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Briefing Book on Environmental and Waste Management Activities

T. A. Quayle
Regulatory Analysis

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**BRIEFING BOOK ON ENVIRONMENTAL AND
WASTE MANAGEMENT ACTIVITIES**

PREFACE

The purpose of the Briefing Book is to provide current information on Environmental Restoration and Waste Management Activities at the Hanford Site. Each edition updates the information in the previous edition by deleting those sections determined not to be of current interest and adding new topics to keep up to date with the changing requirements and issues. This edition covers the period from October 15, 1992 through April 15, 1993.

The sections are formatted to closely follow the contents of the sections that the Regulatory Analysis Group prepares for the annual Hanford Site Environmental Report. The sections are grouped in the following manner:

- Section 1.0 covers current oversight issues
- Section 2.0 deals with environmental compliance
- Section 3.0 discusses operations activities
- Section 4.0 focuses on restoration and waste management
- Section 5.0 provides information on onsite environmental monitoring
- Section 6.0 picks up miscellaneous issues.

To maintain the usability of this report, you are encouraged to provide any comments and suggestions that could lead to improving the document.

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EXECUTIVE SUMMARY

In previous issues, an executive summary was used to identify new, deleted, and changed items. A sentence of explanation accompanied the items to allow the reader to focus quickly on items of interest. New information was noted in shaded areas and a quick review of the shaded areas served as a brief review of the report. This edition has been updated entirely and every section has new content; therefore, shading and a summary are not feasible.

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ACRONYMS

ADS	activity data sheets
AKART	all known, available, and reasonable methods of treatment
BAT	best available technology
CCIP	Contamination Control Improvement Project
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
CFR	<i>Code of Federal Regulations</i>
CY	calendar year
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DOE-HQ	U.S. Department of Energy-Headquarters
DOH	Washington State Department of Health
DST	double-shell tank
EA	environmental assessment
Ecology	Washington State Department of Ecology
EIS	environmental impact statement
EM	Environmental Restoration and Waste Management
EPA	U.S. Environmental Protection Agency
ERA	expedited response action
FEMA	Federal Emergency Management Agency
FFCA	Federal Facility Compliance Agreement
FFTF	Fast Flux Test Facility
FONSI	finding of no significant impact
FR	<i>Federal Register</i>
FY	fiscal year
HAMMER	Hazardous Material Management and Emergency Response
HDW	Hanford Defense Waste
HEC	Hanford Environmental Compliance
HIPP	Hanford Integrated Planning Process
HRA	Hanford Remedial Action
HWVP	Hanford Waste Vitrification Plant
IDB	Integrated Data Base
IEI	International Environmental Institute
JCO	Justification for Continued Operation
KEH	Kaiser Engineers Hanford
LERF	Liquid Effluent Retention Facility
LLW	low-level waste
National Five-Year Plan	<i>Environmental Restoration and Waste Management Five-Year Plan: Fiscal Years 1993-1997</i>
NEPA	<i>National Environmental Policy Act of 1969</i>
NESHAP	National Emission Standard for Hazardous Air Pollutants
NOC	Notice of Construction
NOI	Notice of Intent
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Center
PCB	polychlorinated biphenyl
PFP	Plutonium Finishing Plant

ACRONYMS (cont.)

Plan and Schedule	<i>Plan and Schedule to Discontinue Disposal of Contaminated Liquids into the Soil Column at the Hanford Site</i>
PNL	Pacific Northwest Laboratory
PRF	Plutonium Reclamation Facility
PUREX	Plutonium-Uranium Extraction (Facility)
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
RFP	Request for Proposal
RL	U.S. Department of Energy, Richland Field Office
ROD	record of decision
RQ	reportable quantity
SAP	sampling and analysis plan
SCA	surface contamination area
SST	single-shell tank
TEDF	Treated Effluent Disposal Facility
TRIDEC	Tri-City Industrial Development Council
Tri-Party Agreement	<i>Hanford Federal Facility Agreement and Consent Order</i>
TRU	transuranic
TSD	treatment, storage, and/or disposal
TTF	Thermal Treatment Facility
TWRS	Tank Waste Remediation System
UO ₃	Uranium Trioxide (Plant)
WAC	<i>Washington (State) Administrative Code</i>
WHC	Westinghouse Hanford Company
WIPP	Waste Isolation Pilot Plant
WRAP	Waste Receiving and Processing (Facility)

BRIEFING BOOK ON ENVIRONMENTAL AND WASTE MANAGEMENT ACTIVITIES

1.0 OVERSEEING HANFORD SITE ENVIRONMENTAL COMPLIANCE AND CLEANUP

1.1 HANFORD SITE PLANNING ACTIVITIES

1.1.1 U.S. Department of Energy-Headquarters Five-Year Plan

Current and future efforts are focused on the public review of the National Five-Year Plan (DOE 1991a).

1.1.2 Fiscal Years 1993 Through 1999 Five-Year Plan Activity Data Sheets

The fiscal year (FY) 1993 through FY 1999 Environmental Restoration and Waste Management (EM) activity data sheets (ADS) (DOE-RL 1991a) are scheduled for submittal to the U.S. Department of Energy-Headquarters (DOE-HQ) on April 28, 1993. These ADSs represent planning based on DOE Site priorities.

These ADS reviews will contribute to developing the FY 1995 budget request for the Hanford Site's EM program.

With the actions and decisions that already have been incorporated into the ADSs, a baseline will be established for FY 1993 program execution. The cost and milestone data in the ADSs, Fiscal Year Work Plans (FYWP), and Multi-Year Program Plans (MYPP) will be the baseline for FY 1994 and outyear program planning. This step is crucial for the integration of the National Five-Year Plan with program baseline activities. As a result, any changes to ADS, FYWP, and MYPP milestones, budget, or scope baseline data will be documented on change requests and sent to DOE for formal approval before implementation.

1.1.3 Hanford Site-Specific Plan

The FY 1993 Hanford Site-Specific Plan comprises the following four major parts:

- Overview Document--The *Overview of the FY 1993 Site-Specific Plan* (DOE-RL 1991b) summarizes the detailed document and gives information of a more general interest. This document was released in March 1993.
- Detailed Information Document--The latest edition of the detailed information document, *Environmental Restoration and Waste Management Fiscal Year 1993 Site Specific Plan for the Richland Field Office - Hanford Site 5-Year Plan FY 1994 through 1998* (DOE-RL 1992c) was

completed and issued for public release in March 1993. This plan specifically addresses plans for FY 1993 based on FY 1992 accomplishments.

- Vision Statement--The vision statement, "Five-Year Vision for Hanford Cleanup," is Appendix B of the detailed information document. It presents the DOE's vision of the progress that should be achieved in the first 5 years to meet the 30-year goal of cleaning up inactive facilities and waste sites.
- Activity Data Sheets--The *Hanford Site Environmental Restoration and Waste Management Five-Year Plan Activity Data Sheets - Revision 1* (DOE-RL 1991a) include individual data sheets for each program or project activity. These ADSs form the basis of the planning contained in the National Five-Year Plan for the Hanford Site. The sheets consist of narrative, priorities, funding profiles, alternatives, and milestones for Hanford Site environmental restoration, waste management, and corrective action activities. The ADSs for FY 1995 through FY 1999 will be included in the FY 1995 President's Budget to Congress.

The documents described above were issued for public review and released in March 1993. A comment/response document will be issued after the public review. Resolution of the comments again will include the participation of the DOE, Richland Field Office (RL) and the contractors. In last year's comment/response document (DOE-RL 1992f), many of the public comments received focused on funding, *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1990) issues, the openness of the DOE, cleanup technologies, tank safety concerns, and tribal and land use concerns. Approximately 10 percent of the 343 comments were forwarded to DOE-HQ for resolution as part of the next National Five-Year Plan.

1.1.4 Hanford Site Roadmaps

Roadmaps are issues-oriented planning documents that provide a self-assessment of the Site's progress in completing its mission. Each DOE site was tasked with producing its own Roadmaps in FY 1992. Roadmaps are a planning tool used by the DOE EM. The Environmental Restoration Division completed its Roadmap in FY 1992. The primary Environmental Restoration issues identified were:

- The Tri-Party Agreement approach does not achieve efficient cleanup of past-practice sites.
- Treatment, storage, and/or disposal (TSD) policy; technology; and facilities to meet the defined mission and potential early (accelerated) remediation decisions are not established.
- The EM Program is not receiving the timely selection and development of site-specific cleanup technology that it requires.
- Lack of timely analytical results delays remedial investigation activities.

- Lack of timely decisions extends schedules and increases costs.
- *Non-Resource Conservation and Recovery Act of 1976 (RCRA)/Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)* work required to meet the 30-year (year 2018) cleanup goal is not driven by the Tri-Party Agreement.

The data requested in Roadmaps are being developed by programs in their MYPPs in FY 1993.

1.1.5 The Hanford Integrated Planning Process

The Hanford Integrated Planning Process (HIPP) is a joint effort of the Hanford Site contractors and RL to perform top-down, sitewide planning for the Hanford Site's new environmental mission. This new mission brings complex technical, legal, regulatory, and social challenges that demand this new integrated approach to site planning and management.

A guidance document outlining the mission of the Hanford Site is being prepared in FY 1993. It will provide assumptions, program interfaces, issues, and actions for the Hanford Site.

1.2 TRI-PARTY AGREEMENT

Originally signed on May 15, 1989, the Tri-Party Agreement is an agreement among the U.S. Environmental Protection Agency (EPA), the Washington State Department of Ecology (Ecology), and the DOE to achieve compliance with CERCLA remedial action provisions and with RCRA TSD unit regulation and corrective action provisions. The Tri-Party Agreement (1) defines and ranks RCRA and CERCLA cleanup commitments, (2) establishes responsibilities, (3) provides a basis for budgeting, and (4) reflects a concerted goal of achieving full regulatory compliance and remediation, with enforceable milestones, in an aggressive but achievable manner. Ninety-six of one hundred milestones scheduled for 1992 were completed, although some were delayed as approved through the change request process. Included in these completed milestones were the following activities:

- Two RCRA Part B permit applications and four closure plans were submitted to Ecology for Hanford TSD facilities.
- Ten Aggregate Area Management Study Reports for the 200 Areas of the Hanford Site were submitted to Ecology.
- Actions to meet 37 Tri-Party Agreement milestones dealing with management of liquid effluents at the Hanford Site were completed.
- Twenty-six RCRA groundwater monitoring wells were installed.

1.2.1 Tri-Party Agreement Milestone Status

As of February 28, 1993, 241 of 245 enforceable milestones have been met on schedule or in accordance with a revised schedule approved by the EPA and Ecology.

1.2.1.1 Milestones M-05-03 and M-05-04. Two Tri-Party Agreement milestones (M-05-03 and M-05-04) require the stabilization of 13 single-shell tanks (SST). On August 28, 1991, DOE-HQ halted progress on stabilizing the tanks to resolve the issue of potentially adding liquid to "watch list" (Public Law 101-510, Section 3137 [Wyden Amendment]) tanks. DOE submitted a request to change milestone M-05-03 on September 9, 1991, but Ecology and EPA denied it. On October 7, 1991, DOE invoked dispute resolution. On December 17, 1991, DOE reiterated the difficulties in meeting future M-05 milestones. DOE withdrew the request and terminated dispute resolution but indicated that it would submit a new request when better information is available to determine impacts to future M-05 milestones. Safety issues still exist with SSTs, and pumping continues to be impacted.

1.2.1.2 Milestone M-14-00. Another milestone not met (M-14-00) requires the construction and operation of a low-level mixed waste laboratory. DOE, EPA, and Ecology agreed to use commercial laboratories, with penalties assessed for failure to comply with the Tri-Party Agreement. In addition, if mandated sample turnaround times are not met with commercial laboratories, the agreement requires the construction of additional laboratory facilities. Ecology and EPA raised concerns about the Request for Proposal (RFP) for commercial laboratory services not satisfying the agreement for milestone M-14-00. The two key issues are the timeframe for a local laboratory coming into operation and the quantity of samples that may be sent to secondary contract labs.

1.2.1.3 Milestone M-31-02. An extension was requested for milestone M-31-02 requiring the evaluation of additional double-shell tank (DST) requirements, so that necessary information on future tank needs may be incorporated from the ongoing Tank Waste Remediation System planning and integration effort. This planning and integration effort became necessary in part because of the determination that the B Plant could not meet RCRA requirements, allowing tank waste pretreatment and the need to address tank waste safety issues. The request for extension was denied by the EPA and Ecology and, dispute resolution, as provided by the Tri-Party Agreement, was entered to reach a resolution on this issue.

1.2.1.4 Liquid Effluent Milestones Approved. DOE, EPA, and Ecology approved change form M-17-91-05A, which will add 84 new milestones to the Tri-Party Agreement in the area of liquid effluents, on August 31, 1992. Numerous public comments were generated related to continued discharge of liquid effluents at the Hanford Site and change form M-17-91-05A. Resolution of these comments required renegotiation of some of the 84 milestones and the adoption of restrictions on the volume to be discharged from some of these streams. This change package also deleted the proposed milestones for the Decontamination Laundry Facility because the DOE will pursue a private, offsite vendor for those services.

