

**2003 SITEWIDE INSTITUTIONAL CONTROLS  
ANNUAL ASSESSMENT REPORT**

**Hanford CERCLA Response Actions**

## ACRONYMS

<b>AEA</b>	Atomic Energy Act
<b>AR</b>	Administrative Record
<b>CERCLA</b>	"Comprehensive Environmental Response, Compensation and Liability Act of 1980"
<b>CVP</b>	Cleanup Verification Package
<b>DOH</b>	Washington State Department of Health
<b>Ecology</b>	State of Washington Department of Ecology
<b>EPA</b>	U.S. Environmental Protection Agency
<b>ERC</b>	Environmental Restoration Contractor
<b>ERDF</b>	Environmental Restoration Disposal Facility
<b>ESD</b>	Explanation of Significant Difference
<b>FFTF</b>	Fast Flux Test Facility
<b>FH</b>	Fluor Hanford, Inc.
<b>IC</b>	Institutional Controls
<b>JHA</b>	Job hazard analyses
<b>LIGO</b>	The Laser Interferometer Gravitational Wave Observatory facility
<b>LTS</b>	Long-Term Stewardship
<b>NCP</b>	The National Oil and Hazardous Substances Pollution Contingency Plan
<b>NPL</b>	National Priorities List
<b>OU</b>	Operable Unit
<b>PNNL</b>	Pacific Northwest National Laboratory
<b>PS&amp;S</b>	Project Systems and Support
<b>RCRA</b>	Resource Conservation and Recovery Act of 1976
<b>ROD</b>	Record of Decision
<b>TCE</b>	Trichloroethene
<b>TPA</b>	Tri-Party Agreement
<b>WAC</b>	Washington Administrative Code
<b>WIDS</b>	Waste Information Data System

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## EXECUTIVE SUMMARY

The purpose of this assessment as specified in the Institutional Controls (IC) Plan was two-fold: 1) to evaluate the implementation and effectiveness of ICs associated with *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) Records of Decision (RODs); and 2) to identify corrective actions as necessary. Additionally, this assessment covered an assessment of sitewide ICs at the Hanford Site. The IC Plan was approved by the Tri-Party agencies July 2002, "Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions," DOE/RL-2001-41, Revision 0. The goal of the Plan was to identify ICs for current CERCLA response actions, describe how they are implemented and maintained, and serve as a reference for the selection of ICs in the future. Section 4.2 of the IC Plan summarizes the objectives for the assessment as follows: "A focused and periodic self-assessment and reporting of ICs provides for an evaluation of the effectiveness of the controls and the opportunity for cost-effective improvements."

The IC Plan required that within 12 months of its approval, the U.S. Department of Energy, Richland Operations Office (DOE-RL) issue the first annual assessment report. The IC Plan also stated that the assessment would be conducted initially on an annual basis. The Plan recognizes that DOE-RL contractors have the primary responsibilities for these activities, and DOE-RL conducts oversight and evaluation of contractor activities.

This report is a compilation of the self-assessments conducted by the prime contractors, as well as DOE-RL's assessment of the ICs at the Hanford Site during the period of March 9, 2003, to May 16, 2003, and thus satisfies DOE-RL's responsibility to submit its first annual IC assessment within 12 months of July 2002. DOE-RL plans to correct deficiencies identified in this Plan and perform another annual assessment within 12 months of the final report date. The ICs identified in the RODs associated with the Hanford Site consist of one or more of the following as specified in DOE-2001-41: Procedural Access Controls, Land-use Management, Warning Notices (Signs) and Fencing, Notification of Trespass Events, and Recordkeeping on Remedial Action Information. Additionally, controls over the use and access to the Hanford Site groundwater were assessed.

All IC categories and ROD-specific ICs were evaluated for implementation and effectiveness. The following summarizes the major observations and recommended improvements and/or actions resulting from this review:

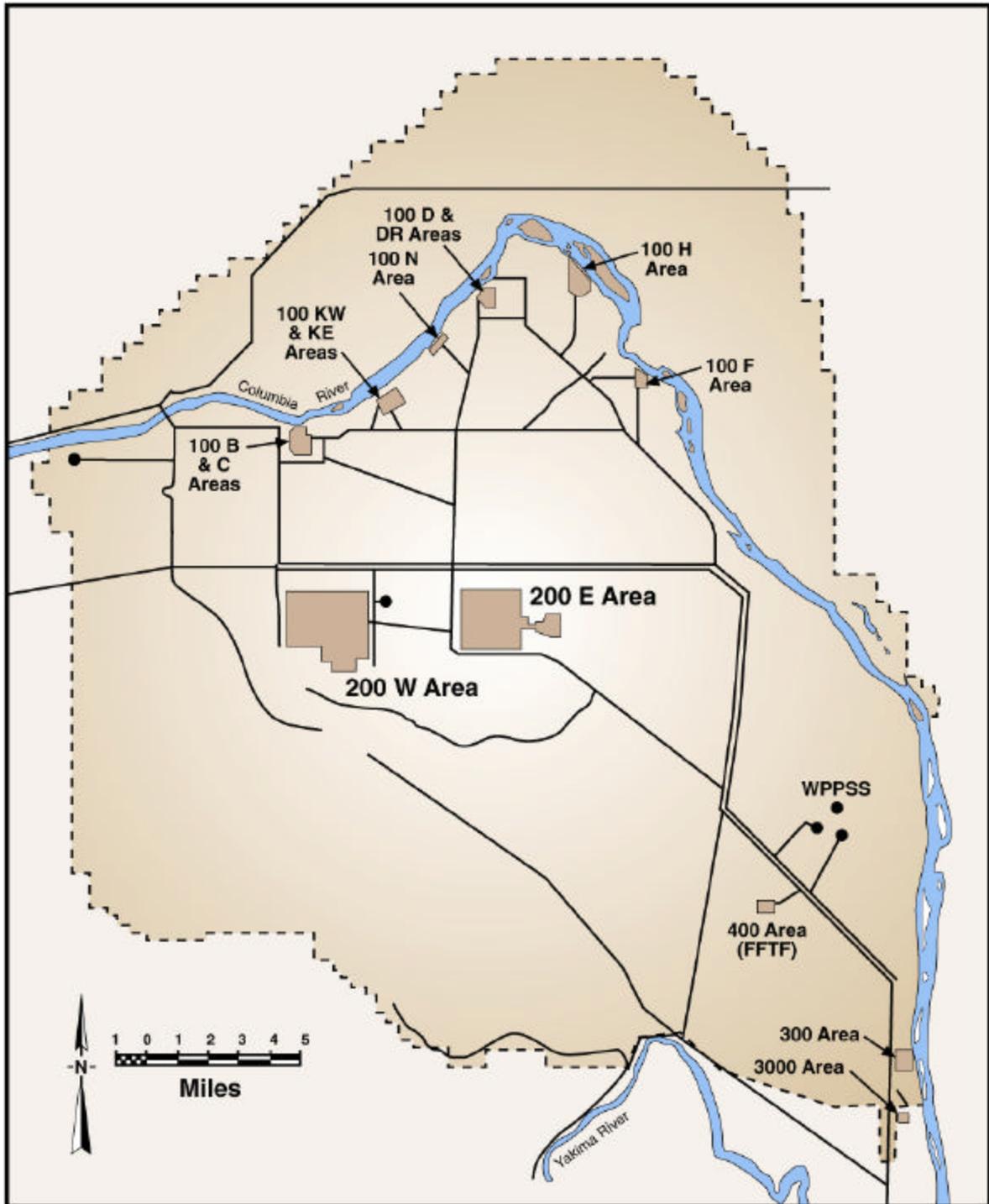
### Major Observations

Number	Description
1	Based on review of 144 waste sites out of approximately 560 waste sites, this assessment did not result in any major findings. Generally, the ICs were found to be implemented and effective with some minor adjustments.
2	While there were incidents of potential trespass on the Hanford Site, none involved trespass of an IC (active or remediated) site.
3	The use of the land has been confirmed to be compatible with the cleanup

	requirements identified in the RODs.
4	The excavation permit process effectively identified waste sites at or near the work location and evaluated excavation activities for potential impacts from the waste sites.
5	Security of the groundwater wells is checked during routine and non-routine well maintenance inspections and by the sampling teams. All active wells have caps and locks in place to avoid unauthorized access.
6	The Waste Information Data System (WIDS) correctly reflected the required ICs for more recent Cleanup Verification Package (CVP) information. For earlier sites, restrictions against deep excavations or well drilling were not documented in WIDS. Minor changes to the recording language are desirable to better define the scope and nature of the ICs (e.g., clarification that the ICs applied both to drilling or excavation below 4.6 m [15 ft])
7	A single strand of the wire fence at the Horn Rapids Landfill entrance was found to require minor repairs.

