Y	Y	3,000	4	0	1500	6000	22500	800	7386	0	$38,186
100-FR-1	1607-F4 (124-F-4)	Septic tank and drain field for 115-F Gas Recirculation Bldg.	24	20	10	Y	Y	Y	Y	Y	480	4	0	1500	6000	22500	800	7386	0	$38,186
100-FR-1	1607-F5 (124-F-5)	Septic tank and drain field for 181-F pumphouse.	24	20	10	Y	Y	Y	Y	Y	480	4	0	1500	6000	22500	800	7386	0	$38,186
100-FR-1	1607-F7 (124-F-7)	Septic tank and drain field for 141-M Building.	60	43	10	Y	Y	Y	Y	Y	2,580	4	0	1500	6000	22500	800	7386	0	$38,186
100-FR-1	UPR-100-F-1	UN-100-F-1 Unplanned Release, 141-C to 141-M Process Sewer Line Leak	40	40		Y	Y			N	1,600	4	0		6000	22500	800	7386	0	$36,686
100-FR-1	UPR-100-F-3	Mercury Spill at 146-F Fish Lab	10	10		N			Y	N	100	6	0		9000	22500	800	7386	0	$39,686
100-FR-2	100-F-14	Vent pipe (Carpenter shop waste site vent)				N		Y	Y	N	unknown	20	0		30000	22500	1600	7386	0	$61,486
100-FR-2	100-F-28	Septic tank and drain field for undocumented building.	60	60	10	Y	Y			Y	3,600	4	0	1500	6000	22500	800	7386	0	$38,186
100-FR-2	118-F-4	Silica Gel Burial Ground; 115-F Pit	10	10	15	N	Y	Y	Y	N	100	6	0		9000	22500	800	7386	0	$39,686
100-FR-2	128-F-1	Burning Pit	100	100	10	N		Y	Y	N	10,000	7	0		10500	22500	800	7386	0	$41,186
100-FR-2	128-F-3	PNL Burning Pit	100	100		N	Y	Y	Y	N	10,000	7	0		10500	22500	800	7386	0	$41,186
100-FR-2	1607-F1 (124-F-1)	Septic tank and drain field for badge house, fire station, office, and change room.	45	31	10	Y	Y			Y	1,395	4	0	1500	6000	22500	800	7386	0	$38,186
100-HR-1	100-H-3	1716-H Garage Fuel Tank Site	50	50	15	N	N	Y	N	Y	2,500	6	0	1500	9000	22500	800	7386	0	$41,186
100-HR-1	100-H-4	1717-H Hot Shop French Drain and Contaminated Storage Unit				Y	Y	Y		Y	unknown	4	0	10000	6000	22500	800	7386	0	$46,686
100-HR-1	100-H-7	French Drain A	3	3		Y	Y			Y	9	4	0	1500	6000	22500	800	7386	0	$38,186
100-HR-1	100-H-8	French Drain B	3	3		Y	Y			Y	9	4	0	1500	6000	22500	800	7386	0	$38,186
100-HR-1	100-H-9	French Drain C	2	2		Y	Y			Y	4	4	0	1500	6000	22500	800	7386	0	$38,186
100-HR-1	100-H-10	French Drain D	4	4		Y	Y			Y	16	4	0	1500	6000	22500	800	7386	0	$38,186
100-HR-1	126-H-2	183-H Clearwells/Disposal Pit	751	135	18	N	Y	Y	Y	N	101,385	20	0		54000	22957	4533	7386	0	$88,877
100-HR-1	132-H-1	116-H Reactor Exhaust Stack Burial Site	220	25	10	N	Y			Y	5,500	6	0	1500	9000	22500	800	7386	0	$41,186
100-HR-1	132-H-3	1608-H Waste Water Pumping Station Site	36	34	32	N	Y		Y	Y	1,224	6	0	1500	28800	22500	800	7386	0	$60,986
100-HR-2	128-H-1	Burning Pit	300	300	10	N		Y		N	90,000	20	0		30000	22500	1600	7386	0	$61,486
100-HR-2	128-H-2	Burning Pit	170	135		N		Y		N	22,950	9	0		13500	22500	800	7386	0	$44,186
100-HR-2	132-H-2	117-H Filter Building Site	60	40	32	N	Y			Y	2,400	6	0	1500	28800	22500	800	7386	0	$60,986
100-HR-2	1607-H1	Septic Tank and Drain Field, 124-H-1	70	50	10	Y	Y			Y	3,500	4	0	1500	6000	22500	800	7386	0	$38,186
100-IU-2	600-5	Waste Oil Dump; Asphalt Heliport	25	15	10	N		Y		N	375	6	0		9000	22500	800	7386	0	$39,686
100-IU-2	600-52	White Bluffs Surface Basin	280	130		Y			Y	N	36,400	12	0		18000	22500	1600	7386	0	$49,486

Table NB-3. Parameters and Results for Confirmation Sampling Cost Estimates. (Page 5 of 6)