1.2.2 Other Tri-Party Agreement Developments

The following is a summary of the other more significant compliance events occurring in the current reporting period.

- Third Amendment Approved--DOE, EPA, and Ecology approved a third amendment to the Tri-Party Agreement on August 31, 1992 that extends the review and revision time periods for RCRA Part B permit applications and closure plans. This amendment became necessary because of the complexity of permitting and/or closing facilities at the Hanford Site.
- Definitive design of the new Multi-Function Waste Tank Facility was initiated.
- Improved in-tank monitoring, a revised contingency plan for leaks, and physical preparations for emergency pumping of liquids were provided for SST T-101.
- Construction of the Hanford Waste Vittrification Project (HWVP) Canister Storage Building/Multi-Purpose Storage Building was initiated.
- A draft RCRA closure plan for the 100-D Pond was completed and submitted to EPA and Ecology.
- On April 2, 1993, RL invoked dispute resolution for the Solid Waste Designation Compliance issue originated by Ecology's Notice of Penalty (\$100K) and Compliance Order, March 10, 1993 (see Section 2.1.3).

1.3 Federal Facility Compliance Agreement

The Federal Facility Compliance Agreement (FFCA) establishes that federal facilities do not have sovereign immunity from state enforcement of environmental laws. The FFCA includes a 3-year moratorium on enforcement of mixed waste land disposal restriction requirements. The moratorium requires that DOE facilities that generate or store mixed wastes prepare a mixed waste treatment plan except for facilities that are currently covered by a permit, agreement, or order that establishes a schedule for treatment of these wastes. The Hanford Site, through the Tri-Party Agreement, has such an agreement and therefore is not required to submit a site treatment plan. DOE has discussed this issue with Ecology and the EPA, and has requested their confirmation that a plan is not required. The Site received EPA concurrence with this view on March 18, 1993, and is awaiting a response from Ecology.

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2.0 ENVIRONMENTAL COMPLIANCE STATUS

2.1 RESOURCE CONSERVATION AND RECOVERY ACT/ WASHINGTON (STATE) ADMINISTRATIVE CODE 173-303 COMPLIANCE ACTIVITIES

2.1.1 Resource Conservation and Recovery Act/Dangerous Waste Permit Applications and Closure Plans

For purposes of RCRA and Ecology's Dangerous Waste Regulations, the Hanford Facility is considered to be a single facility encompassing over 60 TSD units. The Tri-Party Agreement (Ecology et al. 1990) recognizes that all of the TSD units cannot be permitted simultaneously, and sets up a schedule for the submittal of TSD unit-specific Part B RCRA/Dangerous Waste permit applications and closure plans to Ecology and EPA. During the reporting period, initial submittals of the following closure plans were made on schedule in fulfillment of Tri-Party Agreement milestones.

- Hanford Patrol Academy
- 200 West Area Ashpit Demolition Site
- 218-E-8 Borrow Pit Demolition Site
- Hexone Storage and Treatment Facility.

During the reporting period, work also continued on the preparation and/or revision of 13 TSD unit-specific Part B RCRA/Dangerous Waste permit applications and 12 closure plans. Revisions were conducted in response to review comments received from Ecology and EPA.

2.1.2 Management of Listed Waste Contaminated Soil

RL has implemented a surface contamination remediation program to address radiological surface contamination at the Hanford Site tank farm facilities. The current proposal is to remove the top 15 cm (6 in.) of contaminated soil from these facilities and to replace this soil with clean material.

To address the issue of environmental media contaminated with listed waste, the EPA developed the contained-in policy. This policy regulates mixtures of environmental media and listed wastes as long as the media in question contain such listed waste at concentrations in excess of specified health-based standards.

The RL has transmitted a letter to Ecology proposing to implement the contained-in policy for soil excavated from the tank farm facilities. On February 16, 1993, Ecology issued a policy statement condoning the use of EPA's contained-in policy. This policy states that, as an interim policy, risk-based action levels should be established using residential standards calculated under "The Model Toxics Control Act Cleanup Regulations" (WAC 173-340). This policy statement also allows contingent management (i.e., allowing application of the contained-in policy provided the media is managed in a specific manner, which further reduces risk to human health or the environment) to be considered on a case-by-case basis.

2.1.3 Enforcement Actions

- On October 27, 1992, Kaiser Engineers Hanford (KEH) and DOE received a compliance letter related to an Ecology inspection of the 200 East Area Slab Yard. The alleged violations were associated with waste generator and container management requirements. On November 16, 1992, RL letter #93-RPA-051 was issued to Ecology responding to the findings.
- On October 30, 1992, Ecology issued a compliance letter to Pacific Northwest Laboratory (PNL) and DOE following an inspection of the 305-B Storage Facility. Alleged violations were related to container management standards. On December 2, 1992, RL letter #93-RPA-061 was issued to Ecology responding to the findings.
- On November 12, 1992, Ecology issued a compliance letter on alleged violations at the SST 241-101-T. The violations were associated with the leak detection capabilities of the tank. With the letter, Ecology initiated a Tri-Party Agreement change request to add new milestones. New milestones have been approved by DOE, EPA, and Ecology, and are being completed on schedule.
- On January 15, 1993, DOE and Westinghouse Hanford Company (WHC) received a compliance letter from Ecology for waste storage issues in the 241-SY-101 Tank Farm. The violations noted include exceeding the waste accumulation limit of 120 days, and compliance problems associated with generator waste storage, pursuant to WAC 173-303-200 and WAC 173-303-630. DOE has issued a formal response. No additional actions were necessary.
- On March 10, 1993, DOE and WHC received a Notice of Penalty Incurred and Due for failure to designate these solid wastes as dangerous or extremely hazardous to public health and the environment. Approximately 2,000 containers of solid waste were an alleged violation of WAC 173-303-170(1)(a) and the implementation of WAC 173-303-070.

2.1.4 Groundwater Monitoring

Twenty-six groundwater monitoring wells were constructed at nine RCRA TSD facilities to meet the calendar year (CY) 1992 Tri-Party Agreement milestone M-24-00. The RCRA groundwater monitoring wells were constructed at the following TSD facilities in CY 1992: 216-B-63 Trench, Grout Treatment Facility, SSTs (A/S Tank Farms), nonradioactive dangerous waste landfills, 216-B-3 Pond system, low-level burial grounds, 216-S-10 Pond and Ditch, 216-A-29 Ditch, and 100-N facilities. All well locations were approved by Ecology before drilling.

Four wells were also constructed for Projects W-049H (three wells) and C-018H (one well). Pursuant to WAC 173-160, a regulatory variance on well W18-32 in the low-level burial grounds was issued by Ecology for noncompliance with the construction standards.

2.2 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT COMPLIANCE ACTIVITIES

2.2.1 Expedited Response Actions

In October 1990, the Secretary of Energy proposed three accelerated cleanup actions. These actions would be completed as expedited response actions (ERA) (to hasten cleanup and prevent further spread of contamination). In 1992, the Secretary of Energy proposed six more accelerated cleanup actions. The actions would (1) remove drums thought to contain hexone and uranium from a burial ground in the 300 Area, (2) remove carbon tetrachloride from the vadose zone of two ground disposal sites in the 200 West Area, (3) remove contaminated sediments from the bottom of 300 Area Process Trench, (4) characterize and identify physical hazards associated with the 100 Area North Slope Disposal Site, (5) characterize and identify chemical hazards to the soil from the 100 Area Pickling Acid Crib, (6) excavate and remove debris in the 100 Area Sodium Dichromate Landfill, (7) characterize and identify residual contamination of the 34 km² (13 mi²) area in the northwest corner of the Hanford Site (Riverland), (8) characterize and identify hazards to the soil in the burial grounds north of the 300 Area, and (9) mitigate flow of contamination to the Columbia River through pump hydraulic controls and grouting curtain of N Springs in the 100 Area.

2.2.1.1 Status of Currently Developing ERAs. ERAs for the following specific waste sites are in progress at the Hanford Site. Status for the period from January 1 through April 1, 1993, is given below:

- 618-9 Solvent Waste Burial Ground--Excavation has been completed and noncontaminated solvents have been shipped offsite to a permitted hazardous waste disposal facility. This ERA activity was considered complete in October 1992.
- Carbon Tetrachloride Vapor Extraction--Vapor extraction from the vadose zone beneath 200 West Area began in February 1992 with one vacuum system operating 24 hours per day at a 14-m³/min (500-ft³/min) capacity. A second 14-m³/min (500-ft³/min) system was operational in February 1993. A third system was installed and upgrades were made to the first two operating systems to provide a total of 85-m³/min (3,000-ft³/min), around-the-clock vapor extraction program. The 85-m³/min (3,000-ft³/min) capability became functional March 31, 1993.
- 316-5 Process Trenches--Contaminated sediment and soil were removed from the active portion of the trenches. Soil sampling, laboratory analysis, and data validation were conducted. A final report was issued in July 1992.
- North Slope Disposal Sites--The North Slope (Wahluke Slope) is located on the northern and eastern borders of the Hanford Site. It was used by the U.S. Army for NIKE missile sites and anti-aircraft gun emplacements during the Cold War era. The guns and missiles have been removed, but numerous physical hazards associated with these facilities remain. Early cleanup of the North Slope is

desirable because the area is accessible to the public and would free 492 km² (190 mi²) of Hanford Site land for other uses. Field activities conducted to date include soil sampling and geophysical surveys.

- Pickling Acid Cribs--Nitric and hydrofluoric acids were used in the 1940's to clean or "pickle" galvanized pipe before being used in the construction of the 100 Area reactors at the Hanford Site. The Pickling Acid Cribs, located south of the White Bluffs townsite, were used to dispose of used acid. No radiological hazards are believed to be associated with this site. Field activities conducted to date include soil sampling, ground-penetrating radar surveillance, and test pit excavations.
- Sodium Dichromate Landfill--During Hanford's early production years, sodium dichromate was added to reactor cooling water to prevent pipe corrosion. Empty chemical drums were placed in a ravine and covered with soil. Construction debris may also have been disposed of at this site. In January 1993, EPA and Ecology recommended excavation and removal of the debris to accomplish a clean record of decision (ROD). Cleanup and excavation activities were completed on April 13, 1993. Over 4,000 crushed drums were excavated and are being sent to the central landfill. No indication of contamination has been revealed through field screening and laboratory analysis.
- Riverland--Riverland is located in the northwest corner of the Hanford Site, west of Highway 240. The area is approximately 34 km² (13 mi²) of property consisting of two anti-aircraft gun emplacements, an insecticide/pesticide can dump, a transit waste dump, a munitions cache, and a railroad maintenance facility. The railroad facilities were decommissioned in 1963. The railroad maintenance shop pits ("wash pit") were used to clean and decontaminate railroad cars of grease and low-level radioactivity from 1943 to 1957. Site characterization has shown radiological readings are at background levels. Characterization has identified residual diesel fuel contamination of the pit concrete and insecticide residuals as the hazardous substances of concern. An engineering study of removal alternatives is being prepared.
- 618-11 Burial Grounds--The 618-11 (WYE) Burial Ground is located 12 km (7.5 mi) north of the 300 Area, adjacent to Washington Public Power Supply System Plant Number 2. Low-level, intermediate, high-level activity, and transuranic (TRU) wastes from 300 Area research facilities were disposed of into trenches, caissons, and pipe storage units from 1962 to 1967. An engineering study of removal alternatives is being prepared and is scheduled for issue in June 1993.
- N-Springs--Engineering alternatives are being evaluated that will control the migration of contaminated groundwater into the Columbia River. The draft engineering study is scheduled for completion in May 1993.

2.2.2 CERCLA Reportable Releases

There were three releases reported under the CERCLA reportable quantity (RQ) requirements between January 1, 1993 and April 1, 1993. The first spill involved a continuous release of carbon tetrachloride during the solvent extraction process at the Plutonium Reclamation Facility (PRF). The second spill involved a small amount of antifreeze (ethylene glycol) being released to the asphalt roadway in the 100-H Area. The third spill involved a small amount of highly concentrated polychlorinated biphenyl- (PCB) contaminated oil being released in the 189-D Area. The PCB level for this spill was below the CERCLA RQ, but was required to be reported per 40 CFR 761.125(c)(1)(i). Absorbent material was applied to the spills and the contaminated mixtures were disposed of according to the proper regulations. Appropriate notifications were made to the National Response Center (NRC), Ecology, and the EPA in accordance with CERCLA. There was no impact to personnel or the environment.

2.2.3 Lawsuit Filed

The Legal Advocates for Washington and Heart of America, Northwest filed a lawsuit against both WHC and RL on April 16, 1992. The suit alleges that WHC and DOE failed to notify the appropriate agencies on releases of hazardous substances from Tanks 106-C and 105-A, connected piping, ventilation, infrastructure, duct work, and other connected tanks. Ecology has filed an Amicus Brief on the applicability of CERCLA to the discharges. Presently, the parties are awaiting adjudication on the defendants' "Motion to Dismiss." No other lawsuits on CERCLA were filed during this time period.