### Recommendations and Actions

Action Item	Description	Due Date
IC-ERC-1	Review previously completed CVPs to identify sites requiring ICs against excavation to ensure appropriate land use controls, i.e., if not unrestricted use, ICs will be required. RL will prepare a list of sites where it is recommended that additional IC language be added to WIDs site description. The list will be provided to EPA and Ecology for their concurrence.	September 30, 2003
IC-ERC-2	Consistent with the last five-year CERCLA review observation, an Explanation of Significant Differences (ESD) may be warranted to adjust disparity in dates with regards to the timing of the IC annual reports. Also, discussions with EPA and Ecology need to take place, aimed at establishing a single, cohesive set of IC standards to replace the disparate requirements reflected in the existing RODs. This effort should be completed in a time frame that allows the revised requirements to be assessed as part of the next annual IC report. Regulatory actions and concurrences are required to rectify these discrepancies via an ESD to change the ROD requirements and/or the IC Plan.	December 31, 2003
IC-FH-1	Warning signs missing along the Hanford Site shoreline need to be replaced in order to maintain the voluntary 500-foot interval between the signs.	January 31, 2004
IC-FH-2	A single strand of the wire fence at the Horn Rapids Landfill entrance needs to be repaired.	December 1, 2003



Hanford Site Map

## INTRODUCTION

Contamination in the soil and groundwater resulting from nuclear materials production activities over the past 60 years resulted in the inclusion of four areas of Hanford Site on the CERCLA National Priorities List (NPL). The four NPL sites are the 100, 200, 300, and 1100 Area NPL sites. This constitutes approximately six percent of the total land mass that has been disturbed by the industrial activities that took place between 1943 and 1989. Each NPL site is further divided into operable units (OUs). An OU is a grouping of individual waste sites, based primarily on separate geographic area or common waste sources; soil and groundwater contamination are usually in separate OUs.

The CERCLA cleanup actions, including the requirements for ICs, are defined and documented in CERCLA decision documents. The CERCLA decision documents are part of the Administrative Record (AR) for the selection of remedial actions for each waste site. ICs can be specified in the following CERCLA decision documents: 1) ROD, 2) ROD Amendment, 3) ESD, and 4) Action Memorandum. According to the EPA Region 10 Memorandum, May 1999, the ICs generally include all non-engineered restrictions on activities, access, or exposure to land, groundwater, surface water, waste and waste disposal areas and other areas or media.

The procedures for evaluating and selecting remedies are stipulated in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The NCP (40 CFR 300.430(a)(iii)D) allows ICs to be used to supplement engineering controls while conducting remedial investigation/feasibility studies and implementation phase where necessary. The NCP specifies criteria for use of ICs in conjunction with engineered remedies as well as for situations where ICs can be used as the sole remedy. Generally, ICs are used in conjunction with active treatment or containment remedies.

At the Hanford Site, the Hanford Past-Practice strategy has resulted in interim RODs, which were implemented prior to a final selection of remedial actions (with the exception of 300-FF-1 OU). IC requirements are included within most of these RODs. These requirements vary somewhat between RODs, but typically include procedural restrictions for access, warning notices, and land-use controls.

The initial RODs for the Hanford Site tended to establish requirements only for the specific waste sites addressed by the cleanup action. The 100 Area burial ground interim action ROD (issued in September 2000, EPA 2000a) required that the U.S. Department of Energy (DOE) develop and submit a sitewide IC plan for EPA and Ecology approval. The resulting plan, the *Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions*, was approved by the regulatory agencies in July 2002 (DOE-RL 2002). The IC Plan outlined five main categories of institutional controls which included: Procedural Access Controls, Land-use Management, Warning Notices (Signs) and Fencing, Notification of Trespass Events, and Recordkeeping on Remedial Action Information. The plan required DOE to submit an annual assessment of the performance of the ICs for the Hanford Site with the first submittal due July 2003. This *Institutional Controls Annual Assessment Report - 2003* provides DOE with the results from an annual assessment conducted from March 9 through May 16, 2003.

<p>The plan required DOE to submit an annual assessment of the performance of the ICs for the Hanford Site with the first submittal due July 2003.</p>
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At the request of DOE, Hanford Site contractors with responsibility for implementing ICs reviewed the effectiveness of implementation of the ICs that they are responsible for. Flour Hanford Inc. (FH), Bechtel Hanford Inc. (BHI) [hereinafter known as the Environmental Restoration Contractor (ERC)] and Pacific Northwest National Laboratory (PNNL) conducted IC assessments for areas under their management responsibilities, and provided DOE-RL the results of their self-assessments. Subsequently, DOE-RL reviewed the results to verify the contractors' input, and conducted a further assessment of sitewide ICs, which were not specifically required by the RODs and were cross cutting in nature.

At the Hanford Site, FH is responsible for managing the ICs specified in groundwater RODs and other RODs located in the Central Plateau. As of this assessment period, FH had responsibilities for some waste sites and facilities located in the 300 Area of the Hanford Site. ERC is primarily responsible for the cleanup of the waste sites located along the Hanford Site River Corridor, better known as the 100 Area and the 300 Area. ERC is also responsible for the management of the Environmental Restoration and Disposal Facility (ERDF) located in the 200 Area. PNNL is responsible for some waste sites and facilities located primarily in the 300 Area of the Hanford Site.

## Purpose

The purpose of this assessment was to evaluate the implementation and effectiveness of ICs associated with CERCLA RODs, and to identify corrective actions based on performance findings. The IC Plan was approved by the Tri-Party agencies July 2002, "Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions," DOE/RL-2001-41, Revision 0. The goal of the Plan was to identify ICs for current CERCLA response actions, describe how they are implemented and maintained, and serve as a reference for the selection of future ICs. Initially, the IC Plan required that the assessment be conducted on an annual basis and be issued within 12 months of the IC Plan approval. This report describes the institutional control assessment conducted at OUs managed by DOE-RL at the Hanford Site. These OUs are associated with CERCLA RODs identified in Appendix A of DOE/RL-2001-41, titled "Sitewide Institutional Controls (IC) Plan."

<p>The purpose of this assessment was to evaluate the implementation and effectiveness of ICs associated with CERCLA RODs, and to identify corrective actions based on performance findings.</p>
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EPA Region 10 definition of ICs as stated in the May 1999 policy memorandum is "[Institutional controls]...generally include non-engineered restrictions on activities and access to land, groundwater, surface water, waste sites, waste disposal areas, and other areas or media...ICs include restrictions on use or access, zoning, governmental permitting, public advisories, or installation master plans. ICs may be temporary or permanent restrictions or requirements." The requirements for ICs are recorded in CERCLA decision documents. These decision documents are part of the AR for the selection of remedial actions for each waste site and present the selected remedial actions that are chosen in accordance with the CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the NCP. With regard to federal facilities, the 1999 EPA policy stated that "In recognition that ICs are as necessary a component of the remedy as an engineered remedy...the facility-wide IC requirements included in a decision document are enforceable by EPA...however, it is not EPA's

intention to directly enforce specific installation policies, procedures, or processes that are developed by federal facility to meet the IC requirement.”

This report contains the assessment observations and recommendations for the ICs identified in the corresponding RODs provided in Appendix A of the IC Plan, DOE/RL-2001-41, Revision 0. Additionally, an assessment of the shoreline ICs as well as the groundwater controls were conducted as part of this review. Appendix A of this assessment report provides a summary of ICs required by existing CERCLA decision documents. Appendix B contains the 100 Area IC assessment checklist. Appendix C reflects the 200 Area IC assessment information. Appendix D provides 300 Area IC assessment information. Appendix E describes the 1100 Area Horn Rapid Landfill site, and Appendix F presents a set of photos taken during the field assessments.

## Scope and Methodology

The IC assessment consisted of field inspections, personnel contacts, and review of records. Field inspections were used predominantly to determine the presence and status of warning signs, and to check for indications of unauthorized waste site disturbances. Approximately 144 waste sites out of 560 waste sites were assessed. The criteria for this evaluation are outlined in Appendix A of this report. Personnel contacts were made to assess procedural access controls (e.g., the site badging program) and to report any trespass events. Record reviews were also conducted to confirm land-use management controls via the excavation permit process, and recording of ICs at remediated waste sites within the WIDS.

Approximately 144 waste sites out of 560 waste sites were assessed.
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FH responsibilities cover 15 OUs that include 94 waste sites; 72 waste sites were evaluated. At the Hanford Site, FH is responsible for managing workscope associated with the sitewide groundwater units as well as the source OUs in the Central Plateau. Appendix C lists the 72 waste sites evaluated and the effectiveness of the site-specific ICs. FH’s responsibilities in such cases were limited to the following: 1) NPL sitewide ICs, which include access controls, badging, and land-use management; and 2) site-specific ICs, which include signs and fences.