Operable Unit	Number of Waste Sites	Name of Waste Site	Dimensions (ft)			Liquid Waste?		COPCs		Site Invest?	Area	# Samples	Individual Costs							Total Cost
			Length	Width	Depth		Rad	Organics	Metals				Analyses	Site Invest.	Excavation	PM/CM	Misc.	P & C	Adders	
100-IU-2	600-99	J. A. Jones #2	30	30		N		Y		Y	900	6	0	1500	9000	22500	800	7386	0	$41,186
100-IU-2	600-120	Spare Parts Burn Pit				N		Y	Y		unknown	20	0		30000	22500	1600	7386	0	$61,486
100-IU-2	600-124	Burn Site and Paint Disposal Area				N		Y	Y	Y	unknown	20	0	10000	30000	22500	1600	7386	0	$71,486
100-IU-2	600-127	Fuel Storage Area	182	116		N		Y		N	21,112	9	0		13500	22500	800	7386	0	$44,186
100-IU-2	600-128	Oil and Oil Filter Dump Site	7	7		N		Y		N	49	6	0		9000	22500	800	7386	0	$39,686
100-IU-2	600-131	Special Fabrication Shop and Warehouse				N		Y		Y	unknown	20	0	10000	30000	22500	1600	7386	0	$71,486
100-IU-2	600-132	Construction Contractor Shop Landfill	545	370		N	Y	Y		Y	201,650	20	0	1500	30000	22500	1600	7386	0	$62,986
100-IU-2	600-135	Spare Parts Machine Shop Landfill	300	300		N	Y	Y	Y	Y	90,000	20	0	1500	30000	22500	1600	7386	0	$62,986
100-IU-2	600-139	Automotive Repair Shop	100	65		N		Y		Y	6,500	6	0	1500	9000	22500	800	7386	0	$41,186
100-IU-2	600-176	White Bluffs Paint Disposal Area				N		Y		Y	unknown	20	0	10000	30000	22500	1600	7386	0	$71,486
100-IU-2	600-181	White Bluffs Oil Dump	56	50		N		Y		N	2,800	6	0		9000	22500	800	7386	0	$39,686
100-IU-2	600-188	White Bluffs Waste Disposal Trench 2	300	132		N		Y	Y	N	39,600	12	0		18000	22500	1600	7386	0	$49,486
100-IU-2	600-189	White Bluffs Warehouse Facility French Drains				Y		Y		Y	unknown	4	0	10000	6000	22500	800	7386	0	$46,686
100-IU-2	600-190	White Bluffs Warehouse Tar / Paint Disposal Area				N		Y		Y	unknown	20	0	10000	30000	22500	1600	7386	0	$71,486
100-IU-2	600-199	White Bluffs Ash Covered Concrete Pad				N			Y	Y	unknown	20	0	10000	30000	22500	1600	7386	0	$71,486
100-IU-2	600-201	White Bluffs Paint and Solid Waste Disposal Site				N		Y		Y	unknown	20	0	10000	30000	22500	1600	7386	0	$71,486
100-IU-2	628-1	White Bluffs Burn Pit	100	100		N		Y		N	10,000	7	0		10500	22500	800	7386	0	$41,186
100-IU-6	600-3	Hanford Townsite Dumping Area and Paint Pit	1600	925		N		Y	Y	Y	1,480,000	20	0	1500	30000	22500	1600	7386	0	$62,986
100-IU-6	600-107	Cribs at 213-J&K Gable Mtn. Plutonium Storage Vaults	16	8	15	Y	Y			Y	128	4	0	1500	6000	22500	800	7386	0	$38,186
100-IU-6	600-108	213-J & K Gable Mountain Plutonium Storage Vaults	20	12	8	N	Y			N	240	6	0		9000	22500	800	7386	0	$39,686
100-IU-6	600-111	P-11 Critical Mass Laboratory	8	8		N	Y			Y	64	6	0	1500	9000	22500	800	7386	0	$41,186
100-IU-6	600-202	Four Burn and Burial Pits at Hanford Townsite	500	250	20	N		Y		Y	125,000	20	0	1500	60000	22957	4533	7386	0	$96,377
100-IU-6	600-204	Hanford Townsite Burn and Burial Trench	46	3	2	N		Y		Y	138	6	0	1500	9000	22500	800	7386	0	$41,186
100-IU-6	600-208	Hanford Construction Camp Boiler House Ponds	60	20	5	Y			Y	N	1,200	4	0		6000	22500	800	7386	0	$36,686
100-IU-6	UPR-600-16	Fire and contamination spread; UN-600-16	180	100		N	Y			N	18,000	8	0		12000	22500	800	7386	0	$42,686
100-KR-2	100-K-13	French Drain west of 166 KW oil storage tank	5	5	15	Y	Y	Y		N	25	4	0		6000	22500	800	7386	0	$36,686
100-KR-2	100-K-29	183-KE Sandblasting Site	150	90	5	N	N	Y	Y	N	13,500	8	0		12000	22500	800	7386	0	$42,686
100-KR-2	100-K-30	183-KE Sulfuric Acid Tank Site (West)	33	12		N		Y	Y	Y	396	6	0	1500	9000	22500	800	7386	0	$41,186
100-KR-2	100-K-31	183-KE Sulfuric Acid Tank Site (East)	33	12		N		Y	Y	Y	396	6	0	1500	9000	22500	800	7386	0	$41,186