2.3 CLEAN AIR ACT PERMITS/COMPLIANCE ACTIVITIES

2.3.1 Compliance with the Revised 40 CFR 61 Emission Measurement Requirements

On February 3, 1993, the DOE and the Hanford Site contractors received a compliance order from the EPA, pursuant to Sections 113 and 114 of the *Clean Air Act*. This compliance order requires DOE to comply with the radionuclide National Emission Standard for Hazardous Air Pollutants (NESHAP) by evaluating radionuclide emission points at the Hanford Site and performing continuous emission measurements, as specified by 40 CFR 61.93. In addition, EPA has required that DOE prepare a written compliance plan by April 30, 1993 to address the requirements of the compliance order. The compliance plan must provide schedules for implementation and for monthly reporting of work completed and work planned for the following month. EPA expects to use this schedule as the basis for an FFCA to be developed with DOE. This FFCA will formalize the schedule of emissions assessment and any necessary measurement compliance actions.

2.3.2 Washington State Department of Health

On February 2, 1993, the Washington State Department of Health (DOH) issued a Notice of Violation (NOV) for radioactive airborne emission issues

related to the proposed fuel encapsulation activities at the 100-KE Fuel Storage Basins. The NOV stated that DOE and WHC have initiated work that directly supports fuel encapsulation, without DOH's approval, pursuant to WAC 246-247. The NOV formally directed DOE and WHC to stop all work at the 100-KE Basins immediately. DOE has formally responded to the NOV, and has initiated a Notice of Construction (NOC). Formal discussions have begun with DOH; final resolution is pending.

2.3.3 Prevention of Significant Deterioration

Under the Prevention of Significant Deterioration (PSD) program within the *Clean Air Act*, the Plutonium-Uranium Extraction (PUREX) facility and Uranium Trioxide (UO₃) Plant nitrogen oxide emissions are permitted. Emissions from the PUREX facility essentially have ceased with the cessation of all cladding removal and fuel dissolution in 1989. The UO₃ Plant has not operated during 1992 or 1993; therefore, emissions are also negligible. Emissions are expected during the upcoming UO₃ Plant stabilization campaign, which will consist of a preconcentration phase and a calcination phase. The campaign is expected to take approximately 1 month to complete.

2.4 CLEAN WATER ACT PERMITS/COMPLIANCE ACTIVITIES

The *Clean Water Act* applies to all discharges to waters of the United States. At the Hanford Site, the regulations are applied through a National Pollutant Discharge Elimination System (NPDES) permit governing effluent discharges to the Columbia River.

2.4.1 NPDES Permit Status

- Six permitted outfalls are operated within the NPDES permit. Two outfalls had instances of noncompliance. Outfall 003 (181-KE inlet screen backwash) of the 100-K Area exceeded the allowance for total suspended solids. This incident was reported to the EPA on August 6, 1992 as an unusual occurrence, and discharge has been discontinued. Discharge will not likely be resumed. The current plan is to dispose of the effluent from the filter backwash operation to an alternate site not associated with NPDES requirements. Outfall 004 had an exceedance of the specified holding time limit during November 1992.
- Permit applications have been submitted to the EPA Region 10 for three new facilities (outfalls) planned for the 100 and 300 Areas. These new facilities include a treatment facility for process waste water (1325-N), as well as filter backwash/ash sluicing wastewater disposal facility (315/384) and the 300 Area Treatment Effluent Disposal Facility (Project L-045H).

2.4.2 Lawsuit Filed

The Heart of America filed a lawsuit against both WHC and DOE on April 16, 1992. The suit alleges violations of the *Clean Water Act* caused by discharges of pollutants without a NPDES permit in the 300 Area Process Trenches, the U-17 Crib, and the Z-20 Crib. Ecology has filed an Amicus Brief on the applicability to the discharges described. Currently, the parties involved are awaiting adjudication on the defendants' "Motion to Dismiss."

2.4.3 Liquid Effluent Consent Order

The consent order, DE 91NM-177 (216 Consent Order) (Ecology and DOE 1992), regulating Hanford Site liquid effluent discharges, was signed on December 23, 1991 by RL and Ecology. The 216 Consent Order contains compliance milestones for Hanford Site liquid effluent streams designated as Phase I, Phase II, and miscellaneous streams. In accordance with terms of the order, sampling and analysis plans have been submitted to Ecology for the Projects W-049H and C-018H effluent streams. The UO₃ Plant process condensate to the 216-U-17 Crib, the UO₃ Plant wastewater to the 216-U-14 Ditch, the Plutonium Finishing Plant (PFP) wastewater, and 400 Area secondary cooling water sampling and analysis plans have been approved by Ecology. In addition, the liquid effluent sampling quality assurance project plan was also approved by Ecology.

2.5 TOXIC SUBSTANCES CONTROL ACT

2.5.1 Radioactive Polychlorinated Biphenyl Waste Management

Radioactive waste with greater than or equal to 50 parts per million PCBs is being stored at the Hanford Central Waste Complex. Meetings with the EPA have commenced and negotiations are continuing on a compliance agreement for the storage of radioactive PCB waste, pursuant to 40 CFR 761. This agreement, between RL and the EPA Region 10, is intended to allow the acceptance and storage of radioactive PCB waste at the Hanford Site until an adequate disposal or treatment technology/capacity is available and the accumulation of the stored waste can be eliminated.

2.6 NATIONAL ENVIRONMENTAL POLICY ACT

2.6.1 Hanford Site Environmental Impact Statements

This section gives brief descriptions of pending, planned, and recently approved environmental impact statements (EIS) affecting the Hanford Site.

2.6.1.1 Environmental Impact Statements in Progress.

2.6.1.1.1 U.S. Department of Energy, Headquarters, Office of Environmental Restoration and Waste Management Programmatic Environmental Impact Statement.

- Purpose--This EIS will evaluate the potential nationwide environmental impacts of DOE's EM program. It could include actions for remediations, compliance with RCRA and CERCLA, restoration, waste management, and repositories.
- Status--The Notice of Intent (NOI) was published in the *Federal Register* in October 1990. DOE-HQ issued an implementation plan for public comment in FY 1992 (DOE 1992a).

2.6.1.1.2 Weapons Complex Reconfiguration Modernization Programmatic Environmental Impact Statement, U.S. Department of Energy, Headquarters, Office of Defense Programs.

- Purpose--This programmatic EIS assesses the potential environmental impacts of the overall restructuring of the DOE defense program and its facilities, both on a programmatic and site-specific level.
- Status--The Hanford Site is being evaluated as a location for all or part of the reconfigured weapons complex. Consolidation of nonnuclear elements was removed from the scope of this EIS and is being addressed in an environmental assessment (EA). Currently the EA is in review at DOE-HQ.

2.6.1.1.3 Comprehensive River Conservation Study/Environmental Impact Statement - Hanford Reach of the Columbia River, National Parks Service, Draft Environmental Impact Statement.

- The National Parks Service released a draft EIS on July 2, 1992 (National Parks Service 1992), that considers options for the future management of the Hanford Reach of the Columbia River. The agency's proposed action is to make the Wahluke Slope a National Wildlife Refuge and to designate the Hanford Reach of the Columbia River as a Wild and Scenic River. This would transfer responsibility for the river, a quarter-mile-wide strip of land on both shores, and most of the Wahluke Slope to the U.S. Fish and Wildlife Service. DOE would retain responsibility for remediation, environmental monitoring, cultural resource management, and Hanford Site security.
- Status--The final EIS is in preparation, and is expected to be released in summer 1993.

2.6.1.1.4 Hanford Remedial Action Environmental Impact Statement.

- Purpose--Potential environmental impacts of CERCLA and RCRA remediation activities at the Hanford Site, particularly cumulative impacts, will be assessed in the Hanford Remedial Action-Environmental Impact Statement (HRA-EIS). The HRA-EIS could cover environmental restoration of past-practices liquid effluent disposal

sites, buried solid low-level wastes (LLW), pre-1970 TRU wastes, high-activity wastes associated with storage tanks and their piping, and miscellaneous dangerous and nondangerous waste sites. Additional *National Environmental Protection Act of 1969* (NEPA) documentation could be prepared, as needed, for specific remediation of individual operable units or construction of waste management facilities.

The HRA-EIS will not make site-specific "level of cleanup" decisions. CERCLA has the final authority to determine the appropriate level of cleanup for each operable unit. Instead, the HRA-EIS NEPA ROD may establish a range of future site uses that in turn can be used in the CERCLA ROD as justification for cleanup levels. The CERCLA ROD will ensure the protection of the environment and public from hazardous substances. The NEPA ROD will allow DOE to assign the necessary natural resources to support the CERCLA and RCRA missions. The use of the HRA-EIS as a land management NEPA document is still being developed as a result of public input received during scoping. The scope of the HRA-EIS will be clear once the implementation plan is issued.

- Status--The NOI was published in the *Federal Register* on August 21, 1992. Scoping meetings began in September and scoping was to have closed November 25, 1992. Because of a public request, however, the public comment period was extended to February 15, 1993. The ROD is targeted for publication in 1995.

2.6.1.2 Planned Environmental Impact Statements.

2.6.1.2.1 Hanford Sitewide Environmental Impact Statement.

- Purpose--As part of his 10-point initiative in June 1989, the Secretary of Energy mandated an EIS for each DOE facility. This EIS will document the impacts from the overall operations and activities at the Hanford Site and will provide a baseline analysis.
- Status--DOE-HQ has directed the Hanford Site and other sites to delay their sitewide EISs until Lawrence Livermore National Laboratory and Rocky Flats Plant have completed their EISs. The Hanford Sitewide EIS will be completed after finalization of the HRA-EIS and the Tank Waste Remediation System (TWRS)-EIS.

2.6.1.2.2 Tank Waste Remediation System Environmental Impact Statement.

- Purpose--This EIS has its origin in two DOE decisions. The first was an October 1990 commitment by the Secretary of Energy to prepare a supplement to the Hanford Defense Waste (HDW)-EIS to address tank management and safety issues. The second was a December 1991 decision by the Secretary of Energy to rebaseline the entire tank safety/tank waste treatment and disposal program, and to accelerate retrieval of SST waste. This EIS combines the scope of the originally planned supplemental EIS and the tank safety mitigation/remediation issues EIS.

- Status--The draft NOI is being revised to reflect the rebaselining of the TWRS program and preliminary DOE-HQ comments. The NOI is expected to be published in the *Federal Register* in 1993.

2.6.1.2.3 Irradiated Fuels Environmental Impact Statement.

- Purpose--This EIS will assess future management alternatives for irradiated fuel at the Hanford Site, such as interim storage.
- Status--Publication of the NOI is delayed pending finalization of an implementation plan for the EM programmatic EIS. A programmatic EIS draft implementation plan identified the need for DOE to evaluate whether consolidation of irradiated fuel storage at single or multiple DOE sites is a reasonable alternative.

2.6.1.3 Recently Approved Environmental Impact Statements.

Draft Environmental Impact Statement, Decommissioning of Eight Surplus Reactors at the Hanford Site, Richland, Washington (DOE 1989)

- Purpose--This EIS assessed potential environmental impacts of decommissioning eight water-cooled, graphite-moderated reactors on the Hanford Site. The EIS evaluated five alternatives, including immediate one-piece removal, safe storage followed by deferred dismantlement, and in situ decommissioning. Decommissioning of N Reactor is not included within the scope.
- Status--The final EIS was issued in the form of an addendum to the draft EIS in December 1992. A Notice of Availability was published in the *Federal Register* on January 15, 1993 (58 FR 4690), to give the public the opportunity to review the final EIS. After a minimum 30-day comment period, a ROD will be published in the *Federal Register*. DOE has determined that after a "multiyear safe storage period" the reactor blocks will be decommissioned on the 200 Area Plateau.

2.6.1.4 Environmental Assessments in Preparation.

- Proposed 200 Areas Steam Plant Replacement. After review of early drafts, the final draft EA for the steam plant project is in review and is scheduled to be submitted to RL in May 1993.
- Proposed Interim Stabilization of Eight Tanks Containing Ferrocyanide. The preparation of an EA for interim stabilization of eight SSTs containing ferrocyanide was initiated August 31, 1992. The proposed EA was submitted to RL on January 27, 1993 for DOE review.
- Proposed Replacement of the Cross-Site Transfer System. This EA addresses the replacement of the cross-site waste transfer line between 200 East and 200 West Areas. The EA was submitted to RL on December 31, 1992 for review and comment.

- Proposed 222-S Radiative Waste Line Replacement and 219-S Double Containment Upgrade. These projects will replace aging drain lines from the 222-S Analytical Laboratory to the 241-SY Tank Farm and upgrade the 219-S Waste Handling Facility, which treats the liquid waste from the Laboratory. A draft EA and a finding of no significant impact (FONSI) were submitted to RL on December 9, 1992. In January, RL provided comments on the EA. The document was revised and re-submitted to RL in March 1993.
- Proposed Enhanced Radioactive Waste Storage Facility-Phase V. This EA addresses the proposed construction of a facility to store waste products before processing in the Waste Receiving and Processing (WRAP) Facility. Additional support facilities are included as an infrastructure upgrade. The EA was submitted to RL on January 29, 1993 and is in review. DOE recently directed that the EA be revised to include the Phase I retrieval operation from the low-level burial grounds. This revision is in preparation.
- Proposed 300 Area Process Sewer Upgrade. The EA addresses a proposal to upgrade the existing 300 Area process sewer lines leading to the 300 Area Treated Effluent Disposal Facility. The draft EA was submitted to RL in March 1993.
- Proposed Tank 241-C-103 Vapor Phase Characterization. This EA proposes to sample the organic vapor and liquid in Tank 241-C-103. This SST is on a Hanford Site watch list because of organic waste reactivity concerns. There are also concerns related to potentially toxic gases and the potential flammability of the organic vapor/liquid layer within the tank. The EA will assess worker and public risk from an explosion, from uncontrolled releases to the atmosphere caused by rapid chemical reactions, and from toxic vapors. The EA was submitted to RL in April 1993.
- Proposed Rotary Mode Sampling of Ferrocyanide Waste Storage Tanks. This EA addresses a proposal to characterize tank waste by installing and operating a rotary mode sampling system to obtain samples of tank waste salt cake. Existing characterization devices can obtain samples of the soft tank wastes, such as liquids and sludges. However, characterization efforts require methods to sample the hard wastes as well. The preparation of this EA was initiated in February 1993. This EA is temporarily on hold until technical design considerations are finalized.