For waste sites under ERC management responsibility, 100 percent of the site-specific ICs listed in the RODs were also evaluated. For each IC within the ERC workscope, an IC assessment form was used. The completed form states the IC requirement as specified in the applicable ROD, identifies the evaluation criteria for assessing the effectiveness of the IC, and presents the assessment results. In addition, it provides recommendations for repairs and improvements.

PNNL is currently responsible for 17 waste sites on the Hanford Site, most of which are located within the 300 Area of the Hanford Site. PNNL has procedures requiring semi-annual inspections of these waste sites. PNNL last performed these inspections in October 2002, and three weather-beaten signs were replaced during these inspections. Waste site intrusion is prevented via the excavation permit process. Any excavation in areas controlled by PNNL requires a permit and review by a PNNL Environmental Compliance Officer (ECO). The ECO reviews all permit requests against the WIDS database to ensure no WIDS sites are improperly disrupted.

Appendix A provides a summary of ICs required by the existing CERCLA RODs for selected sites as well as any possible repairs and improvements deemed appropriate. Appendices B, C, D, and E of this report include the completed assessment forms for the 100, 200, 300, and 1100 Areas, respectively. Appendix F provides a sample of photos from each area, taken during various field inspections, depicting the existing ICs.

The waste sites listed in 100 and 300 Area RODs were grouped into three categories: completed waste sites, sites with active remediation, and sites awaiting initiation of action. Seventeen completed waste sites were field inspected, which included five sites from the 300 Area; 100 percent of the active remediation sites were inspected, which included eight waste sites; and for sites awaiting action, 29 sites were inspected, including seven burial grounds and seven candidate sites. Within these groupings, several criteria were developed for establishing the scope of the field inspections, which were associated with ICs for waste sites. 200 Area waste sites are primarily comprised of groundwater OUs and portions of 200 Area Interim Remedial Action ROD requirements and ERDF ROD requirements.

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## SITE-SPECIFIC INSTITUTIONAL CONTROLS CRITERIA

Several site-specific ICs established in CERCLA RODs are applicable to cleanup actions at waste sites identified in RODs for various OUs located within the four major NPL sites at the Hanford Site, i.e., 100, 200, 300, and 1100 Areas. These ICs can be characterized into the following general categories, as described below.

### Procedural Access Controls

Access controls are ICs that are intended to limit the access of humans to areas that have been remediated but where contaminants were left in place. These ICs may apply to all of the OUs listed on the NPL. Requirements for access control for OUs on the Hanford Site include badging, operation of access control points (barricades), and reporting of incidents of trespass into areas that have been remediated but where contaminants were left in place.

DOE security requirements prohibit access to anyone who does not have in their possession a security badge issued by DOE or one of the DOE contractors.<sup>1</sup> DOE and DOE contractor personnel and all visitors must be wearing a current security badge when on the Hanford Site. Unauthorized persons are denied entry to the Hanford Site. DOE maintains three site access control points (Wye, Yakima, and Rattlesnake barricades), manned by armed security forces to control access at the Hanford Site. The effectiveness of access control and badging processes were verified by confirming the following: 1) Procedures for access control and badging are in place. 2) Trespassing incidents are reported to the Benton County Sheriff's Office.

The effectiveness of access control and badging processes were verified by confirming the following: 1) Procedures for access control and badging are in place. 2) Trespassing incidents are reported to the Benton County Sheriff's Office.

<sup>1</sup> Richland Operations Office Policy for Enforcement of Trespassing on the Hanford Site, K. A. Klein, dated February 19, 2002. Also, 02-SES-124 letter from K.A. Klein to G. Hughes, US F&W, dated February 20, 2002.

Three site access points (WYE, Yakima, and Rattlesnake) control access at the Hanford Site. All personnel entering these barricades must be wearing a current security badge. The same requirements apply to personnel entering DOE controlled areas outside the barricades. Unauthorized personnel are denied entry to the Hanford Site. The badging process is governed by a Hanford Site procedure, while access control processes are governed by a DOE-Headquarters complex-wide directive. Authorized personnel on the Hanford Site are required to wear, display, and present badges on request. Additional levels of access control and badging could be required based on specialized needs.

Special requirements are in place for visitors and foreign nationals. Visitors and their hosts are provided appropriate training on policies and procedures pertaining to safety, security, and escorting requirements. Visitors require a host on the Hanford Site, and the host must know the location of the visitor at all times.

The Physical Security group within the Safeguard and Security organization conducts site security activities for the Hanford Site. The ICs require that trespassing incidents be reported to the Benton County Sheriff's Office. While there were incidents of potential trespass on the Hanford Site, none involved trespass of an IC (active or remediated) site. When unauthorized personnel and members of the public were encountered, they were redirected to public access areas, and no incidents of trespass resulted from these attempted accesses.

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Since trespass onto federal property constitutes a criminal act, DOE, as a matter of policy, would refer such matters for prosecution to the Benton County Sheriff's Office.<sup>2</sup> Hanford Patrol is required to report trespassing incidents to Benton County Sheriff's Office. Hanford Patrol uses a 'Quick Reaction Checklist' to deal with any incidents requiring action. The checklist lists common incidents and outlines the steps that need to be taken. Trespassing is one of the incidents listed and the action to be taken is to report the incident to the Benton County Sheriff's Office. During FY 2002, there were 60 incidents where Hanford Patrol denied Site access at the barricades due to no badge, expired badges, badge discrepancies, unauthorized badges, forgotten badges, etc.

During FY 2002, there were 60 incidents where Hanford Patrol denied Site access at the barricades due to no badge, expired badges, badge discrepancies, unauthorized badges, forgotten badges, etc.

Access controls achieved through the DOE badging program and via the escorting of visitors entering any covered waste sites is required by the RODs for the 100 Area burial grounds (EPA 2000a), the 100-NR-1 OU (EPA 2000b), the 100 Area remaining sites (EPA 1999), and the 300-FF-2 OU (EPA 2001). Additionally, access controls are required by the 100-BC-1, 100-DR-1, and 100-HR-1 OUs ROD (EPA 1995a), as well as in the ERDF ROD (EPA 1995b).

### **Land-Use Management Controls**

The use of land at OUs and the waste sites are restricted and controlled in accordance with the ICs requirements of the CERCLA ROD documents. ICs that address land use have been

<sup>2</sup> 02-SES-119 letter from K. A. Klein to Sheriff Larry Taylor, dated February 20, 2002

grouped into the following two categories: 1) land-use and real property controls; and 2) excavation permits

The objectives of land-use and real property controls are two fold: 1) ensure that the use of land is compatible with the hazards; and 2) ensure that any changes in the use of land are restricted and/or controlled to ensure consistency with OU ICs requirements.

The use of the land has been confirmed to be compatible with the cleanup requirements identified in the RODs. The FH Real Property group supports DOE-RL in land, facility transfers (e.g., to private parties), siting of property (such as relocating mobile offices), or identifying areas suitable for construction on the Hanford Site. The effectiveness of land-use and real property controls are verified by the use of General Services Administration Standard Form SF 118 for the land transfers to other parties. This form ensures that land-use and real property control objectives are met. This form provides information concerning activities related to the hazardous substances on the specific parcel of the land being transferred, and are given to a potential buyer as a part of the real estate transaction documents. No transfer of land to private parties has occurred to date. The effect of impacts to waste sites is required to be evaluated before each property transfer occurs on the Hanford Site. The EPA Region 10's IC policy recognizes the need for federal facilities "to develop a comprehensive facility-wide approach to restricting land-use and access where such land restriction is a component of a CERCLA remedy...covenants, easements, and deed restrictions are not, in general, available for use at federally owned property."

The use of the land has been confirmed to be compatible with the cleanup requirements identified in the RODs.

Controls that specifically identify prohibitions against unauthorized disturbance (e.g., well drilling or intrusive work) of waste sites are addressed by various RODs. These provisions appear in the RODs for the 100 Area burial grounds (EPA 2000a); the 100-NR-1 OU (EPA 2000b); the 100 Area remaining sites (EPA 1999); the 100-BC-1, 100-DR-1, and 100-HR-1 OUs (EPA 1995a); and the 300-FF-1 and 300-FF-2 OUs (EPA 1996, 2001). The Hanford Site excavation permit process is used as the primary mechanism for authorizing well drilling or other intrusive work at waste sites addressed by the RODs. The permit process applies to all Hanford Site contractors. The Excavation Permit is reviewed and approved by Hanford Site utility representatives, (telephone, electrical, water and steam) Radiological Control, Security and Environmental Compliance reviews. The review process includes a check for WIDS waste sites in the vicinity of the excavation. Cultural Resource and biological reviews are also required for excavations done on the Hanford Site.

The Hanford Site excavation permit process is used as the primary mechanism for authorizing well drilling or other intrusive work at waste sites addressed by the RODs. The permit process applies to all Hanford Site contractors.

