

Reliance on institutional controls after contaminants have been reduced and engineered barriers have been put in place is referred to as long-term stewardship. Specific long-term stewardship activities depend on the specific hazards that remain and how those hazards are being controlled. Long-term stewardship activities are intended to continue isolating hazards from people and the environment. Specific long-term stewardship activities can include:

- monitoring to verify the integrity of caps placed over disposal sites
- maintaining caps to ensure their continued integrity
- monitoring groundwater and/or the vadose zone to determine whether systems that contain hazardous materials are performing as expected
- monitoring for surface contamination
- monitoring animals, plants, and the ecosystem
- performing groundwater pump-and-treat operations
- installing and maintaining fences and other barriers
- posting warning signs
- establishing easements and deed restrictions
- establishing zoning and land use restrictions
- maintaining records on clean up activities, remaining hazards, and locations of the hazards
- providing funding and infrastructure (e.g., utilities, roads, communications systems) necessary to support long-term stewardship activities.

DOE does not rely solely on long-term stewardship to protect people and the environment. As indicated in the DOE-sponsored report *Long-Term Institutional Management of U. S. Department of Energy Legacy Waste Sites* (National Research Council 2000), “contaminant reduction is preferred to contaminant isolation and the imposition of stewardship measures.” Contaminant reduction is a large part of the ongoing cleanup efforts at Hanford. The long-term stewardship plan for the Hanford Site was approved in August 2003 (DOE-RL 2003).

2.3 References

10 CFR 61. “Licensing Requirements for Land Disposal of Radioactive Waste.” Code of Federal Regulations. Online at: http://www.access.gpo.gov/nara/cfr/waisidx_01/10cfr61_01.html

10 CFR 71. “Packaging and Transportation of Radioactive Material.” Code of Federal Regulations. Online at: http://www.access.gpo.gov/nara/cfr/waisidx_01/10cfr71_01.html

10 CFR 962. “Byproduct Material.” Code of Federal Regulations. Online at: http://www.access.gpo.gov/nara/cfr/waisidx_02/10cfr962_02.html

40 CFR 761. “Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, and Use Prohibitions.” Code of Federal Regulations. Online at: http://www.access.gpo.gov/nara/cfr/waisidx_01/40cfr761_01.html

49 CFR 106-180. "Subtitle B—Other Regulations Relating to Transportation. Chapter I. Research and Special Programs Administration." Code of Federal Regulations. Online at: http://www.access.gpo.gov/nara/cfr/waisidx_02/49cfrv2_02.html

49 CFR 390-397. "Federal Motor Carrier Safety Regulations." Online at: http://www.access.gpo.gov/nara/cfr/waisidx_01/49cfr390_01.html

68 FR 1052. "Notice of Intent To Prepare an Environmental Impact Statement for Retrieval, Treatment, and Disposal of Tank Waste and Closure of Single-Shell Tanks at the Hanford Site, Richland, WA." *Federal Register* (January 8, 2003).

15 USC 2601 et seq. Toxic Substances Control Act (TSCA). Online at: <http://www4.law.cornell.edu/uscode/15/2601.html>

42 USC 6901 et seq. Resource Conservation and Recovery Act (RCRA) of 1976. Online at: <http://www4.law.cornell.edu/uscode/42/6901.html>

42 USC 13101. Pollution Prevention Act of 1990. Online at: <http://www4.law.cornell.edu>

Anderson, B. C., J. D. Anderson, J. A. Demiter, D. R. Duncan, and D. C. McCann. 1990. *Contact-Handled Transuranic Waste Characterization Based on Existing Records*. WHC-EP-0225, Westinghouse Hanford Company, Richland, Washington.

Aromi, E. S. and R. D. Freeberg. 2002. *Request for CHG Support Concerning Immobilized Low-Activity Waste Choices*. CHG-0203620R2, CH2M Hill Hanford Group, Richland, Washington.

Burbank, D. A. 2002. *Conceptual Design Report for Immobilized Low-Activity Waste Disposal Facility, Project W-520, Rev 0*. RPP-7908, Rev. 0A, CH2M Hill Hanford Group, Richland, Washington.

DOE. 1987. *Final Environmental Impact Statement for Disposal of Hanford Defense High-Level, Transuranic, and Tank Wastes*. DOE/EIS-0113, U.S. Department of Energy, Washington D.C.

DOE. 1998. *Environmental Assessment – Non-Thermal Treatment of Hanford Site Low-Level Mixed Waste*. DOE/EA-1189, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Online at: <http://www.hanford.gov/docs/ea/ea1189/index.html>

DOE. 1999. *Environmental Assessment – Offsite Thermal Treatment of Low-Level Mixed Waste*. DOE/EA-1135, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Online at: <http://www.hanford.gov/docs/ea/ea1135/FONSI.html>

DOE. 2001a. *Environmental Assessment – K Basins Sludge Storage at 221-T Building, Hanford Site, Richland, Washington*. DOE/EA-1369, U.S. Department of Energy, Richland, Washington. Online at <http://www.hanford.gov/docs/ea/ea1369/ea-1369.pdf>

DOE. 2001b. *Radioactive Waste Management Manual*. DOE Manual 435.1. U.S. Department of Energy, Washington D.C. Online at: <http://www.directives.doe.gov>