2.6.1.5 Recently Approved Environmental Assessments.

- DOE/EA-0429, *Environmental Assessment for the Proposed Construction and Operation of the Environmental Molecular Sciences Laboratory* (DOE 1992b). PNL Environmental and Molecular Sciences Laboratory will provide, in a single location, a suitable facility for basic and applied research directed toward environmental compliance and remediation programs carried out by DOE at the Hanford Site. The FONSI was approved on September 17, 1992.

- DOE/EA-0802, *Proposed Pump Mixing Operations to Mitigate Episodic Gas Releases in Tank 241-SY-101* (DOE 1993a). This EA addresses the installation and operation of a mixer pump to test the possibility of mixing the waste in Tank 241-101-SY to allow trapped hydrogen bubbles to be released on a continuous basis. Theoretically, releasing gas in this manner would eliminate the episodic gas releases that periodically cause the gas weight percent to exceed 25 percent of the lower flammability limit. The FONSI was approved at the DOE-HQ on September 18, 1992.
- DOE/EA-0803, *Tank 241-SY-101 Equipment Installation and Operation to Enhance Tank Safety, Hanford Site* (DOE 1993b). This EA addressed several projects designed to enhance the safety and environmental monitoring systems in Tank 241-SY-101. This involved the installation and operation of (1) a permanent inlet filter; (2) a multifunctional instrument tree; (3) standard hydrogen monitoring systems; (4) a velocity, density, and temperature tree; and (5) a gas chromatograph. Removal of air lances from within the tank was also addressed. The FONSI was issued at DOE-HQ on August 13, 1992.

3.0 MAJOR OPERATIONS AND ACTIVITIES

3.1 IRRADIATED FUEL STORAGE AND PROCESSING

DOE does not designate irradiated fuel to be a waste, and it is not included in the waste inventory.

3.1.1 Irradiated Fuel Inventory, Storage, and Planned Actions

Approximately 2,100 metric tons of irradiated uranium fuel from N Reactor are stored in the 105-KE and KW Basins. The fuel at the 105-KW Basin is encapsulated and the fuel at the 105-KE Basin is currently stored in open-topped canisters. WHC plans to encapsulate the fuel now stored in open-topped canisters at the 105-KE Basin.

Approximately 11.0 metric tons of irradiated heavy metal fuel from the Fast Flux Test Facility (FFTF) continue to be stored at the 400 Area. Approximately 1.9 metric tons of unirradiated FFTF fuel is stored at FFTF and PFP. Movement of some FFTF irradiated fuel to cask storage is being considered.

Approximately 15.7 metric tons of irradiated uranium fuel from the Shippingport Pressurized Water Reactor Core II are stored at T Plant. Movement of the Shippingport fuel to dry storage is currently being evaluated. A small amount of aluminum-clad, single-pass reactor fuel is stored at the PUREX Plant storage basin and the 105-KE and KW Basins; approximately 2.9 metric tons uranium at the PUREX Plant and 0.5 metric tons uranium in 105-KE and KW Basins. Consolidation of all Shippingport fuel at the 105-KE and KW Basins storage pools is being planned.

About 2.6 metric tons of heavy metal fuel are retrievably stored in several facilities in the 300 Area and at the 200 West Area Low-Level Burial Grounds. This fuel was primarily brought to the Hanford Site to support postirradiation examination programs. Approximately 85 percent of this fuel is from commercial light-water reactors and is stored in hot cells at the 324 Building. Another 12 percent of this fuel is retrievably stored in shielded containers in the 200 West Area Low-Level Burial Grounds and is primarily FFTF and Experimental Breeder Reactor Number II fuel pin pieces.

Approximately 290,000 kg of uranium in spent nuclear fuel assemblies from the Washington Public Power Supply System Plant Number 2 also are located at the Hanford Site. The assemblies in the reactor vessel and adjacent pool cell contain approximately 129,000 and 161,000 kg of uranium, respectively. Though located on the Hanford Site, the reactor and the fuel are owned and managed by the Washington Public Power Supply System, not DOE.

3.1.2 Irradiated Fuel Disposition

In the past, irradiated fuels from Hanford Site production reactors (N Reactor and single-pass production reactors) were processed through large chemical processing plants, such as the PUREX Plant, to recover plutonium for defense and research purposes. Shippingport and FFTF irradiated fuels were also to be processed at the PUREX Plant after completion of N Reactor irradiated fuel processing. This program changed in October 1990 when the DOE Secretary of Energy announced that plutonium from the Hanford Site was not needed at the present time and that DOE would have an EIS prepared to assess impacts of potential management and disposal options for irradiated fuel at the Hanford Site. Subsequently, DOE determined that the underlying need for the EIS is interim storage of the irradiated fuel until a geologic repository is available for DOE-owned materials or a beneficial use is identified. DOE delayed preparation of the EIS until DOE complex fuel strategies and scope and alternatives of the programmatic EIS for DOE's EM Programs were developed adequately. Recently DOE determined that these activities have evolved sufficiently to proceed with preparation of the EIS.

3.1.3 PUREX Plant Status and Plans

The PUREX Plant achieved the standby configuration in October 1992. Remaining solvent has been isolated in two tanks awaiting a contract placement to ship offsite for incineration. Remaining plutonium oxide has been removed and shipped to PFP. Plutonium liquid systems were flushed and all plutonium/uranium solutions were isolated in two 18,927-L (5,000-gal) tanks in the canyon. Aqueous makeup tanks have been drained and flushed except one caustic tank and one nitrite tank needed to neutralize liquid wastes before shipment to tank farms. Steam and water to process vessels have been blanked and, as of June 30, 1992, flowout of the cooling water and steam condensate headers to the B Pond and Crib, respectively, ceased. The only remaining release of liquid effluent to the environs is to the chemical sewer, which receives noncontaminated steam condensate and cooling waters discharged from building heating and cooling for air compressors.

In December 1992, DOE-HQ directed RL and WHC to proceed with shutdown of the PUREX Plant. This will place the Plant in a minimum surveillance mode awaiting decontamination and decommissioning (D&D). The PUREX Plant management is committed to have a Project Management Plan for shutting down the PUREX Plant by the end of FY 1993. It is expected the shutdown will take approximately 3 years.

3.1.4 UO₃ Plant Stabilization Campaign

The UO₃ Plant plans to conduct a final campaign to convert the remaining 757,080 L (200,000 gal) of liquid uranyl nitrate hexahydrate in storage at the PUREX Plant to UO₃ powder. Uranyl nitrate hexahydrate is corrosive and is considered a potential environmental threat for long-term storage. UO₃ powder, a stable, less hazardous material, is more suitable for long-term storage. The campaign is expected to start in April 1993 with preconcentration of the dilute uranyl nitrate hexahydrate, followed by full

plant operation in May 1993. Following the run, the UO₃ Plant will transition to cold shutdown, pending a decision on terminal cleanout.

The WHC operational readiness review (ORR), with oversight from WHC safety organizations and RL, was completed on December 31, 1992. The RL operational readiness evaluation was completed on February 8, 1993. Plant personnel are in the process of resolving the operational readiness evaluation findings. Final approval to start the facility will require concurrence of WHC management, RL, and DOE-HQ.

3.1.5 Plutonium Finishing Plant Restart

Reactivation of two process areas in the PFP will stabilize materials held in the facility. This materials stabilization campaign is in response to direction from DOE-HQ to operate PFP as necessary to stabilize and prepare materials for long-term storage and to conduct cleanout activities needed to improve the safety of the facility.

Operation of the PRF, one of two active process facilities and the first step in the stabilization process, will be resumed following completion of the readiness review process. Residual in-process chemically active recyclable liquids, sludges, fluoride powder, and rags containing plutonium will be processed to produce plutonium nitrate solutions. These plutonium nitrate solutions will then be converted in the other process facility, the remote mechanical "C" line, to an oxide form. Plutonium oxide is a stable form suitable for extended storage. Reactivation of the PRF is scheduled for mid-June 1993.

Evaluation of the PFP status with respect to selected DOE orders and implementation of a new PFP final safety analysis report will also be performed before PRF restart.

3.1.5.1 PFP Activities On Hold While Safety Issues Are Addressed. As a result of several recent safety-related occurrences at the PFP, a temporary administrative hold on plant activities was instituted.

- On March 17, 1993, two employees were exposed to radioactive particles while performing routine maintenance on an air filter outside a glovebox. The two employees, and eight other workers associated with the job, were taken to the Hanford Environmental Health Foundation and PNL's Whole Body Counter for further examination. Preliminary results showed measurable contamination for one millwright and no detectable contamination for the other nine workers. A followup whole body count of the millwright showed no detectable contamination.
- On March 19, 1993, a chemical reaction occurred during routine maintenance on a transfer pump. Chemicals inside the pump seeped onto rags containing a different chemical, causing a chemical reaction that produced fumes. As a precautionary measure, seven workers were taken to Kadlec Medical Center, examined, and released to return to work.

- On March 22, 1993, during routine maintenance, four employees were potentially exposed to airborne contamination from an apparent leak in an airflow meter. The four employees were taken to the Whole Body Counter facility. Preliminary results showed no detectable contamination for any of the four employees.

In all cases, established safety procedures were followed and preventive action promptly was taken to prevent injury to employees.

During this administrative hold, plant upgrades and maintenance activities will be minimized while work processes are reviewed and evaluated to identify areas where employee safety controls should be improved. The administrative hold will remain in effect until plant management implements any needed safety control improvements.

3.1.6 N Reactor Shutdown

Current N Reactor activities are comprised of continuity of operations, waste cleanup and disposal, and maintaining environmental and safety compliance.

Ongoing activities in this reporting period include the following.

- N Reactor tie-in to the Export Water System work was re-started in February 1993 after NEPA approval was granted. The original completion date of September 30, 1992 has been rescheduled for June 30, 1993.
- Preparation of the 100-NR-1 and 100-NR-2 Operable Work Unit Plans is complete. These plans have been reviewed, but not yet approved by Ecology and EPA. Groundwater monitoring is in progress.
- An investigation on the advisability of using D&D crafts to perform all or part of the basin cleanup work currently is underway. This investigation was initiated due to concerns expressed by the Hanford Atomic Metal Trades Council regarding the subcontracting of basin cleanup work. This is an Enhanced Performance Initiative.
- The EA in support of the N Reactor Shutdown Program currently is in progress. Submittal to RL is an April 30, 1993 Performance Initiative.

Completed activities in this reporting period include the following.

- A closure plan for submittal to Congress, as required by the *National Defense Authorization Act for Fiscal Years 1990 and 1991* (Public Law 101-189), was submitted to RL on February 16, 1992.
- Work was completed to vacate 109-N Building to reduce required surveillance and maintenance activities.
- Revision 3 of the N Reactor Shutdown Program Plan (WHC 1992a) was submitted to DOE on September 30, 1992.

- Work was completed on preparation of the FY 1993 Work Plan.
- The inventory of 31,797 L (8,400 gal) of sodium hydroxide was dispositioned.
- The Action Description Memorandum for the EA was completed on December 17, 1992.
- Through February 4, 1993, over 76 m³ (2,700 ft³) of radioactive waste from the 222-S Laboratory at the 200 Area was transported to N Reactor for compaction to reduce waste volume. Through the compaction process, the 76 m³ (2,700 ft³) of waste was reduced to 14 m³ (481 ft³), constituting a near 6 to 1 volume reduction. The cost savings of \$1,200 per drum equates to a net savings of \$78,000 to date.

A significant linkage between N Reactor shutdown and Tri-Party Agreement milestones also has been identified (i.e., the former fuel storage basins must be drained and stabilized before characterization of several N Reactor high-priority sites). Characterization data are needed to complete the Tri-Party Agreement required operable unit work plans. This relationship makes it imperative that shutdown execution and basin cleanup activities commence by early FY 1994 to meet the Tri-Party Agreement milestone for work plan submittal.