The excavation permit process is used for the following: 1) Avoid unplanned disturbance or infiltration; 2) inform and protect personnel regarding potential exposure to hazardous substances; 3) avoid the creation of potential pathways for the migration of hazardous substances; and 4) to identify, protect and avoid underground utilities and other obstructions. FH is responsible for issuing excavation permits on the Hanford Site. The requirement to obtain an excavation permit is identified through the automated job hazard analysis (JHA) process during

job planning. The JHA insures worker safety issues are identified prior to any excavation activity.

To evaluate the effectiveness of this IC, a sample of excavation permits issued in CY 2002 were reviewed to verify that waste sites at or near work locations were identified and the potential impact of excavation activities was evaluated. During CY 2002, there were 221 excavation permits issued across the Hanford Site. This review indicated that the excavation permit process effectively identified waste sites at or near the work location and evaluated excavation activities for potential impacts from the waste sites.

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### Warning Notices (Signs) and Fencing

The effectiveness of posted signs at waste sites were evaluated by verifying whether the signs provided accurate waste site identifications, were in good conditions, and were visible. The Hanford Site perimeter signs were evaluated by verifying condition, visibility, and presence of a “No Trespassing” notice. According to the workscope assigned to FH-Project Systems and Support (PS&S), there are approximately 4000 “No Trespassing” signs at the Site boundaries including signs along the Columbia River.<sup>3</sup> Approximately five percent of these signs are repaired/replaced annually. Signs along the Columbia River are inspected twice annually. The information displayed on all waste sites signs was found to be accurate. There are approximately 765 road signs on the Hanford Site; approximately 10 are repaired/replaced annually. The “No Trespassing” signs were posted every 500 feet along the perimeter of the Hanford Site, including the high water mark along the Columbia River shoreline. There are approximately 600 signs along the river, which include the land currently being managed by the U.S. Fish and Wildlife Service.<sup>4</sup> Generally, all signs were found to be in good condition and were legible. Signs are not identified as IC in the RODs for groundwater management units. However, there are signs at each groundwater management unit clearly identifying the unit.

There are approximately 4000 “No Trespassing” signs at the Site boundaries including signs along the Columbia River. Approximately five percent of these signs are repaired/replaced annually. Signs along the Columbia River are inspected twice annually. The information displayed on all waste sites signs was found to be accurate. There are approximately 765 road signs on the Hanford Site. Approximately 10 are repaired/replaced annually.

Generally, all signs were found to be in good condition and were legible. Signs are not identified as IC in the RODs for groundwater management units. However, there are signs at each groundwater management unit clearly identifying the unit.

Warning signs are specifically required by the RODs for the 100 Area burial grounds (EPA 2000a), the 100-NR-1 OU (EPA 2000b), the 100 Area remaining sites (EPA 1999), and the 300-FF-2 OU (EPA 2001). The requirements vary somewhat between the RODs. Some RODs require signs along the Columbia River shoreline, as well as along access roads, while other RODs simply state that “existing signs” must be maintained. Warning signs at

<sup>3</sup> FH-Project Systems and Support, Transportation Services, WBS 3.4.2.1.2.3, Grounds Maintenance Service Descriptions.

<sup>4</sup> FH-Project Systems and Support, interview with road maintenance staff on July 7, 2003.

the Hanford Site are typically “layered” from the general to the more specific, and may include general signs prohibiting trespass, waste site-specific signs warning of hazards, and/or radioactive area postings. This layered approach reflects a graded approach based on site hazard. For waste sites inside security checkpoints (i.e., badgehouses), all entrants must have appropriate access training prior to entering. “Warning,” “restricted access,” “no trespassing,” or similar signs are typically present at access roads leading to waste sites, whether the sites are within or outside of security checkpoints. Waste sites outside of security checkpoints are often fenced, with warning signs present on the fencing. Sites undergoing active remediation include notification signs warning of the cleanup activities, and the sites themselves are generally fenced. Finally, sites with radioactive contamination are posted with radioactive control signs or markers at the actual waste site.

The objective of fencing around waste sites is to prevent unauthorized people and large animal access to hazardous or sensitive areas. Fencing also provides protective barriers to standard industrial hazards. To determine their effectiveness, fences were assessed for integrity and to verify lock and key control. Fences were found to be in good conditions, and keys to fenced areas were found to be under the control of the appropriate responsible organizations.

### **Notification of Trespass Events**

DOE is required to notify EPA and Ecology in the event of trespass incidents, under the terms of the RODs for the 100 Area burial grounds (EPA 2000a), the 100-NR-1 OU (EPA 2000b), the 100 Area remaining sites (EPA 1999), and the 300-FF-2 OU (EPA 2001). In addition, the latter three RODs also stipulate that trespass events must be reported to the Benton County Sheriff’s Office. While there were incidents of potential trespass on the Hanford Site, none involved trespass of an IC (active or remediated) site. Trespass incidents were reported to the Benton County Sheriff’s Office. RL encountered 60 unauthorized personnel and members of the public attempting to make unauthorized entry and they were redirected to the public access areas, no incidents of trespass resulted from these attempted accesses.

Fences were found to be in good conditions, and keys to fenced areas were found to be under the control of the appropriate responsible organizations.

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### **Recordkeeping on Remedial Action Information**

The primary system of recordkeeping on remedial action information is the AR that was established in accordance with Section 9.4 of TPA. A provision in the 100 Area burial grounds ROD (EPA 2000a) requires a tracking mechanism that identifies all land areas under restriction or control. The 300-FF-1 and 300-FF-5 ROD (EPA 1996) contains a requirement for placing written notification of remedial action in the facility land-use master plan. In practice, ICs for individual remediated waste sites are identified in the CVPs and are approved by the lead regulatory agency. ICs identified in the CVPs are typically entered into WIDS; WIDS serves as the primary mechanism used by the Hanford Site to record ICs associated with remediated waste sites.

WIDS is the system designated in Section 3.5 of the Tri-Party Agreement for tracking the waste sites at Hanford. The WIDS describes the history, location, regulatory information, cleanup activities, and current status of all identified waste sites. All information in the WIDS is traceable to supporting references including technical documents, Hanford drawings, photographs, interview, and field logbooks. The Environmental Information Systems group of FH currently manages the WIDS database. WIDS includes all waste sites, except for former and future facilities that will undergo decontamination and decommissioning.

## STATUS OF INSTITUTIONAL CONTROLS

This section provides, in general terms, a description of the overall effectiveness of IC waste sites by each NPL site.

### 100 Area ICs

The 100 Area NPL site is located in the northern portion of the Hanford Site. The portion north and east of the river is the Wahluke or the North Slope, which was contaminated by anti-aircraft missile bases. The source contamination in the 100 Area is grouped geographically into 17 OUs. These OUs contain about 400 waste sites, which can be categorized into four different types: contaminated soil, structures, debris, or burial grounds. Since the 100 Area was listed on the NPL, a Notice of Partial Deletion has been published for the North Slope.

ICs at six OUs were evaluated in the 100 Area. The required ICs were access control, badging, excavation permit, fences, signs, and prevention of exposure to groundwater. All the controls are implemented and effective.

Field inspections of 44 waste sites along the River Corridor revealed no unauthorized disturbances (e.g., well drilling or intrusive work) at any of the waste sites. For sites with active remediation (seven sites in all), the presence of approved excavation permits authorizing the work was confirmed.

Signs were present at 43 of the 44 waste sites assessed. The main entrances to the 100-B/C, 100-D/DR, 100-F, 100-H, 100-N, and 100-K Areas are posted with the following information:

WARNING: HAZARDOUS AREA DO NOT ENTER. Area May Contain  
Hazardous Soil and Water Seeps. For information Call: (509) 376-7501

The telephone number listed was verified as accurate to obtain additional information. One waste site (128-C-1) was accessible without passing a warning sign, however, there was a warning sign on the west access road to the 100 B/C area. Waste site 128-C-1, which is nonradioactive can be accessed via an alternative access road.

All but one waste site (100-N-14) was posted with the correct contact number. *The contact number posted for the 100-N-14 site was out of date.* Each waste site assessed containing

*The contact number posted for the 100-N-14 site was out of date and it has been corrected.*

radioactive contamination, whether surface or underground, was posted with radiological warning signs. Several waste sites were located within the fence line of the reactor buildings.

These locations were well marked with warning signs cautioning of construction dangers, restricted access, and radiological dangers/contamination.

Contact was made with the Hanford Patrol, and the Benton County Sheriff's Office regarding trespass events during the past year. There were no known trespass incidents onto the waste sites located within the 100 and 300 Areas of the Hanford Site during the past year. While there were incidents of potential trespass on the Hanford Site, none involved trespass of an IC (active or remediated) site. Trespass incidents were reported to the Benton County Sheriff's Office. When unauthorized personnel and members of the public were encountered, they were redirected to public access areas, and no incidents of trespass resulted from these attempted accesses.