Table NB-3. Parameters and Results for Confirmation Sampling Cost Estimates. (Page 6 of 6)

Operable Unit	Number of Waste Sites	Name of Waste Site	Dimensions (ft)			Liquid Waste?		COPCs		Site Invest?	Area	# Samples	Individual Costs							Total Cost
			Length	Width	Depth		Rad	Organics	Metals				Analyses	Site Invest.	Excavation	PM/CM	Misc.	P & C	Adders	
100-KR-2	100-K-32	183-KW Sulfuric Acid Tank Site (East)	33	12		N		Y	Y	Y	396	6	0	1500	9000	22500	800	7386	0	$41,186
100-KR-2	100-K-33	183-KW Sulfuric Acid Tank Site (West)	33	12		N		Y	Y	Y	396	6	0	1500	9000	22500	800	7386	0	$41,186
100-KR-2	100-K-35	183-KE Acid Neutralization Pit	10	6	5	N	N	N	Y	Y	60	6	0	1500	9000	22500	800	7386	0	$41,186
100-KR-2	100-K-36	1706-KE Chemical Storage Facility Dry Well	2	2	7	Y	N	Y	Y	Y	4	4	0	1500	6000	22500	800	7386	0	$38,186
100-KR-2	100-K-46	119-KE French Drain	2	2	10	Y	Y	Y	Y	Y	4	4	0	1500	6000	22500	800	7386	0	$38,186
100-KR-2	100-K-48	100-KE Oil Contamination Areas				N		Y		N	unknown	20	0		30000	22500	1600	7386	0	$61,486
100-KR-2	100-K-49	100-KW Oil Contamination Areas				N		Y		N	unknown	20	0		30000	22500	1600	7386	0	$61,486
100-KR-2	120-KE-3	183-KE Filter Water Facility Trench for sulfuric acid sludge.	40	3	3	Y			Y	N	120	4	0		6000	22500	800	7386	0	$36,686
100-KR-2	120-KE-6	183-KE Former Sodium Dichromate Tank Site	20	20		N			Y	Y	400	6	0	1500	9000	22500	800	7386	0	$41,186
100-KR-2	120-KW-5	183-KW Former Sodium Dichromate Storage Tank Site	20	20		N			Y	Y	400	6	0	1500	9000	22500	800	7386	0	$41,186
100-KR-2	130-K-2	Former location of 1717-K Waste Oil Storage Tank				N		Y		Y	unknown	20	0	10000	30000	22500	1600	7386	0	$71,486
100-KR-2	130-KE-1	Former location of 105-KE Emergency Diesel Oil Storage Tank	20	20		N	Y	Y		Y	400	6	0	1500	9000	22500	800	7386	0	$41,186
100-KR-2	130-KW-1	Former location of 105-KW Emergency Diesel Oil Storage Tank	20	20		N	Y	Y		Y	400	6	0	1500	9000	22500	800	7386	0	$41,186
100-KR-2	600-29	100-K Construction Laydown Area; Surface Chemical Dumping Site	2000	1000		N	N	Y	Y	Y	2,000,000	20	0	1500	30000	22500	1600	7386	0	$62,986
100-KR-2	UPR-100-K-1	105-KE Fuel Storage Basin Leak	150	100	15	Y	Y	N	Y	N	15,000	4	0		6000	22500	800	7386	0	$36,686
																			SUM	$6,531,899

Table NB-4. Confirmation Sampling Estimate.

PM/CM	Hours/Day	Hourly $	$/Sample
Planning and Controls	2	52.08	
Design Engineering	1	65.27	
Procurement	1	44.75	
Project Management			
Environmental Compliance	0.5	61.36	
Field Support	9	47.68	
Environmental Engineering (samplers)	16	54.45	
Sample Management	2	54.45	
Heath and Safety	4	54.31	
Total PM/CM per day		2,097.79	
Administrative Services (6 hrs/project)	6	29.66	
Miscellaneous			
HPTs plus tools, per hour		56.35	
Materials, per sample			5.40
Planning and Closeout			
Planing, permits, total hours[a]	20	67.314	
Closeout report, total hours	80	67.314	

[a]Based on 80% Design Engineering, 20% Project Management.

Assumptions: 4 days/project for PM/CM if # 10 samples
6 days/project for PM/CM if >10 samples

If size is unknown:
For liquid waste sites, <10,000 ft^2 used
For non-liquid waste sites, >84,400 ft^2 used

2 HPTs for 8 hours for up to 10 samples, 16 hours for >10 samples.