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4.0 ENVIRONMENTAL RESTORATION, WASTE MANAGEMENT, AND TECHNOLOGY DEVELOPMENT

4.1 WASTE TANK MANAGEMENT ACTIVITIES

4.1.1 Waste Tank Status

The status of waste tanks is reported monthly in *Tank Farm Surveillance and Waste Status Summary Report* (Hanlon 1993). The summary reported the following:

- Number of waste tanks
 - 149 SSTs
 - 28 DSTs
- Number of tanks that are assumed to leak
 - 67 SSTs
 - 0 DSTs
- Chronology of SST leaks
 - 1956--first tank reported leaking (241-U-104)
 - 1988--latest tanks reported leaking (241-AX-102, 241-C-201, 241-C-202, 241-C-204, 241-SX-104)
 - 1973--largest estimated leak (241-T-106, 435,321 L [115,000 gal])
- Interim stabilization program for SSTs
 - 105 SSTs stabilized
 - Stabilization program to be completed in 1996
- Isolation program for SSTs
 - 98 SSTs interim isolated
 - 51 SSTs partial interim isolated
- Total radioactive waste leakage volume
 - Previously published leak estimates (38 tanks)--2,051,687 L (542,000 gal)
 - Leaks where loss was determined by measurement (9 tanks)--132,489 L (35,000 gal)
 - Leaks statistically determined median (19 tanks)--617,020 L (163,000 gal)
 - Total estimated volume--<2,271,240 to 3,406,860 L (600,000 to 900,000 gal)
- Total waste inventory
 - 36,239,000-gal SSTs
 - 24,816,000-gal DSTs
 - 61,055,000-gal total.

4.1.2 Watch List Tanks

Fifty-four high-level waste storage tanks (48 SSTs and 6 DSTs) are on the watch list. These are the tanks identified in accordance with "Safety Measures for Waste Tanks at Hanford Nuclear Reservation," Section 3137 of the *National Defense Authorization Act for Fiscal Year 1991*, November 5, 1990, Public Law 101-510, Subsection 3137(a) (the Wyden Amendment), as high-level radioactive waste tanks that "...may have a serious potential for release of high-level waste due to uncontrolled increases in temperature or pressure." The safety issues these tanks present are grouped by priority.

Fifty-two of these tanks contain chemical materials that, if raised to temperatures much higher than measured in any Hanford Site tanks, could produce heat-related reactions. Tank 241-C-106 also was identified because it is the only SST that requires the periodic addition of drainable water for cooling by evaporation. Water is added to prevent catastrophic structural failure and possible release of radioactive waste to the environment. Single-shell Tank 109-SX was included in the watch list only because other tanks with a potential for flammable gas accumulation vent through it. Double-shell tank 241-AW-101 was re-evaluated and added to the watch list in November 1992, as having a potential for flammable gas accumulation.

As a more detailed characterization of tank contents progresses and associated risk factors are more clearly defined, tanks may be dropped or added to the list. Removing any tank from the list will require, by law, a determination by the Secretary of Energy that the tank no longer poses a serious potential for release of high-level nuclear waste.

Current efforts are focused on determining the mechanisms that cause the safety concerns and developing corrective action plans to mitigate or resolve the safety issues.

4.1.3 Tank 241-T-101

On September 18, 1992 the surface level in Tank 241-T-101 was noted to have dropped 6.6 cm (2.6 in.) from a previously established liquid level of 112.3 cm (44.2 in.). The surface-level decrease was discovered following maintenance on the liquid-level indicating transmitter that had been operating sporadically since December 1991. A review of the surface-level history was initiated to identify any trends. The in-tank photographs were reviewed as were the drywell monitoring and surface-level history data. A drywell scan was conducted on September 24, 1992. The scan did not detect any leaks. The level decrease was confirmed by alternate surface level measurements and corresponded to a 28,390-L (7,500-gal) liquid loss in the tank. On October 5, 1992, Tank 101-T was declared an assumed leaker based upon liquid-level measurements.

On October 5, 1992, a courtesy call was made to the NRC to inform them of the possible CERCLA reportable release from Tank 241-T-101. Calculations were made to determine if any of the 17 hazardous substances or radioactive isotopes in the tank could have exceeded its RQ. On October 7, 1992, the determination was made that ¹³⁷Cs exceeded its RQ, and the NRC was contacted on the CERCLA reportable release. The estimated release volume was calculated

as approximately 28,390 L (7,500 gal) of waste tank liquid that were released from June 8, 1992 through September 21, 1992. Based on information derived from other leaking tanks, the waste is believed to be contained in the soil surrounding the tank. This has been the case in past releases from other SSTs. DOE-HQ approval was received for pumping this tank and pumping began on March 12, 1992. A transfer of 68,906 L (18,203 gal) was made to receiving Tank 244-TX. The transfer was stopped when Tank 244-TX reached maximum liquid level for the transfer. The contents of Tank 244-TX must be sampled and transferred out before pumping of Tank 101-T can resume. When the chemical composition is considered to be correct, the transfer from Tank 244-TX to 102-SY will commence. Pumping of Tank 101-T will then continue.

4.1.4 Tank 241-SX-103

On October 20, 1992, the surface-level measuring equipment for Tank 241-SX-103, which appeared to be functioning normally, indicated a decrease in tank level in excess of allowable limits. Based on an evaporation study completed by Waste Characterization Analysis, it was concluded that the observed rate of liquid level decrease is within the range expected from evaporation.

4.1.5 Tank 241-SY-101

The predicted gas release from Tank 101-SY began on February 2, 1993. The total level decrease was 21 cm (8.3 in.), which was sufficient to allow the scheduled in-tank activities to proceed. Although the goal was to install a mixer pump, which may bring an end to the periodic venting, it was decided to postpone the installation because of safety concerns. When the tank vented, a 3-m (10-ft) layer of very thick waste at the bottom of the tank in which an estimated 255 m³ (9,000 ft³) of gas is trapped remained relatively undisturbed; thus, residual gas continues to be present. It was felt that lowering the seven-story pump into the million-gallon tank could cause a violent release of this trapped gas. Installation of the pump is delayed at least until late May or early June 1993, when the tank is expected to vent again. Other work was accomplished during window "H," including repairing and reinstalling the in-tank television camera, making improvements to the tank's ventilation system and exterior structure, and making modifications to the cradle, which will hold the pump when the installation occurs.

4.2 TREATMENT, STORAGE, AND DISPOSAL ACTIVITIES

4.2.1 Forecasted Incoming Wastes

A formal data request is sent out annually to all onsite and offsite waste generators who plan to ship their hazardous and/or radioactive solid waste to the Hanford Site for TSD over the next 30 years. This forecast is in accordance with DOE Order 5820.2A. The Waste Volume Forecast helps to establish FY budget allocations, provides data to support planning of future solid waste facilities and operational requirements (e.g., future TSD

facilities), supports the burial ground performance assessment, and provides data that are incorporated into the Integrated Data Base (IDB).

Radioactive solid waste will go to the low-level burial grounds, the Hanford Central Waste Complex, and the Transuranic Storage and Assay Facility. It is assumed that all hazardous waste will continue to be shipped offsite to a licensed TSD facility for treatment and disposal. Solid waste forecast information is categorized by Hanford Site waste classification designations. The radioactive hazardous mixed waste forecast is further identified by prominent contaminants (e.g., land disposal restricted wastes, organics).

It has been projected that 65 percent of the total solid waste volume (414,000 m³) will consist of low-level class I waste, which does not require storage or treatment to meet the requirements of DOE Order 5820.2A, except for volume reduction when it is shown to be cost effective. Seventeen percent of the total projected solid waste volume will be designated as low-level mixed waste requiring storage and treatment before onsite disposal. Approximately 4 percent of the forecasted waste will be designated as TRU. Of this amount, nearly 2,000 m³ are expected to be spent fuel; less than 1 percent will be TRU-mixed waste. The remainder of the waste falls into other waste classifications (LLW class III, etc.).

Offsite-generated waste is about 22 percent of the 30-year total solid waste volume, and about 38 percent results from D&D plans for SSTs.

The physical composition of forecasted waste is as follows:

• Soils	35%
• Metals	16%
• Liquids and sludges	4%
• Combustibles/compactible solids	23%
• Construction materials	10%
• Other (high-efficiency particulate air filters, resins, etc.)	5%
• Particulates	7%.

The forecast information is limited because it is based on restricted planning and characterization data. The forecast does not include D&D waste from the PUREX tunnels (other than surplus equipment), the canyon facilities, or structures not yet designated as surplus facilities. The SST and DST forecast information does not include waste volumes resulting from treatment of the tank contents, nor does it include the tanks and inner connecting piping (e.g., spent retrieval equipment). These wastes are considered to have a major impact on the volume of solid waste requiring TSD at the Hanford Site.

4.2.2 Hanford Environmental Compliance Project

The Hanford Environmental Compliance (HEC) Project provides the capital improvements necessary to achieve compliance with environmental requirements at the Hanford Site. The project mission is to upgrade selected systems and facilities that are required to support DOE's commitment to bring Hanford Site

operations into compliance with current environmental criteria, standards, and regulations.

The total project cost is \$272.7 million. Approximately half of the HEC Project funding will be used to implement best available technology (BAT) economically achievable in eliminating discharges of contaminated liquids to the soil column at the Hanford Site. Remaining funding will be applied to RCRA and CERCLA, and environmental compliance activities such as groundwater monitoring, upgrades to existing systems, and TSD of radioactive mixed and hazardous wastes.

The HEC Project is managed in accordance with DOE Order 4700.1 (SEN-27-90). It comprises 14 individual subprojects: 5 FY 1989 subprojects, 4 FY 1990 subprojects, 3 FY 1991 subprojects, and 2 FY 1992 subprojects. Nine of the fourteen subprojects support Tri-Party Agreement milestones. Of the 14 authorized subprojects; 4 are completed. These subprojects are V-791H, 300/400 Area Wastewater Facilities; W-017H, Groundwater Monitoring Well Systems; W-016H, Radioactive Mixed Waste Storage Facilities; and W-010H, B Plant Environmental Compliance Upgrades. Five of the subprojects are in construction: W-020H, Waste Management Facilities Cathodic Protection; W-011H, Waste Sampling and Characterization Facility; B-680H, PFP Liquid Low-Level Waste System Modification; W-041H, Environmental Hot Cell Expansion; and C-018H, 242-A Evaporator/PUREX Condensate Treatment Facility. Three subprojects are in the design phase: W-007H, B Plant Process Condensate Treatment Facility; W-049H, 200 Area Treated Effluent Disposal Facility; and L-045H, 300 Area Treated Effluent Disposal Facility. C-031H, PFP Liquid Effluent Treatment Facility, is in construction/rescope. Finally, it is proposed that subproject W-024H, B Plant Radiological/Effluent Containment Upgrades be cancelled.

All of the HEC Project's subprojects have been validated. Table 4-1 provides a list of the subprojects as well as the estimated cost, schedules, and locations.

4.2.3 HWVP Project

The HWVP is being developed for the stabilization of high-level radioactive waste. The project was initially validated during FY 1987. The detailed plant design was initiated by Fluor Daniel, Inc. in January 1990. The plant preliminary design was completed during 1992 and early 1993. Construction and site preparation, conducted by United Engineers & Constructors-Catalytic, Inc., began in April 1992 and continues. Construction is expected to be completed in June 1998 and operations are to begin December 1999. The overall size of the vitrification building is 24,748 m² (266,400 ft²).

The RL advised Ecology in December 1990 of technical and programmatic concerns that may delay the start of plant construction. To address these technical and programmatic concerns, RL initiated a systems engineering risk assessment to evaluate the technical, safety, and regulatory uncertainties in the HWVP Project. Review of the draft findings from the vitrification systems' risk assessment and negotiations between DOE, Ecology, and EPA resulted in a decision that the program for remediation of the Hanford Site

Table 4-1. Subprojects in the Hanford Environmental Compliance Project.

Project number	Subproject	Total estimate to complete (x \$1,000)	Schedule ^a		Location (areas/facilities)
			Start ^b	End ^c	
W-017H	Groundwater Monitoring Well System	12,000	01/89	03/93	Hanford Site (approximately 165 wells)
W-007H	B Plant Process Condensate Treatment Facility ^d	14,700	01/89	TBD	200 East/B Plant
W-020H	Waste Management Facilities Cathodic Protection	7,100	01/89	11/92	200 West, 200 East/piping and tanks associated with various facilities
V-791H	300/400 Area Wastewater Facility	1,500	08/89	09/91	300, 400 Areas
W-016H	Radioactive Mixed Waste Storage Facility	8,700	04/89	12/92	200 West
B-680H	Plutonium Finishing Plant Liquid Low-Level Waste System Modification	6,900	11/90	09/93	200 West/Plutonium Finishing Plant
C-031H	Plutonium Finishing Plant Liquid Effluent Treatment with TRUEX ^d	16,100	07/91	09/95	200 West/Plutonium Finishing Plant
W-010H	B Plant Environmental Compliance Upgrade	3,500	01/90	07/92	200 East/B Plant
W-011H	Waste Sampling and Characterization Facility ^d	22,000	01/90	10/93	200 West/REDOX Facility
W-024H	B Plant Radiological and Containment Upgrades ^d	12,000	01/91	09/94	200 East/B Plant
W-041H	Environmental Hot Cell Expansion	13,800	01/91	04/93	200 West/REDOX Facility
C-018H	242-A Evaporator/PUREX Liquid Effluent Treatment Facility	52,600	07/91	06/94	200 East/PUREX Plant
L-045H	300 Area Treated Effluent Disposal Facility	14,700	01/92	07/94	300/TBD
W-049H	200 Area Treated Effluent Disposal Facility	42,800	01/92	12/94	200/TBD

^aDates subject to change pending availability of funding.^bStart definitive design.^cConstruction complete (not necessarily ready to proceed with operation).^dProgrammatic changes have placed these subprojects on hold.