There were no known trespass incidents onto the waste sites located within the 100 and 300 Areas of the Hanford Site during the past year.

When unauthorized personnel and members of the public were encountered, they were redirected to public access areas, and no incidents of trespass resulted from these attempted accesses.

The exposure scenario used to model waste sites within the 100 Area OUs assumes no deep (i.e., >4.6 m [15 ft]) well drilling or excavation. As a consequence, most of the remediated liquid waste sites within the 100 Area OUs required an IC prohibiting unauthorized drilling or excavation below 4.6 m (15 ft). The majority of the CVPs and reclassification forms for these sites indicated whether prohibitions against deep drilling or excavations were required. This assessment evaluated the adequacy of the IC recordkeeping; the WIDS database was reviewed to determine whether the ICs required at the waste sites were appropriately recorded. This assessment showed that a complete recording of IC information was present in WIDS for 33 waste sites. For 29 waste sites (primarily associated with the earliest 100 Area CERCLA remediation efforts when ICs were not specified in the associated CVP) the WIDS entries did not reflect the requirement for ICs below 4.6 m (15 ft).

For 29 waste sites... the WIDS entries did not reflect the requirement for ICs below 4.6 m (15 ft).

The procedural access controls systems for the 100 Area remedial action sites were found to be operational and effective. Thus, there are no recommended changes based on assessment results.

The land-use management controls for the 100 Area remedial action sites were found to be functional and adequate. There are no recommended changes based on the assessment results.

Overall, the warning notices were satisfactory. One site, 128-C-1, did not have any warning signs near or approaching the waste site from the K Area access road, nor were any warning signs present at the waste site. These deficiencies have been corrected. Additionally, a warning sign on the access road to 100-N-14 had an incorrect contact number listed. This sign has been replaced with a sign that identifies the correct contact number.

There were no known trespass events onto waste sites addressed by 100 Area RODs, and no recommended changes to the notification program based on the assessment results. While there were incidents of potential trespass on the Hanford Site, none involved trespass of an IC (active or remediated) site. Trespass incidents were reported to the Benton County Sheriff's Office. When unauthorized personnel and members of the public were encountered, they were redirected to public access areas, and no incidents of trespass resulted from these attempted accesses.

The process for recordkeeping on remedial actions was found to be effective in recording IC information. However, the “Post Closure Requirements” section of the WIDS entries should be expanded: *(1) to better define the scope and nature of applicable ICs for 17 waste sites, and (2) include the requirement for ICs below 4.6 m (15 ft) for any of the applicable waste sites, such as where the reclassification form was approved by the regulatory agencies, but ICs were not specifically identified.*

*...(1) to better define the scope and nature of applicable ICs for 17 waste sites, and (2) include the requirement for ICs below 4.6 m (15 ft) for any of the applicable waste sites, such as where the reclassification form was approved by the regulatory agencies, but ICs were not specifically identified.*

### 200 Area ICs

The 200 Area NPL site consists of 200 East and West Areas. The 200 East and West areas were used for chemical processing and waste management. These activities resulted in large amounts of contaminated soil and groundwater. The ongoing waste management activities include active treatment, storage, and/or disposal facilities, including the ERDF and the high-level nuclear waste tank farm operations under the management responsibility of the Office of River Protection. The 200 Area NPL is divided into 12 OUs, which contain approximately 700 soil waste sites and four groundwater OUs (200-ZP-1 and 200-UP-1 in 200 West Area; 200-BP-5 and 200-PO-1 in 200 Area East). Currently, there are seven CERCLA decision documents, including the RODs for ERDF, 200-ZP-1, and 200-UP-1 OUs.

ICs at four OUs listed in Appendix C were evaluated by FH in the 200 Area. The required ICs included access control, badging, excavation permit, fences, signs, and prevention of exposure to groundwater.

The only 200 Area IC requirement within the ERC scope of work is in the ROD for the ERDF. The requirement states that ICs shall be imposed to restrict public access to the landfill.

Appendix C presents the assessment checklist for this requirement. The ERDF site is fenced and is posted with warning signs along the perimeter fence, and the Route 3 haul road. Existing controls at ERDF were found to be robust and appropriate to satisfy the ROD requirements. As a consequence, no changes were recommended.

Existing controls at ERDF were found to be robust and appropriate to satisfy the ROD requirements. As a consequence, no changes were recommended.

### 300 Area ICs

The 300 Area is located just north of the City of Richland. Fuel fabrication and laboratory facilities located in the 300 Area released contaminants to the surface, soil column, and groundwater. Waste from the 300 Area operations was also disposed of in designated landfills/burial grounds and discharged to unlined surface ponds/trenches. The 300 Area is comprised of three OUs: the 300-FF-1 and 300-FF-2 OUs address soil contamination areas and burial grounds while the 300-FF-5 OU addresses groundwater contamination beneath the burial grounds and soil waste sites.

The primary IC at the three vehicle entrances to the 300 Area is signs and fencing prohibiting entrance to unauthorized personnel. The restricted area is completely fenced aside from vehicle and

The primary IC at the three vehicle entrances to the 300 Area is signs and fencing prohibiting entrance to unauthorized personnel.

pedestrian access ways. At the Apple Street entrance, there are approximately 17 warning signs, providing ample warning to a potential trespasser. The other two vehicle entrances have adequate signs prohibiting unauthorized access.

The areas currently being remediated are the 618-4 and 618-5 burial grounds. They are surrounded by fences and access ways are posted restricting unauthorized access. Appendix D presents the assessment checklist for these requirements. ICs at 43 waste sites associated with one OU were evaluated in the 300 Area. The required ICs were access control, badging, excavation permit, fences, signs, and prevention of exposure to groundwater. The controls are implemented and effective.

Two waste sites, 618-10 and 618-11, are outside the boundaries of the 300 Area. 618-11 is located near the Energy Northwest Plant. Access to 618-11 is through a controlled guard gate at the Energy Northwest plant. This waste site is fenced and proper warning signs are posted on the fence. 618-10 is located south of the 400 Area and has a chain-linked fence with warning signs posted on the fence. However, the entrance road approaching 618-10 and neighboring waste sites does not have a warning sign visible before the sign posted on the burial ground fence. Such a sign should be posted to warn of the hazard before approaching the boundary fence, and to warn of the neighboring waste sites. A small number of "Underground Radioactive Material Area" signs were visibly faded but legible.

Access to 618-11 is through a controlled guard gate at the Energy Northwest plant. This waste site is fenced and proper warning signs are posted on the fence.

As provided in Appendix D, the Hanford Site badging program for the 300 Area is in place, and effective. Visitors, Site contractors, and DOE personnel were required to have a badge to access restricted areas of the Hanford Site. Before receiving a badge, all must receive training, which includes training on recognizing signs, hazard postings, and compliance with appropriate procedures. Site contractors have procedures in place that comply with the Hanford Site badging requirements.

Field inspections of 11 waste sites revealed no unauthorized disturbances (e.g., well drilling or intrusive work) at any of the waste sites. For sites with active remediation (two sites in all), the presence of approved excavation permits authorizing the work was confirmed.

Signs were present at entrances to the main portion of the 300 Area and along the access roads to the waste sites. Of the 11 sites evaluated, two of the outlying waste sites (300-VTS and 618-7) did not have adequate signage along the access road. These sites are located across the street from the 300 Area and are surrounded by perimeter fencing and warning signs.

Of the 11 sites evaluated, two of the outlying waste sites (300-VTS and 618-7) did not have adequate signage along the access road. This deficiency has been corrected.

Although no warning signs were present on the access road, two signs have been posted. Signs at these two waste sites provided an incorrect contact number. Additionally, the 618-7 waste site had radiation-warning signs that were not legible, as they had melted, apparently as a result of the brush fire in 2000 (24 Command Fire). This deficiency has been corrected. The other nine sites evaluated had well-maintained and legible signs.

The 618-7 waste site had radiation-warning signs that were not legible, as they had melted, apparently as a result of the brush fire in 2000. This deficiency has been corrected.

There were no known trespass events onto waste sites addressed by the 300 Area RODs, and no recommended changes to the notification program based on the assessment results. While there were incidents of potential trespass on the Hanford Site, none involved trespass of an IC (active or remediated) site. Trespass incidents were reported to the Benton County Sheriff's Office. When unauthorized personnel and members of the public were encountered, they were redirected to public access areas, and no incidents of trespass resulted from these attempted accesses.

There were no known trespass events onto waste sites addressed by the 300 Area RODs

The 300-FF-1 and 300-FF-5 ROD (EPA 1996) requires written notification of the remedial action in the facility land-use master plan. WIDS is used to document ICs applicable after remediation. Cleanup standards for the 300 Area waste sites were based on an industrial land-use scenario. To support RL's assessment of the sitewide IC requirement, it has been verified (see Appendix D) that the WIDS properly recorded and identified the remediated waste sites; however, the industrial land-use basis was not reflected.