DOE. 2001c. *Supplement Analysis for the Tank Waste Remediation System*. DOE/EIS-0189-SA3, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE. 2002a. *Environmental Assessment – Transuranic Waste Retrieval from the 218-W-4B and 218-W-4C Low-Level Burial Grounds, Hanford Site, Richland, Washington*. DOE/EA-1405, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Online at: <http://www.hanford.gov/docs/ea/ea1405/ea1405.pdf>

DOE. 2002b. *Radioactive Material Transportation Practices Manual for Use with DOE O 460.2*. DOE Manual 460.2-1, U.S. Department of Energy, Washington, D.C. Online at: <http://www.directives.doe.gov/pdfs/doe/doetext/neword/460/m4602-1.pdf>

DOE and Ecology. 1996. *Tank Waste Remediation System, Hanford Site, Richland, Washington, Final Environmental Impact Statement*. DOE/EIS-0189, U.S. Department of Energy, Richland Operations Office, Richland, Washington and Washington State Department of Ecology, Olympia, Washington.

DOE-NTP. 2002. *National TRU Waste Management Plan*. DOE/NTP-96-1204, Rev. 3, U.S. Department of Energy, Carlsbad Field Office, Carlsbad, New Mexico. Online at: <http://www.wipp.carlsbad.nm.us/library/ntwmp/rev3/Cover.pdf>

DOE-RL. 1997. *Hanford Facility Dangerous Waste Permit Application, Low-Level Burial Grounds*. DOE/RL-88-20, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL. 2003. *Hanford Long-Term Stewardship Program and Transition: Preparing for Environmental Management Cleanup Completion*. DOE/RL-2003-39, Rev. 0, U.S. Department of Energy, Richland, Washington.

DOE-WIPP. 2002. *Contact-handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*. DOE/WIPP-02-3122, Revision 0.1. U.S. Department of Energy, Waste Isolation Pilot Plant, Carlsbad, New Mexico. Online at: <http://www.wipp.ws/library/wac/CH-WACRev0.1.pdf>

DOT. 1998. *Hazardous Materials Shipments*. U.S. Department of Transportation, Office of Hazardous Materials Safety, Research and Special Programs Administration, Washington, D.C. Online at: <http://hazmat.dot.gov/pubtrain/hmship.htm>

DOT. 2000. United States: Dept. of Transportation, Research and Special Programs Administration; Canada: Transport Dangerous Goods Directorate; Mexico: Secretaría de Comunicaciones y Transportes. *2000 Emergency Response Guidebook: a guidebook for first responders during the initial phase of a hazardous materials incident* [Washington, D.C.]. U.S. Dept. of Transportation, Research and Special Programs Administration.

EPA. 1989. *Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments*. EPA/530/SW-89/047, Environmental Protection Agency, Office of Solid Waste, Washington, D.C.

FH. 2003. *Hanford Site Solid Waste Acceptance Criteria*. HNF-EP-0063, Rev. 9, Fluor Hanford, Inc., Richland, Washington. Online at: <http://www.hanford.gov/wastemgt/wac/acceptcriteria.cfm>

FH. 2004. *Hanford Site Solid Waste Management Environmental Impact Statement Technical Information Document*. HNF-4755, Rev. 2, Fluor Hanford, Inc., Richland, Washington.

National Research Council. 2000. *Long-Term Institutional Management of U. S. Department of Energy Legacy Waste Sites*. Prepared by Committee on the Remediation of Buried and Tank Wastes, Board on Radioactive Waste Management, Commission on Geosciences, Environment and Resources, National Research Council, National Academy Press, Washington, D.C. Online at: <http://www.nap.edu/books/0309071860/html>

NEI. 2003. *Transportation of Radioactive Materials—Safety in Motion*. Nuclear Energy Institute, Washington, D.C. Online at: <http://www.nei.org/index.asp?catnum=3&catid=462>.

OAR 740-100. “Vehicles: Driver: Equipment: Equipment Required and Condition of Vehicles.” Oregon Administrative Rule 740-100, Salem, Oregon. Online at: http://www.sos.state.or.us/archives/rules/OARS_700/OAR_740/740_100.html

OAR 740-110. “Transportation of Hazardous Materials.” Oregon Administrative Rule 740-110, Salem, Oregon. Online at: http://arcweb.sos.state.or.us/rules/OARS_700/OAR_740/740_110.html

RCW 70.105. “*Hazardous Waste Management Act*.” Revised Code of Washington. Olympia, Washington. Online at: <http://www.ecy.wa.gov/laws-rules/index.html>

Tisinger, L. G. and J. P. Giroud. 1993. The Durability of HDPE Geomembranes. *Geotechnical Fabrics Report*, 11(6): 4-8.

WAC 173-303. “Dangerous Waste Regulations.” Washington Administrative Code, Olympia, Washington. Online at: <http://www.ecy.wa.gov/laws-rules/index.html>

WAC 246-231. “Packaging and Transportation of Radioactive Materials.” Washington Administrative Code, Olympia, Washington. Online at: <http://www.leg.wa.gov/wac/index.cfm?fuseaction=chapterdigest&chapter=246-231>

WAC 446-50. “Transportation of Hazardous Materials.” Washington Administrative Code, Olympia, Washington. Online at: <http://www.leg.wa.gov/wac/index.cfm?fuseaction=chapterdigest&chapter=446-50>

Westinghouse. 2001. "WIPP Instructors to Provide Specialized Training for Indiana Emergency Response Professionals." *Westinghouse News*, dated January 25, 2001. Online at: <http://www.wipp.carlsbad.nm.us/pr/2001/INSTEP.pdf>