PUREX = Plutonium-Uranium Extraction (Plant).

REDOX = Reduction-Oxidation.

TBD = To be determined. Projects on hold pending outcome of December 1991 B Plant risk assessment.

TRUEX = Transuranic extraction.

tank wastes needed to be redefined. The redefinition of this program resulted in a re-establishment of the programmatic baseline for the project. As a result, the start of construction on the plant was delayed by 9 months, but the date for starting operations remained unchanged (December 1999). The definitive design, approximately 50 percent complete, is scheduled for completion in June 1994.

NOC for nonradioactive air emissions from the HWVP was completed October 1992 and submitted to Ecology for review and comment. The public comment period ended March 5, 1993. Ecology comments are being addressed with approval expected by mid-1993.

NOC for radioactive air emissions from the HWVP also was completed October 1992. The permit application was submitted to DOH and approval also is expected early 1993.

4.2.4 Waste Receiving and Processing Facility

The WRAP Facility will treat radioactive and mixed solid wastes at the Hanford Site. To speed up initial certification of waste for shipment, the project is being divided into several phased projects. The initial phase uses established technology with known disposal acceptance criteria, thereby permitting the project to proceed on schedule at low risk. Later projects have higher technical risk and/or less well-defined disposal acceptance criteria, and are scheduled for startup operations in later years when these uncertainties can be reduced or eliminated.

The first phase is called the WRAP Module 1. Module 1 will receive mixed TRU and low-level solid waste. These wastes will be received from existing abovegrade- or belowgrade-level storage, or from generators (as newly generated wastes). The wastes originate at both onsite and offsite generators. Newly generated wastes are packaged by the generators in accordance with *Hanford Site Solid Waste Acceptance Criteria* (WHC 1991), and are given a quality overcheck in the WRAP Module 1. Wastes retrieved from belowgrade storage, plus any waste that needs repackaging and a new certification to the disposal waste acceptance criteria, will be treated in the WRAP Module 1 to meet the acceptance criteria. The treated TRU waste from the WRAP Module 1 will be shipped to the Waste Isolation Pilot Plant (WIPP); LLW will be shipped to local disposal trenches. The operation of the WRAP Module 1 is milestone M-18-00 in the Tri-Party Agreement.

Additional phases of development are planned. WRAP Module 2A is planned to start operation by September 1999 and is being structured to process low-level mixed wastes that do not require a thermal treatment process before acceptable disposal in Hanford Site trenches. WRAP Module 2 is planned to be a 1994 Line Item and is currently in the process of being approved as a 1994 Line Item. WRAP Module 2A uses comparatively low-risk technology (principally a stabilization technique, such as encapsulating the waste in grout) and also addresses a substantial portion of the waste volume in abovegrade storage (as well as a substantial portion of the wastes forecasted to be generated during the Hanford Site cleanup operations). This project is a high priority from the volume treatment standpoint, and it also serves to treat a large volume of material contaminated with hazardous contaminants. Wastes treated in the

WRAP Module 2 will be disposed of in Hanford Site trenches. The operation of Module 2A addresses milestone M-19-00 in the Tri-Party Agreement.

WRAP Module 2B is another phase of the solid waste treatment facility. This module will address the wastes that pose the more difficult technical problems, including the treatment of large containers (that will contain a heterogenous mix of waste), waste with high radiation levels (requiring extensive shielding to protect operators during treatment), and other miscellaneous wastes. Currently this project is planned to be a 1997 Line Item and would come online in the year 2004. TRU waste treated in the WRAP Module 2B will be shipped to the WIPP; LLW will be shipped to local trenches. The operation of Module 2B also addresses milestone M-19-00 in the Tri-Party Agreement, although a change request is in process to separate the two modules into two milestones.

The Thermal Treatment Facility (TTF) is also planned as a 1997 Line Item. Because of the additional time required for startup operations and license approvals, the TTF is not planned to be operational before the year 2006. This facility is being designed to treat mixed wastes. Because of their particular contaminants, the mixed wastes require a thermal destruction of the hazardous contaminant before disposal. An example of this waste would be PCB-contaminated material.

The Hanford Site is also investigating the use of commercial thermal treatment capabilities that exist or could be operational before the TTF becomes operational. Should such an option exist, the scope of the TTF will be reduced to the streams that are not acceptable to a commercial treatment plant (expected to be high radiation-level wastes as well as any TRU-contaminated wastes).

Thermally treated low-level wastes will be disposed of at Hanford Site trenches; TRU waste will be shipped to the WIPP for disposal.

The retrieval of waste from underground retrievable storage is divided into two phases. The first phase addresses Trench 04C, which was predicted to have intact containers without external contamination. The second phase will address the remaining 30,000 drums and may include degraded containers with significant external contamination.

4.2.5 Grout Disposal Program

The Grout Treatment Facility will treat and dispose of low-level mixed waste liquid removed from the DSTs. The facility combines liquid wastes with dry materials such as cement, fly ash, clay, and blast furnace slag to produce a grout slurry that is pumped into underground concrete vaults, where it solidifies. Approximately 7.6×10^8 L (200 million gal) of mixed waste are planned to be processed between 1993 and 2038. In late 1993, facility systems are being prepared for restart.

Significant developments during the past 6 months include completion of construction of four mixed waste disposal vaults, identification of the specific grout formulation for the first vault pour, and submittal of the final safety analysis report to DOE-HQ for review and approval.

4.2.6 242-A Evaporator

The 242-A Evaporator is used to reduce the volume of liquid wastes that are placed in storage in the DSTs. The 242-A Evaporator remains in standby status pending completion of three liquid effluent retention facilities. Planned use of the first of three retention facilities is scheduled for operation in 1993. The retention facilities will be used for the temporary storage of liquid condensate from the 242-A Evaporator until the liquid effluent treatment facility is complete. The treatment facility is being designed and constructed in the 200 East Area to remove listed chemical constituents from the 242-A Evaporator process condensate.

The 242-A Evaporator has been upgraded to extend its operational life beyond CY 2000, and is being made ready for return to service. In February 1993, WHC informed DOE that it will complete its ORR activities and will request authorization for restart of the 242-A Evaporator on or before May 7, 1993.

4.2.7 Hanford Site Radioactive Waste Inventories

Hanford Site radioactive waste volumes and radioactivity reported for the IDB for 1992 (DOE 1991b) are listed in Table 4-2.

Table 4-2. Hanford Site Radioactive Waste Summary.

Waste type	Volume (m ³)		Radioactivity
High-level	256,500	(67.8 Mgal)	374 MCi
Transuranic			
Retrievable	15,596	(20,400 yd ³)	55.5 kCi
Buried	109,000	(143,000 yd ³)	29.0 kCi
Contaminated soil	31,960	(41,800 yd ³)	16.7 kCi
Low-level			
Buried	582,800	(762,000 yd ³)	560 kCi ^a
Mixed	2,831	(3,703 yd ³) ^b	--

^aIncludes activity in mixed waste.

^bMass quantity of mixed waste is 2,839,000 kg (3,129 tons).

4.2.7.1 Total Radioactivity of Waste.

High-level	3.74 E+08 Ci	(liquid)
Low-level	5.40 E+06 Ci	(solid)
TRU	1.01 E+05 Ci	(solid) (TRU activity only)

The following generalizations can be made about the radioactivity of the Hanford Site's wastes:

- SSTs contain about 145 million curies.
- Forty-four percent of curies (of radionuclides with half-lives greater than 10 years) onsite are in cesium and strontium capsules.
- Fifty-four percent of curies (of radionuclides with half-lives greater than 10 years) onsite are in SSTs and DSTs.

4.2.7.2 Cesium and Strontium Capsules.

Cesium capsules	1,338	1.11 E+08 Ci
Strontium capsules	605	4.97 E+07 Ci

A total of 1,577 cesium and 640 strontium capsules were produced at the Hanford Site. The difference in the number of capsules produced and the number currently in inventory is due to capsules that have been dismantled and the material put to beneficial use. Of the current capsules, a number were leased and have not yet been returned to the Hanford Site.

4.2.8 Hazardous Waste Inventories

Hazardous waste is generated in the normal operation of the Hanford Site. Waste is recycled or accumulated by the generator, and is packaged and shipped offsite for treatment and disposal.

Radioactive mixed wastes are accumulated at the source of generation, then packaged and transported to the Hanford Central Waste Complex for storage, awaiting ultimate treatment and disposal. Bulk liquid radioactive waste streams are pretreated and transferred to DSTs for storage.

Although generation of hazardous and mixed waste continues to decline, the closure of 2727-S storage facility has contributed significantly to 1992 totals. The comparative amounts for the two waste types are listed in Table 4-3.

Table 4-3. Hanford Site Hazardous Waste Summary.

	1989 (kg)	1990 (kg)	1991 (kg)	1992 (kg)
Containerized:				
Hazardous	250,000	180,000	123,000	604,000
Mixed	721,000	985,000	490,000	60,400
Bulk liquid:				
Hazardous	66,000,000	600,000	261,000	15,000
Mixed ^a	7,255,000	10,998,000	4,095,000	3,300,000

^aBulk liquid radioactive mixed waste figures revised to more accurately reflect total receipts by DSTs and not just facility generation quantities.

4.3 LIQUID EFFLUENT TREATMENT ACTIVITIES

The following is an update of activities at the liquid effluent treatment facilities.

4.3.1 Liquid Effluent Retention Facility

Construction of the Liquid Effluent Retention Facility (LERF) for interim storage of 242-A Evaporator process condensate suspected of containing listed waste is near completion. Leak detection system repairs and prestartup activities remain.

The LERF is scheduled to accept the 242-A Evaporator effluents for 12 to 15 months and then store the effluents until the Effluent Treatment Facility is completed in October 1994. Upon completion of the Effluent Treatment Facility, the effluents stored in the LERF basins will be piped to that facility for treatment and disposal. The ORR is currently being conducted for operation of the facility when required to support the startup of the 242-A Evaporator, currently scheduled for late June 1993.

4.3.2 Effluent Treatment Facility

The 242-A Evaporator/PUREX Plant Process Condensate Treatment Facility (Effluent Treatment Facility) (Project C-018H) is being constructed to provide effluent treatment and disposal capability required to restart the 242-A Evaporator. The facility will provide (1) collection for the three effluent streams, (2) a treatment system to reduce the concentration of radioactive and hazardous waste constituents in the effluent streams to acceptable levels, (3) tanks to permit verification of treated effluent characteristics before discharge, and (4) a state-approved land disposal structure for effluent disposal.

Secondary waste generated by the treatment facility (e.g., filter backwash, ion exchange regenerate, and permeate from the reverse osmosis) will be concentrated and packaged to meet the requirements imposed by the state for storage and/or disposal of solid waste.

Operation of the Effluent Treatment Facility is required by October 1994 to support the removal of land disposal restricted waste and residues from the LERF basins. This requirement is defined both in the Tri-Party Agreement and the State Waste Discharge Permit Program Consent Order. Work is on schedule to meet this date. The design and construction contract has been awarded to Japan Gas Company, 100 percent design is complete, and surrogate testing at the WIPP has begun in support of the Delisting Petition. The Radiation Protection-Air Emissions permit application (WAC 246-247) has received verbal approval from DOH. The WAC 173-216 permit application is on schedule. Conditional approval was received on March 24, 1993 to start construction.

4.3.3 200 Area Treated Effluent Disposal Facility

The 200 Area Treated Effluent Disposal Facility (TEDF) (Project W-049H) will be a permitted system for the collection, sampling, and disposal of thirteen Phase I and three Phase II effluent streams in the 200 East and West Areas.

The 13 Phase I effluents within the scope of the 200 Area TEDF include: PUREX chemical sewer, PUREX steam condensate, B Plant chemical sewer, UO_3/U Plant wastewater, PFP wastewater, S Plant wastewater, T Plant wastewater, 222-S Laboratory wastewater, B Plant steam condensate, B Plant process condensate, 2101-M Laboratory wastewater, UO_3 Plant process condensate, and 2724-W Laundry effluents. The 2724-W Laundry will be replaced with a new laundry that is expected to be provided by a private firm. When the laundry services are privatized, laundry effluents will be dropped from the scope of the 200 Area TEDF.

The three Phase II streams within the scope of the 200 Area TEDF include: 284-W Powerhouse cooling water, 242-S steam condensate, and the T Plant Laboratory wastewater.

Based on data derived in preparing the 240 Engineering Report required by the State Waste Discharge Permit Program, it has been determined that BAT/all known, available and reasonable methods of treatment (AKART) will be implemented at each wastewater generating facility. Effluents will meet the requirements of BAT before discharge to the collection and disposal system. The collection system design is complete and construction is on schedule to begin in April 1993. The disposal facility has completed 30 percent design. Ecology gave unconditional approval to start construction of the W-049H project on March 30, 1993.