WIDS properly recorded and identified the remediated waste sites; however, the industrial land-use basis was not reflected.

### 1100 Area ICs

The 1100 Area NPL site began north of Richland at Horn Rapids Road and extended to the south and north and west of Stevens Drive. The Horn Rapids Landfill site, which operated from the late 1940s to the 1970s as an uncontrolled landfill, extends over approximately 50 acres of generally flat terrain, within the 600 Area. Originally a borrow pit for sand and gravel, the Horn Rapids Landfill was used primarily as a disposal site for office and construction waste, asbestos, sewage sludge, fly ash, and reportedly numerous drums of unidentified organic liquids (DOE/RL-90-18). The landfill contained five disposal trenches, the westernmost of the waste disposal trenches were posted with signs warning that the trench contained asbestos (DOE/RL-92-67, Vol. 1). The 1100 Area NPL was divided into four OUs: 1100-EM-1, 1100-EM-2, 1100-EM-3, which contained the central warehousing, vehicle maintenance, and transportation distribution center for the entire Hanford Site, and the 1100-OU-1 operable unit, a former anti-aircraft missile base and control center, that is now used for the Fitzner-Eberhardt Arid Lands Ecology Reserve. Remediation at four OUs was completed and the 1100 Area was deleted from the NPL in 1996 in a Notice of Deletion. In 1997, DOE-RL recorded a Notice in Deed for the Horn Rapids Landfill with the Benton County Auditor and subsequently EPA was notified.<sup>5</sup>

The 1100 Area ROD established the natural attenuation alternative as the remedial action for the trichloroethene (TCE) plume beneath the Horn Rapids Landfill site. Monitoring to evaluate the success of natural attenuation is performed on an annual basis. Five groundwater-monitoring wells were installed in August 1995, consistent with the requirements identified in the sampling plan (DOE/RL-95-50), downgradient of the Horn Rapids Landfill to facilitate compliance evaluation and the remedial action objectives of the ROD. Groundwater monitoring constituents identified in the sampling plan included: trichloroethene, 1,1-dichloroethene, vinyl chloride, nitrate, and chromium. Compliance with the TCE maximum contaminant level concentration of 5 µg/L appears to have been achieved in 2002. However, additional groundwater monitoring is needed to confirm compliance. There is no groundwater use other than for monitoring purposes.

<sup>5</sup> A letter from T. W. Ferns to A. Nolan, EPA, Recorded Notice in Deed for Horn Rapids Landfill, June 12, 1997.

The fence surrounding the Horn Rapids Landfill was found to require minor repairs. The landfill warning signs were in good condition. The requirement to inspect the landfill cap was fulfilled by ERC, as provided in ERC's surveillance and maintenance project plan. As provided in the Horn Rapids Landfill Surveillance Data Sheet for CY 2002, the plan was successfully implemented. Also, as per the surveillance sheets completed by BHI, there were no cave-ins, depression, or animal intrusion with regards to the surface cap of the landfill.

The fence surrounding the Horn Rapids Landfill was found to require minor repairs.

The procedural access controls systems at the Horn Rapids Landfill were found to be operational and effective. Thus, there are no recommended changes based on assessment results.

The land-use management controls were found to be functional and adequate. The deed restrictions placed on the property appears to be adequate. There are no recommended changes based on the assessment results.

Signs were present at the entrance to the landfill from Horn Rapids Road. The site is located in the immediate north of Horn Rapids Road. With regards to the fencing at the landfill, one wire strand between two metal posts needs to be repaired (Appendix F, 1100 Area, Figure 1).

There were no known trespass events onto waste sites addressed by the 1100 Area RODs, and no recommended changes to the notification program based on assessment results. While there were incidents of potential trespass on the Hanford Site, none involved trespass of an IC (active or remediated) site. Trespass incidents were reported to the Benton County Sheriff's Office. When unauthorized personnel and members of the public were encountered, they were redirected to public access areas, and no incidents of trespass resulted from these attempted accesses.

Records on file with regards to the landfill are kept within the CERCLA administrative records and the WIDS database.

## **GROUNDWATER CONTROLS**

DOE has been monitoring groundwater since the inception of the Hanford Site. The majority of wells on the Hanford Site have been installed as groundwater monitoring wells with the exception of the following wells that are being utilized as either drinking water wells or for other purposes:

In the 300 Area, 331 Aquatic Laboratory utilizes groundwater to conduct aquatic research for a wide variety of clients. The well is located adjacent and south of the 331 Building and was installed in December 1980. The well water is mixed with river water to provide a reliable source of pathogen-free, temperature-controlled, reduced-solids water. Unauthorized use of water from the groundwater well that provides water for fishery research in the 331 Building is prevented by both engineered and administrative controls. The wellhead is located immediately adjacent to the fishery research area outside the building, which is fenced. The wellhead is secured, and water transfers directly into the research facility piping with no opportunity for diversion. If a system modification were to be attempted, the PNNL work control system would

be required. This administrative review would prevent a modification that might allow well water to be diverted to unauthorized uses. PNNL has put in place both engineered and administrative controls to prevent unauthorized use of the groundwater, except as approved by the U.S. Environmental Protection Agency (EPA) and the State of Washington Department of Ecology (Ecology).

In the 400 Area, there are three drinking water supply wells providing potable water for the 400 Area Fast Flux Test Facility (FFTF). Monitoring of the 400 Area Process Ponds is performed using the upgradient well 699-8-17 and two downgradient wells, 699-2-6A and 699-2-7. Continued elevated nitrate levels for downgradient well 699-2-7 were observed during the fourth quarter of 2002, consistent with past trends. This is attributed to a nearby sanitary sewage lagoon (currently inactive and backfilled) and an inactive drainfield. Nitrate values are presently declining in this well in general. Based on the first quarter of 2003 sampling, tritium is the main constituent of concern in these wells. The tritium activity of the primary water supply well 499-S1-8J was reported as 3010 pCi/L for the first quarter of 2003, which is below the 20,000 pCi/L interim drinking water standard. Tritium activity levels in this well are in a stable to slightly declining trend. Tritium levels in the water supply backup wells were generally consistent for the first quarter of 2003 compared with past trends. The tritium activity for the backup well 499-S0-7 was 11,000 pCi/L for the first quarter sampling and is consistent with a generally declining trend for the well. Tritium activity in backup well 499-S0-8 was reported as 2970 pCi/L for the first quarter and indicates a stable to slightly declining trend.

<p>PNNL has put in place both engineered and administrative controls to prevent unauthorized use of the groundwater, except as approved by EPA and Ecology.</p>
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The Laser Interferometer Gravitational Wave Observatory facility (LIGO), which is a non-DOE facility, utilizes one groundwater well for domestic water uses. No information is available on the water supply for LIGO. However, general information on distribution of the tritium plume in the 400 Area indicates that the LIGO facility is outside of the 2000 pCi/L isopleth. The other water supply wells in the proximate vicinity are at FFTF. These wells are completed at a horizon beneath the tritium contamination. The 400 Area wells are sampled monthly for tritium and annually for iodine-129. The average tritium concentrations in the 400 Area have been below State and federal drinking water standards.

In the 200 East Area, the B-Plant utilizes two wells providing emergency cooling water to pool cells. Additionally, one well at the Canton Avenue A-Farm provides emergency cooling water to the 702-A building.

In the 600 Area, Energy Northwest has three serviceable water supply wells (two at WNP-1 and 4, and one at Columbia Generating Station, which is utilized as a backup groundwater well). These wells are located west and slightly south of the 618-11 burial ground. The wells are sampled by Energy Northwest personnel on a quarterly basis for radionuclides and less frequently for nitrates and volatile organic compounds. "The FY 2001 characterization located the tritium contamination to the top of the Ringold mud unit at a depth of 12.8m below the water table. The top of the open intervals for the water supply wells are considerably deeper at approximately 75m below the surface or approximately 34m below the water table. Each well contains four screens separated by blank casing so it is probable that much of the water comes from still deeper in the aquifer. For this reason, it is considered unlikely that these wells will be

impacted by the contamination from the burial ground.”<sup>6</sup> The groundwater analysis indicates “no impact is expected at active groundwater wells. The nearest groundwater wells to the plume are those used at Columbia Generating Station; these wells are not within the expected flow path of this plume. More importantly, these wells are completed deep within the Ringold Aquifer at a depth far below any identified tritium contamination, which is generally found in the upper part of the uppermost unconfined aquifer. These wells are used for water supply and fire suppression.”<sup>7</sup> The monitoring of these wells will continue while the wells remain in use for water supply.