4.3.4 300 Area Treated Effluent Disposal Facility

The 300 Area TEDF (Project L-045H) is a system for collection, treatment, and disposal of effluents from the 300 Area. Currently these effluents are discharged to the 300 Area Process Trenches. The project consists of a collection system, effluent treatment facility designed for flow rate of 1,136 L/min (300 gal/min), holdup diversion basins, and discharge via an outfall to the Columbia River via an NPDES permit.

The 300 Area TEDF has completed 100 percent design and the construction contract currently is out for bid. As a result of a Value Engineering Study to determine an alternative disposal method for the 300 Area Process Sewer, a parallel path effort has been started to dispose of the effluents to the city of Richland's publicly owned treatment works.

4.3.5 Interim Compliance

In October 1991, DOE, Ecology, and EPA completed negotiations to establish new liquid effluent commitments, which became part of the M-17 milestone in the Tri-Party Agreement. DOE and Ecology also negotiated commitments for a separate WAC 173-216 Compliance Agreement (Consent Order). These commitments involve final disposal and permitting of the Hanford Site's 33 major liquid effluent streams and compliance activities to be conducted in the interim period between the negotiations and the final disposition of the streams.

The program scope includes the preparation of stream sampling and analysis plans (SAP), stream characterization, preparation of groundwater impact assessments, and preparation of WAC 173-216 permits. Twenty-two of the twenty-three SAPs have been approved and the last plan, the 300 Area Process Sewer, was submitted in February 1993 to Ecology and EPA for approval. Funding has been approved for the implementation of these SAPs and sampling has begun. Preparation of Groundwater Impact Assessment Plans has begun; five are completed. One assessment has been completed with others on schedule.

4.3.6 200 East Area Phase II Stream Treated Effluent Disposal Facility

As part of the October 1991 negotiations to supplement the Tri-Party Agreement (Ecology et al. 1990) and to create the WAC 173-216 Consent Order, DOE committed to implement BAT for the Phase II streams that were not a part of the 200 Area TEDF (Project W-049H) by October 1997. Before these negotiations, the DOE position regarding these streams was to implement BAT after June 1995 (the date set for BAT implementation for the Phase I streams) but before December 1999. The following Phase II streams are involved:

- 183-D Filter backwash wastewater
- 241-A Tank Farm cooling water
- 242-A Evaporator cooling water
- 242-A Evaporator steam condensate
- 244-AR Vault cooling water
- 284-E Powerplant wastewater

- 400 Area secondary cooling water
- AY/AZ Tank Farm steam condensate
- B Plant cooling water.

Project W-252, "Phase II Treated Effluent Disposal Facility," is set up to implement BAT for these streams. The functional design criteria have been written to define the general criteria needed to provide the new pipelines and modifications to existing facilities required to implement BAT/AKART for these streams. The project will also provide tie-ins to the 200 Area TEDF to allow for wastewater disposal after BAT/AKART has been applied. Coordinating with the 200 Area TEDF design will eliminate duplicate design efforts and will minimize costs.

4.3.7 Miscellaneous Streams

Miscellaneous liquid waste streams (e.g., sanitary wastes and small volume or intermittent discharges from heating, ventilation, and air conditioning systems and floor drains, and sumps from noncontaminated or nonchemical handling facilities) originally were not included within the scope of the plan and schedule, Tri-Party Agreement (Ecology et al. 1990), or the Liquid Effluent Treatment Program. Commitment language has been developed to address these streams, with the initial actions being "accountability" type actions, intended to inventory and identify these streams.

A revised "Inventory of Disposal Sites for Miscellaneous Streams" was issued and included 63 streams. Additionally, a plan was prepared and submitted to Ecology that includes an overall regulatory strategy methodology and schedule for identification and evaluation of all miscellaneous streams. Completion dates for WAC 173-216 permit applications are June (10 major streams) and September 1994 (1 major stream).

5.0 ENVIRONMENTAL MONITORING AT THE HANFORD SITE

5.1 ENVIRONMENTAL MONITORING PROGRAM

Environmental monitoring of the Hanford Site and annual reporting of results are in accordance with DOE Orders 5400.1, 5400.5, 5480.1A, and 5484.1, and the *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance*, DOE/EH-0173T (DOE 1991c). The annual Hanford Site environmental report normally is distributed by June 1, and it is currently in the process of development and review for release as scheduled. A summary of monitoring results from the Hanford Site environmental report for 1992 will be included in the next Briefing Book on Environmental and Waste Management Activities.

5.2 OUTDOOR RADIATION AREAS

All radioactive burial grounds, cribs, trenches, ditches, retention basins, and unplanned release sites are surveyed routinely. The surveys are performed at least annually, but may be done quarterly or semiannually.

Radiological survey reports are shared with WHC's Environmental Engineering Studies function. This group tracks, trends, and reports environmental radiological information regularly and presents the information in the *Westinghouse Hanford Company Environmental Surveillance Annual Report - 200/600 Areas - Calendar Year 1990* (WHC 1992b).

The number of surface contaminated areas varies. The number is not constant because efforts to clean, stabilize, or remedy known contaminated areas are continuing while new areas of contamination are identified.

Contaminated areas are posted as "Surface Contamination Area," "Radiologically Controlled Area," or "Underground Radioactive Material." Radiologically controlled areas are large posted areas with a high potential for encountering speck contamination. The surface contamination areas (SCA) have more widespread contamination. "Underground radioactive material" signs mark cribs, burial grounds, and covered trenches and ponds. If an area has surface as well as underground contamination, such as a surface contaminated crib, it could have both postings (see Table 5-1).

Table 5-1. 4th Quarter 1992.

Hanford Site (by area)	Surface contamination ^a estimated (acres)	Underground rad material ^b (acres)
100 Area	160	460
200 Area	326	366
600 Area	120	230
B and C Plant Controlled Areas	2,500 (RCA) ^c	30
300 Area	45	30
Totals	3,151	1,116

^aIncludes areas posted as "Surface Contamination Areas" or as "Radiologically Controlled Areas" and areas that have both underground and surface contamination.

^bIncludes areas with only underground contamination. Does not include areas that have surface as well as underground radioactive material.

^cRadiologically Controlled Area.

5.3 CONTAMINATION CONTROL IMPROVEMENT PROJECT

The Contamination Control Improvement Project (CCIP) encourages reduction of radioactive surface contamination in operating areas and the environment of the Hanford Site. Reducing the number of contaminated areas and the severity of contamination will reduce the risk of skin contaminations and internal depositions, minimize personnel exposure, increase site productivity, and improve protection of the environment.

The project identifies, tracks, and encourages the reduction of radioactive surface contamination. It addresses SCA in two basic areas: indoor and outdoor operating areas. The number and size of these posted indoor SCAs generally have been decreasing over time. However, the size of posted SCA in outdoor operating areas have been displaying a gradual increase in size since the beginning of 1992.

The numbers below describe areas posted permanently as "Surface Contamination Areas." For other posted areas (i.e., inactive outdoor areas) see Section 5.2.

- Indoor SCAs--At the end of 1989, the CCIP had identified approximately 167,000 m² (1,794,000 ft²) of posted indoor SCAs. By the end of 1992, indoor SCAs were reduced by 11,500 m² (124,000 ft²) to a total of 155,000 m² (1,670,000 ft²). As of February 1993, the amount of posted indoor SCAs was further reduced to 154,900 m² (1,667,000 ft²).

- Outdoor Operating Areas--At the end of 1989, the CCIP had identified about 212 ha (524 acres) of outdoor operating area posted as SCAs. By the end of 1992, there had been a net reduction of 27 ha (66 acres), bringing the total to 185 ha (458 acres). As of February 1993, a total net gain in SCAs in 1993 of more than 1 ha (3 acres) was reported, resulting in 187 ha (461 acres) posted as SCAs in outdoor operating areas.

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6.0 OTHER ISSUES AND ACTIONS

6.1 HANFORD ENVIRONMENTAL DOSE RECONSTRUCTION PROJECT

Dose reconstruction project researchers have revised and expanded project models and developed methods to represent lack of knowledge and variability of parametric values more completely. The current major activity is the testing of the models using real data to ensure reliability. Doses for Native American tribes in the region and selected persons in the Hanford Site thyroid disease study will be calculated. Modeling for the Columbia River has been defined and work is in progress.

PNL manages the project, established in FY 1988, under the direction of an independent technical steering panel of national experts and representatives from the states of Oregon, Washington, and Idaho; Native American tribes; and the public. The Center for Disease Control and Prevention manages the study. The technical steering panel hosts periodic public meetings to conduct business, review PNL work, and respond to public comments on the study.

6.2 HAZARDOUS MATERIAL MANAGEMENT AND EMERGENCY RESPONSE TRAINING CENTER PROPOSAL

The Hazardous Material Management and Emergency Response (HAMMER) Training Center is a proposed, unique, nonprofit training facility that would provide integrated training in a practical applications environment. The HAMMER Training Center will offer training for both chemical and radioactive hazards response. The HAMMER Training Center would support site workers; labor training programs; and state, tribal, and local emergency responders. The estimated capital cost for the HAMMER Training Center is \$29.0 million, and the annual operating costs are estimated to range between \$2.0 to \$3.0 million/year.

The HAMMER Training Center is a local initiative. The Tri-County Fire Commission and the Benton-Franklin Regional Council, through U.S. Congressman Sid Morrison, requested that DOE conduct a feasibility study of the HAMMER Training Center at the Hanford Site. WHC conducted the study in 1989, as directed by RL, and found it to be feasible. U.S. Senator Brock Adams worked with local officials and authored, through the Veterans Administration/Housing and Urban Development appropriations legislation a directive for the Federal Emergency Management Agency (FEMA) to conduct a feasibility study. The feasibility study is nearly complete and is in the final review stages. The Deputy Administrator of the Fire Administration, within FEMA, sent a letter to the HAMMER Steering Committee Chairman acknowledging their new role of sharing insight and providing guidance.

The Tri-City Industrial Development Council (TRIDEC) has identified the HAMMER Training Center as a key FY 1993 initiative and will seek special legislation directing DOE to proceed with construction and operation of the HAMMER Training Center during FY 1994. The funding request will support facility design and construction; development of memoranda with various federal agencies; training development and delivery during FY 1993; and

development of cooperative agreements with state, tribal, and local governments.

Oregon requested an advanced transportation emergency preparedness course. Several meetings have taken place with the Tri-County Fire Commissioners Association, TRIDEC, Washington State, Oregon, the Confederated Tribes of the Umatilla Indian Reservation, and the Yakima Indian Nation. The group consensus is that emergency response training is needed now for hazardous materials shipments that come in and out of the Hanford Site on a routine basis. DOE-HQ agreed to fund two transportation emergency preparedness courses, including the advanced transportation emergency preparedness and an orientation course. The courses will be taught in June and July 1993.

6.3 HANFORD FUTURE SITE USES WORKING GROUP

The Hanford Future Site Uses Working Group was formed in early 1992 by an organizing committee made up of federal, tribal, state, and local governments. The working group was charged with developing a range of future use options for the Hanford Site and assessing the implications of those uses on cleanup. The working group brought governments and representatives of a wide variety of constituencies together to discuss their respective future visions for the Hanford Site. The members of the working group included representatives of federal, state, tribal, and local governments; business, agricultural, and economic interests; academia; environmental groups; and groups with a special interest in the Hanford Site. The working group did not seek consensus on one single vision, but endeavored to provide decision makers with a full range of visions for the future. Cleanup decisions necessary to make these future use options possible will be analyzed in depth in the HRA-EIS.

The working group met monthly from April to December 1992. The group engaged in a joint education process to bring all of its members to a common base of understanding about the Hanford Site. They accomplished this by bringing in experts to address the group on topics that included the history of the Hanford Site from the perspectives of Native Americans, settlers, and the federal government; the habitat that the Hanford Site provides for plants and animals; the economic impact of the Hanford Site on the Tri-Cities; and the contamination on the Hanford Site and technologies available to deal with that contamination.

Using a series of maps to illustrate the various natural and manmade features of six geographic areas of the Hanford Site, the working group considered the distinct features of each area and then developed a list of potential future uses for that area. The group took these future use options and developed cleanup scenarios to describe how clean parts of the Hanford Site would need to be to accommodate the future uses. Future uses were described in generic terms, such as agriculture or wildlife, rather than in specific terms such as cherry orchards or elk herds.

The six geographic study areas are:

- Arid Lands Ecology Reserve--The southwest section of the Hanford Site, kept undisturbed for security and safety reasons, is currently the site of studies of the ecology and habitat of shrub-steppe lands.
- North of the River--The area north of the Columbia River, kept undeveloped as a security buffer, is currently designated in part as a wildlife refuge managed by the U.S. Fish and Wildlife Service. The remainder is a wildlife recreation area managed by the Washington Department of Wildlife.
- Central Plateau or 200 Areas--Nuclear materials were processed, much of the wastes are stored, and much of the known contaminants are concentrated in the 200 Areas.
- Columbia River--The stretch of the river that runs through the Hanford Site, known as the Hanford Reach, is home to spawning grounds for more than a third of the river's fall chinook salmon.
- Reactors on the River--The area along the river containing nine retired plutonium production reactors and the land in between. Eight of the reactors were shut down in the 1960's; the ninth has not operated since 1987 and received a shutdown order in 1992.
- All other areas--This area consists of all of the Hanford Site that is not included in the other geographic areas. This includes the 300 and 1100 Areas just north of Richland, the Washington Public Power Supply System, PNL, as well as large tracts of relatively undisturbed land between those facilities.