The Hanford Patrol Training Academy had previously utilized potable water from one well to the training complex. That well is now providing irrigation water to the facility grounds. Also, one well at the Yakima Barricade provided potable water to the guard station, however, this well is now being utilized by PNNL for monitoring purposes only.

All Public Water Systems are part of the Site Drinking Water program approved by the Department of Health (DOH) and are monitored in accordance with State and federal drinking water laws. All these systems are licensed by DOH in accordance with Washington Administrative Code (WAC) Chapter 246-290 for Group A, or WAC Chapter 246-291 for Group B. All of the active wells are included in the wellhead protection program as required by WAC 246-290-135 (3) Source Water Protection.

All Public Water Systems are part of the Site Drinking Water program approved by the Department of Health (DOH) and are monitored in accordance with State and federal drinking water laws.

The groundwater monitoring network is designed to meet the compliance requirements of the Resource Conservation and Recovery Act of 1976 (RCRA), CERCLA, and Atomic Energy Act (AEA). The regulations that promulgate these laws are for the purpose of detecting contamination in the groundwater so that corrective measures can be employed to prevent or mitigate the contamination, to implement groundwater remedial actions and to monitor the effectiveness of these actions, and to determine whether radionuclides in the groundwater present a hazard to the public. The annual groundwater report, “Hanford Site Groundwater Monitoring For Fiscal Year 2002” details the groundwater monitoring and remedial operations for the past year of the report for each areas of the Hanford Site. The report’s issuance meets regulatory requirements under RCRA and AEA.

The groundwater monitoring network is designed to meet the compliance requirements of the Resource Conservation and Recovery Act of 1976 (RCRA), CERCLA, and Atomic Energy Act (AEA).

Additionally, all discharges to the soil column at the Hanford Site are regulated via the State of Washington State Waste Discharge Permit (WAC 173-216) program obtained through the liquid effluent consent agreement issued in December of 1991. All these permitted discharges meet the requirements of Water Quality Criteria Standard (WAC 173-200-100).

<sup>6</sup> Letter, P. E. Dressel, PNNL, to K. M. Thomspn, RL, “Transmittal of Evaluation of the Impacts of Tritium Contamination in Groundwater from the 618-11 burial Ground at the Hanford Site,” Draft, dated October 25, 2001.

<sup>7</sup> Letter, 02-GWVZ-007, from J. G. Morse, DOE GW/VZ, to D. R. Sherwood, EPA, “Action Item 300-3 of the Comprehensive Environmental Response, Compensation, and Liability Act Five-Year Review,” dated December 1, 2001

During Fiscal Year 2001, water levels were measured in more than 800 wells on the Hanford Site. Water levels were measured more frequently and at more closely spaced wells in the vicinity of the operational facilities, cleanup sites, and the Richland North area, in order to evaluate local groundwater flow patterns associated with those areas. During the same period of time, 706 wells were sampled for radiological and chemical constituents one or more times. The major radionuclides contaminants of concern at levels above the interim drinking water standards in the groundwater include the following: Iodine-129, strontium-90, technetium-99, tritium, and uranium. The major chemical constituents of concern in the groundwater above the primary maximum contaminant levels near the top of the unconfined aquifer include carbon tetrachloride, nitrate, and trichloroethylene, chloroform, chromium, cis-1,2-dichloroethylene, cyanide, fluoride, and some metals (PNNL-13788).

During Fiscal Year 2001, water levels were measured in more than 800 wells on the Hanford Site.

During the same period of time, 706 wells were sampled for radiological and chemical constituents one or more times.

DOE is preparing to issue the *Well Management Plan, DOE/RL-2003-13, Rev. 0*. This plan discusses the roles, requirements, and responsibilities to manage the drilling, completion, maintenance, remediation, and decommissioning of all wells supporting DOE-RL.

Access control to groundwater monitoring wells is through dedicated locks. The well security is checked periodically by sampling teams, as determined by the master sampling schedule (PNNL-14111). The well security is mandated by both 173-160-400 WAC and CP-GPP-EE-02 Procedure 14. Well security is also checked during routine and non-routine well maintenance inspections. There are mechanisms in place to "prevent intrusive work without EPA or Ecology approval." Control is provided by approval of groundwater monitoring plans, treatment plans, and remedial design/ remedial action work plans etc. The locations for the wells are determined by these documents, which require regulatory approval. In addition, waste management under CERCLA requires inclusion of the well on an approved CERCLA document, also requiring regulatory approval. RCRA well locations are specified on regulator approved RCRA monitoring plans. As a cross check, prior to drilling, an excavation permit is filed for each drilling project. This requires signature by the facility landlord.

Access control to groundwater monitoring wells is through dedicated locks. The well security is checked periodically by sampling teams, as determined by the master sampling schedule.

## SHORELINE INSTITUTIONAL CONTROLS

On April 23, 2003, representatives of DOE-RL, FHI, BHI, PNNL, and Ecology examined the warning signs along the Columbia River shoreline and throughout the entire Hanford Site. The review focused on the effectiveness of warning signs as ICs along the Benton County shore of the river, beginning approximately five miles upstream of Vernita Bridge, and ending at the south end of Hanford's 300 Area.

The primary IC along the river is the presence of DOE "No Trespassing" signs placed at 500-foot intervals along the shoreline. In addition, higher hazard areas are fenced, and no physical deterioration was noted. The "No Trespassing" signs

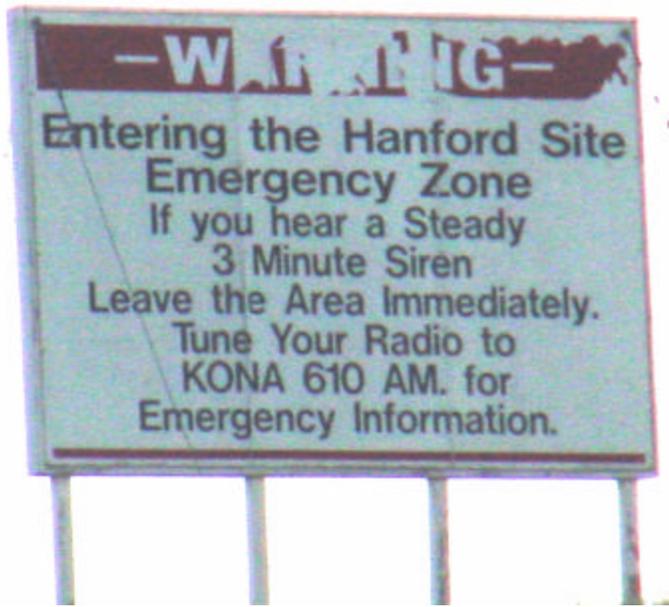
The primary IC along the river is the presence of DOE "No Trespassing" signs placed at 500-foot intervals along the shoreline.

were highly visible and easily legible at close range, and are along the approximately 45 river miles throughout the Hanford Site. A small percentage of the signs were missing, causing intervals of 1000 feet or more between signs in some portions of the 600 Area. RODs require these postings only in the 100 Areas, and no deficiencies were noted in the 100 Areas. During the next semi-annual shoreline inspection, specific locations of damaged or missing signs will be recorded so that PS&S can take corrective action.

In addition to the 500-foot interval “No Trespassing” signs, several larger signs warn boaters against trespassing onto the Hanford Site. Immediately downstream of the Vernita Bridge, on the south river shore, are two such signs as below:



The sign on the left also appears at other locations along the Hanford shoreline. Another general warning to Columbia River boaters is the Hanford Site emergency zone notification sign. It is a large sign instructing boaters on how to properly respond to sirens that are found at several locations along the shoreline. An example is shown below:



Signs warning of potential radioactive contamination are important for protecting the public. Such postings are visible from the river in at least two locations. The 100 B-C Area has ongoing remediation activities, and it has postings warning of underground radioactive material areas near the river shore. Below is a photo of such a posting, along with one of the 500-foot interval “No Trespassing” signs. The 100 B-C remediation area also has several postings along its fence reading “Danger, Cave In.”



The 100-N Area features soil contamination area postings along the N springs shoreline, where contaminated groundwater from N cribs used to seep from the riverbank. Below is one of the N springs postings:



In 2002, each of the 100 Areas and the 300 Area received new warning signs that are four feet high by eight feet wide. The signs warn of possible hazardous soils and water seeps. Each location has a sign posted in Spanish and English. The signs are highly visible, and all signs were intact during this assessment. The signs at 100-N Area are shown below:



Just north of the 300 Area, an active remediation area has warning postings and is protected by a fence. Warning signs at this location include the two pictured below:



The black and yellow sign to the left reads, “Caution-Hazardous Waste Investigation Area- Access Restricted.”

All areas with active remediation, including 100 B-C, 100-K, 100-N, 100-F, and 300 Area, have fences enclosing the areas of activity. In summary, the numerous postings along the Hanford Site river shore are adequate to inform the public of the access restrictions and hazards of the Site.