The working group developed a set of nine major recommendations for the Site as a whole. These recommendations, as well as the future use options and cleanup scenarios, are documented in the working group's final report, *The Future of Hanford: Uses and Cleanup* (Hanford Future Site Uses Working Group 1992).

The working group's recommendations follow.

- **Protect the Columbia River**--At some locations on the Hanford Site, contaminants are known to be entering the river. Stopping actual and potential contamination of the Columbia River is a high priority.
- **Deal realistically and forcefully with groundwater contamination**--The working group recommended that groundwater should not be used if it would jeopardize public health or safety or adversely change hydrologic conditions, thereby increasing the speed of contaminated groundwater flow to the Columbia River. The working group expected that groundwater would ultimately be cleaned up once technology for groundwater cleanup advances.

- **Use the Central Plateau wisely for waste management--**Wastes from throughout the Hanford Site should be concentrated in the Central Plateau (including and surrounding the 200 Areas). Within the Central Plateau, the group suggested that waste TSD activities be concentrated to minimize the amount of land devoted to or contaminated by waste management activities.
- **Do no harm during cleanup or with new development--**The primary goal of cleanup is to protect human health and public safety. In addition, environmental values of the Hanford Site are to be protected and restored. Decisions dealing with cleanup and possible development should be guided by the principle, "do no harm."
- **Cleanup of areas of high future use value is important--**The working group believed that areas of high future use value should be candidates for priority cleanup action. They identified two types: areas that could contribute to the productive development or use of the Hanford Site for other purposes, and areas that could be cleaned up quickly for a very small percentage of the cleanup budget, making large tracts of land available for other uses.
- **Clean up to the level necessary to enable a future use option to occur--**The working group believed that some future uses could occur even if some residual contamination remained. For example, industrial uses do not require the level of cleanup that agricultural uses would. In some cases the activity required to clean soils or groundwater might be detrimental to an area designated for wildlife.
- **Transport waste safely and be prepared--**The working group recognized that decisions related to the Hanford Site cleanup will require the transportation of radioactive and hazardous materials within the Hanford Site, as well as to and from the Hanford Site. Such transportation will require close cooperation between DOE and tribal, state, and local governments. The working group endorsed the HAMMER Training Center.
- **Capture economic development opportunities locally--**DOE has announced its intentions to leave the Hanford Site after completing cleanup. The Hanford Site portion of the region's economic base ultimately must be replaced by non-DOE activities. The working group urged DOE and its contractors to factor local development and economic diversification into cleanup decisions. Research and development necessary for cleanup should occur in a manner that creates additional private sector economic development opportunities.
- **Involve the public in future decisions about the Hanford Site--**Public involvement and consultation must be incorporated into future decision making at the Hanford Site. The working group process should be a model for involving the public. The public should be consulted on decisions involving transportation and emergency preparedness, economic development, the reservation of parts of the

Site by DOE or other missions, use of groundwater, and exposure risk resulting from land use decisions.

The working group completed its final report in December 1992.

6.4 200 AREA SANITARY SEWER SYSTEM

There are approximately 50 septic tank/drainfield systems servicing approximately 150 buildings located throughout the 200 Areas Plateau. These sanitary systems are discharging approximately 340,686 L/day (90,000 gal/day) of untreated wastewater to the soil via septic tanks/drainfields. Most of the sanitary systems are in the process of failing, projected to fail in the future, underdesigned for the current discharge, or require modification because of additional personnel. With the projected growth in the 200 Areas, this discharge is anticipated to rise to 757,080 L/day (200,000 gal/day).

A number of these septic systems have failed or are not sized for the growth in a given area. Only a few systems constructed since 1992 are permitted in accordance with Washington Administrative Code. All new systems and modifications to existing systems are being permitted per the requirements of WAC 246-272 (formerly WAC 248-96).

In April 1991, the Landlord Program initiated an engineering study with Bovay Northwest, Inc., to identify alternatives and recommend a preferred solution. This study was completed in January 1993 and the functional design criteria were completed in March 1993 to support initiation of the conceptual design in April 1993. The Landlord Program submitted the project as a candidate FY 1996 Line Item in November 1992. At this time the preferred alternative of the study recommends a sewer collection system for the 200 East and West Areas that discharges to plastic membrane-lined evaporative lagoons - one in each area. This is the preferred alternative because the system would not discharge wastewater to the soil.

6.5 REGULATORY AGENCY SITE VISITS, INSPECTIONS, SURVEILLANCES, AND AUDITS

Table 6-1 indicates inspections that occurred between October 1, 1992 and March 16, 1993.

Table 6-1. Regulatory Agency Inspections. (2 sheets)

Agency	Description	Date
Ecology	101-T possible leaking tank	10/02/92 ^a
Ecology	4843 Visit - Alkali Metal Storage Facility	10/05/92
Ecology & DOH	242-A Visit	10/13/92
Ecology	Visit to Central Waste Complex	10/16/92
Ecology	283 East Water Treatment Facility	10/20/92

Table 6-1. Regulatory Agency Inspections. (2 sheets)

Ecology	103-SX	10/20/92
Ecology	333 - 30-Day extension east storage pad	10/27/92
Ecology	101-AW	10/30/92
Ecology	306 Drums (9/22/92)	10/30/92
Ecology	Tank farms sampling event	11/20/92
DOH	242-A Evaporator surveillance	12/2-3/92
Ecology	Tri-Party Agreement milestone verification (B Plant)	12/08/92
Ecology	242-S Tri-Party Agreement verification of U-14 Ditch	12/11/92
Ecology	107-AN and 102-A7 continuous air monitor readings	12/15/92
Ecology	Liquid Effluent Retention Facility visit	12/16/92
EPA	616/305-B Waste analysis plan	12/17-18/92
Ecology	Random 90-day and SAA	01/07/93
Ecology	101-SY Air lances	01/14/93
Ecology	204-AR/340 Railcar waste	01/22/93
DOH	105-KE Basin followup of 92-012	02/09/93 ^b
Ecology	Diesel spill	02/10/93
DOH	Reduction Oxidation Plant	02/10, 23-26/93
Ecology	Unknown drum	02/17/93
Ecology	105-SX Liquid level drop	02/19/93
EPA	105-KE Basin	02/22/93
Ecology	Central Waste Complex - Low flashpoint modules	02/24/93
Ecology	2715-EA Followup of 93-001	02/25/93

Table 6-1. Regulatory Agency Inspections. (2 sheets)

Ecology	105-KE Basin	03/01/93
Ecology	Visit to various sites	03/09/93
Ecology	Solid waste issues	03/16/93 ^c

^aRL and Ecology began formal proceedings to set new milestones concerning the single-shell Tank 101-T. The tank was considered an assumed leaker and Ecology wanted to outline a timeline for corrective actions (pumping). Milestones were negotiated and both parties were in agreement. Pumping began on March 19, 1993 and is continuing.

^bA stop work notice was issued concerning possible radiation air emissions from points inside of the 105-KE and KW Basins facility. DOH had a concern that movement of material as part of the encapsulation activity without an air permit was a violation.

^cEcology issued a \$100,000 fine for solid waste management at the tank farms. Ecology has made multiple visits to the Hanford Site to gather data. According to Ecology, the fine stemmed from the failure to designate solid waste drums within the tank farms.

DOH = Washington State Department of Health.

Ecology = Washington State Department of Ecology.

EPA = U.S. Environmental Protection Agency.

6.6 INTERNATIONAL ENVIRONMENTAL INSTITUTE

The International Environmental Institute (IEI) was established to develop and maintain an environmental resource center for the communication, development, application, and commercialization of environmental remediation technologies and experience. The goal of the IEI is to increase the value of the federal investment in the Hanford Site cleanup mission through expedited exchange and sharing of technologies, training, and experience with external entities. The IEI accomplishes this by using the Hanford Site as a unique environmental laboratory to create and nurture partnerships among industry, government, academia, and the public. The IEI also acts as a conveyor or two-way window between the Hanford Site and the outside world to assess existing environmental technologies throughout the world for potential application at the Hanford Site. The IEI is a key component of RL's new Office of Economic Transition, with responsibility to support diversification and long-term stability of the region's economy.

The IEI has been in operation since March 1992, and includes a staff of 240 people. The four key business areas for the IEI are technology acquisition and transfer, resource deployment, training and education, and international business/competitiveness.

Recent highlight activities have included hosting the "Technology Alliances Workshop" at the Pasco Red Lion Inn in January 1993. Attended by over 120 representatives from DOE, DOE contractors, and private industry, the focus of the workshop was to discuss new ways to contribute to the economic development of the country by improving the return on investment from the DOE's EM program and performing site cleanup activities safer, better,

cheaper, and faster. Recent economic transition activities of the IEI include establishment of the Economic Transition Cabinet with the economic development directors of Washington, Oregon, and Idaho; initiation of the Hanford Environmental Industrial Complex; and work towards redeployment of a 3,000-ton extrusion press to the city of Richland. Work is also underway on the Hanford - Tri-Cities Salmon Rearing project Cooperative Research and Development Agreement, involving WHC/IEI, PNL, the Washington State Department of Fisheries, and TRIDEC, for creation of a salmon hatchery on the Hanford Site. In addition, the IEI sponsored a 6-week Hanford Site assignment of Professor Zinifer Ismaguilov from the Institute of Catalysis at Novosibirsk, Russia. Dr. Ismaguilov was here to review the environmental restoration mission of the Site and to identify possible areas for collaboration or application of technologies between his Institute in Russia and the Hanford Site.

Activities expected to be performed by the IEI in the near term include initiating joint demonstration projects with private industry involving laser ablation, in situ vitrification, and waste management; conducting a series of Industrial Opportunities Workshops on Hanford Site needs; continuing to provide self-contained breathing apparatus training to offsite emergency responders in the region; pursuing economic conversion initiatives for the Site; and teaming with other entities in the region on economic development-related proposals.

6.7 WASTE MINIMIZATION

The Hanford Waste Minimization Program was designed to meet DOE Orders 5400.1 and 5820.2A, and DOE guidance, consistent with EPA guidelines. The major elements of the program are (1) management support; (2) employee training, awareness, and incentives; (3) program scope, objectives, and goals; (4) waste minimization assessments/audits; (5) accurate cost accounting; (6) accurate waste accounting; (7) technology transfer; and (8) program evaluation.

The program focuses on preventing and minimizing the generation of waste. The program implements a strategy to reduce the volume and toxicity of wastes that are nevertheless generated. In order of priority, the program advocates waste prevention using source reduction and recycling techniques, treatment, and disposal of wastes. Wastes targeted for minimization include radioactive (high-activity, TRU, low-activity), radioactive mixed, hazardous, and nonhazardous regulated wastes.

Requirements for the Hanford Site program now include the following:

- An annual DOE waste reduction report (DOE-RL 1992a)
- A biennial EPA waste minimization report (DOE-RL 1992e)
- An annual EPA source reduction and recycling report attached to the SARA 313 Report (DOE-RL 1992b)
- An annual DOE-required Hanford Site and contractor-specific waste minimization plan review and update

- Update of the Hanford Sitewide and specific RCRA Part B permits
- DOE-required process waste assessments
- Waste minimization and pollution prevention program plans (updated for the Hanford Site and each contractor).

Each of the above initial reports and/or assessments has been completed during 1991 and 1992.

Waste minimization efforts have reduced the volume of wastewater discharged to process trenches in the 300 Area of the Site by more than 5.7 million L/day (1.5 million gal/day) to meet a Tri-Party Agreement milestone. Modifications included installing closed-loop cooling, plugging drains, lowering thermostats in steam-heated buildings, using water in water-cooled equipment only when required, and putting administrative controls in place where possible.

In addition, a multifunction Tank Space Management Board consisting of plant managers was established to review efforts to reduce wastes generated and sent to the tank farms for storage. Task teams imposed maximum waste generation limits for each plant, and approval from the Management Board was necessary to exceed the established volumes. The volume of liquid waste avoided through waste reduction efforts to date exceeds 22 million L (5.8 million gal).

A paper recycling program has expanded to include 194 buildings onsite. In 1992, approximately 200 tons of paper were recycled.

The EPA Biennial Waste Minimization Report was completed in March 1992 (DOE-RL 1992e). RL issued guidance to create semiannual progress reports in support of implementing the Executive Order 12780 (Office of the President 1991), on federal recycling and affirmative procurement programs. The first progress report was completed on December 15, 1992.

Pursuant to WAC 173-307, "Pollution Prevention Planning," a report on hazardous waste generation and hazardous substance use was completed in August 1992. The report was titled *Executive Summary - Hanford Site Pollution Prevention Plan*, DOE/RL-92-62 (DOE-RL 1992d). Process waste assessments are continuing.

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7.3 FEDERAL AND STATE ACTS AND LAWS

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Resource Conservation and Recovery Act of 1976, as amended, 42 USC 6901 et seq.

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7.4 FEDERAL REGISTERS

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WAC 246-247, "Radiation Protection-Air Emissions," *Washington Administrative Code*, as amended.

WAC 246-272 (formerly 248-96), "On Site Sewage Disposal," *Washington Administrative Code*, as amended.

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