## SUMMARY OF EVALUATIONS AND RECOMMENDED IMPROVEMENTS

ICs required by OU RODs associated with the ERC, FH, and PNNL workscope were assessed for implementation and effectiveness. Appendix A of this report contains a comprehensive list of ICs evaluated at the various OUs as reflected in the IC Plan. The assessment results indicated that the ICs were in place as required by the RODs and were effective. Some minor improvements were recommended. No verifiable trespassing incidents occurred at any waste sites in CY 2002. The signs provide accurate information, and fences provide an effective barrier. A review of excavation permits indicated that the proximity of the waste sites to the proposed excavation sites was evaluated. If property transfers were to occur, internal procedures are in place to ensure that ROD specified land use criteria are met. For the siting of property (e.g., relocation of mobile trailers), effective processes were found to be in place to ensure waste site locations were properly considered. ICs at groundwater wells were found to be effective.

**Procedural Access Controls:** The procedural access controls systems were found to be operational and effective. Thus, there are no recommended changes based on assessment results. ICs at groundwater wells were found to have proper control mechanisms and were effective. A site well survey for wells in use at the time, and surrounding wells, was conducted (BHI, 1999). Groundwater Protection Program staff and contractors perform visual inspections of wells during field visits. Any deficiencies noted during inspections that did not meet State codes were corrected. Following FH procedures, caps and locks were installed on new wells or wells that were deficient (Drilling, Maintaining, Remediating, and Decommissioning Resource Protection Wells, GeoProbe and Geotechnical Soil Borings, CP-GPP-EE-02-14.0). In addition, security of operating wells was checked by the scheduled sampling and/or maintenance inspection activities.

**Land-Use Management Controls:** The land-use management controls at the Hanford Site were found to be functional and adequate. There are no recommended changes based on the assessment results.

**Warning Notices (Signs) and Fencing:** The signs at the 618-7 and 300-VTS sites were replaced. The other waste sites evaluated were found to be sufficiently signed; no changes are recommended based on the assessment results. Warning sign deficiencies noted by ERC and FH during this annual inspection have been corrected.

The “No Trespassing” signs placed at 500-foot intervals along the shoreline are visible and legible at close range. However, a small percentage of these signs are missing, causing intervals of 1000 feet, or more. These downed signs should be reinstalled, or replaced. FH needs to establish routine procedures for inspecting and repairing, as necessary, the signs along the shoreline of the Hanford Site.

**Notification of Trespass events:** There were no known trespass events onto waste sites addressed by the remedial action sites along the shoreline RODs, and there are no recommended changes to the notification program based on the assessment results. While there were incidents of potential trespass on the Hanford Site, none involved trespass of an IC (active or remediated) site. Trespass incidents were reported to the Benton County Sheriff's Office. When unauthorized personnel and members of the public were encountered, they were redirected to public access areas, and no incidents of trespass resulted from these attempted accesses.

**Recordkeeping on Remedial Action Information:** A review of the waste site closeout packages were made to identify all the sites where closeout actions were premised on industrial land-use. For such waste sites, the “Post Closure Requirements” section of the WIDS entries should be revised to reflect that the site is acceptable for industrial use only.

WIDS is a waste-site specific database. On the other hand, ICs are ROD-specific requirements. The convergence of these two activities from an assessment standpoint can be problematic. WIDS tracks waste site activities related to source OUs. However, WIDS does not capture information pertaining to groundwater OUs. Post-closure conditions need to be fully reflected in WIDS such as post-remediation mapping footprint should be provided to the Central Mapping Services for incorporation and sitewide uses. The Remedial Project Managers should provide a surveyed footprint to reflect new boundaries of the remediated waste sites, along with deed restrictions through the Real Property Officer for incorporation into WIDS, as appropriate. Currently, WIDS lists the four following items within the database: groundwater monitoring, re-vegetation, soil remediation, and surveillance. However, there is an option within WIDS to include written text for post-closure requirements. WIDS’s accuracy relies primarily upon the information provided within the CVP documents, and the procedures require a peer review of closure information by WIDS staff after data entry. Also, each contractor providing a CVP has an opportunity to review the closure information contained within the WIDS General Summary report for accuracy and adequacy. The WIDS in field work references the reader to the Hanford Environmental Information System database for additional information, and it contains groundwater sampling information. It provides sample dates and some sample numbers, which assist in a search for soil samples such as shallow and deep zones, and overburden that are required by the Data Quality Objectives. However, there is no hot link between the two databases at this time.

<p>Post-closure conditions need to be fully reflected in WIDS such as post-remediation mapping footprint.</p>
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The Tri-Party Agreement Handbook Management Procedures, MP-14 procedure (RL-TPA-0001) containing processes for site identification, classification, and reclassification of waste sites on WIDS database should be updated. MP-14 Manual was first issued March 24, 1998, and the procedure has not properly been maintained to reflect the current Hanford Site contractors and WIDS databases interfaces. This procedure is currently being revised by DOE-RL.

WIDS should reflect the results of CERCLA’s five-year reviews and findings. While not required nor specifically considered by this assessment, it appears that the WIDS may provide a useful vehicle for addressing the Hanford Site Long-Term Stewardship (LTS) needs. Post-closure information within the WIDS may enhance and facilitate the LTS needs. Another area of potential improvement is a cross-reference system between the AR and the WIDS database.

## Observations

1. Based on the review of 144 waste sites out of approximately 560 waste sites, this assessment did not result in any major findings. Generally, the ICs were found to be implemented and effective with some minor adjustments.
2. While there were incidents of potential trespass on the Hanford Site, none involved trespass of an IC (active or remediated) site.
3. The various RODs containing IC requirements were written over a span of several years, during which time EPA's expectations regarding the scope and nature of ICs changed greatly. As a consequence, the IC provisions vary greatly between RODs.
4. Timing of the IC annual report as outlined in the Plan conflicts with the other dates provided for similar reviews in the RODs.
5. A small percentage of warning signs along the shoreline were missing.
6. The use of the land has been confirmed to be compatible with the cleanup requirements identified in the RODs.
7. The excavation permit process effectively identified waste sites at or near the work location and evaluated excavation activities for potential impacts from the waste sites.
8. There are ample number of signs along roadways, shoreline, and at the vicinity of the waste sites, providing warnings and general information to the general public. Along the Hanford Site shoreline, at or near the waste sites, such as the reactor areas, there are large warning signs in English and Spanish warning would-be trespassers onto the Hanford Site. Most of the signs were found to be in good conditions and legible.
9. Two sites within 300 Area (300 VTS and 618-7) did not have adequate signage along the access road. Also, incorrect contact numbers were given at the waste sites. Additionally, the 618-7 waste site warning signs were not legible and had faded due to the 2000 brush fire. Corrective actions have been implemented for both these deficiencies.
10. Security of the groundwater wells is checked during routine and non-routine well maintenance inspections and by the sampling teams. All active wells have caps and locks in place to avoid unauthorized access.
11. Actions pertaining to the IC findings generated by the last CERCLA five-year review were addressed in DOE-RL's response to EPA on April 13, 2001.
12. WIDS correctly reflected the required ICs for more recent CVP information. For earlier sites, restrictions against deep excavations or well drilling were not documented in WIDS. Minor changes to the recording language are desirable to better define the scope and nature of the ICs (e.g., clarification that the ICs applied both to drilling or excavation below 4.6 m [15 ft]).
13. A single strand of the wire fence at the Horn Rapids Landfill entrance was found to require minor repairs.
14. The entrance road approaching 618-10 burial ground and neighboring waste sites does not have a warning sign visible before the sign posted on the 618-10 fence.

## Recommendations and Actions

1. The various RODs containing IC requirements were written over a span of several years, during which time EPA's expectations regarding the scope and nature of ICs changed greatly. As a consequence, the IC provisions vary greatly between RODs. RL believes that revision of the ROD IC requirements to create a consistent approach is needed. RL

proposes discussions with EPA and Ecology aimed at establishing a single, cohesive set of IC standards to replace the disparate requirements reflected in the existing RODs. This effort should be completed in a time frame that allows the revised requirements to be assessed as part of the next annual IC report.

2. A graded approach should be implemented for future IC field assessments. Assessments should be performed on a limited number of operable units (OUs) for next year and all following years, until 2006, to support the next CERCLA five-year review. All OUs would be assessed at least once during the next 3-year period.
3. Timing of the IC annual report as outlined in the Plan conflicts with the other dates provided for similar reviews in the RODs. Regulatory actions and concurrences are required to rectify these discrepancies via an ESD.
4. Signs missing along the shoreline need to be replaced in order to maintain the voluntary 500-foot interval between these signs.
5. The single strand of the wire fence at the Horn Rapids Landfill needs some minor repair.
6. A warning sign should be posted along the entrance road approaching the 618-10 burial ground and neighboring waste sites as soon as practicable.

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