DOE/EA-0981

Environmental Assessment

Solid Waste Retrieval Complex, Enhanced Radioactive and Mixed Waste Storage Facility, Infrastructure Upgrades, and Central Waste Support Complex, Hanford Site, Richland, Washington

U.S. Department of Energy
Richland, Washington

September 1995

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ENVIRONMENTAL ASSESSMENT

SOLID WASTE RETRIEVAL COMPLEX, ENHANCED RADIOACTIVE AND MIXED WASTE STORAGE FACILITY, INFRASTRUCTURE UPGRADES, AND CENTRAL WASTE SUPPORT COMPLEX

U.S. DEPARTMENT OF ENERGY

RICHLAND, WASHINGTON

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Summary

The U.S. Department of Energy (DOE) needs to take action to: retrieve transuranic (TRU) waste because interim storage waste containers have exceeded their 20-year design life and could fail causing a radioactive release to the environment; provide storage capacity for retrieved and newly generated TRU, Greater-than-Category 3 (GTC3), and mixed waste before treatment and/or shipment to the Waste Isolation Pilot Project (WIPP); and upgrade the infrastructure network in the 200 West Area to enhance operational efficiencies and reduce the cost of operating the Solid Waste Operations Complex.

This proposed action would initiate the retrieval activities (Retrieval) from Trench 4C-T04 in the 200 West Area including the construction of support facilities necessary to carry out the retrieval operations. In addition, the proposed action includes the construction and operation of a facility (Enhanced Radioactive Mixed Waste Storage Facility) in the 200 West Area to store newly generated and the retrieved waste while it awaits shipment to a final disposal site. Also, Infrastructure Upgrades and a Central Waste Support Complex are necessary to support the Hanford Site's centralized waste management area in the 200 West Area. The proposed action also includes mitigation for the loss of priority shrub-steppe habitat resulting from construction. The estimated total cost of the proposed action is $66 million.

Other alternatives to the Retrieval, the Storage Facility, Infrastructure Upgrades, and the Central Waste Support Complex were considered. In addition to a No-Action Alternative, other alternatives included the use of existing onsite storage facilities, and the use of existing onsite office facilities. These alternatives did not meet DOE's need to retrieve TRU waste; provide storage capacity for retrieved and newly generated TRU, mixed, and GTC3 waste; upgrade the infrastructure; and reduce the cost of operating the Solid Waste Operations Complex (SWOC).

The proposed action was evaluated for potential impacts to the environment, workers, and the public. Under normal operating conditions, no environmental impacts in terms of

adverse health effects to the general public is expected. All work would be performed in compliance with As Low As Reasonably Achievable (ALARA) principles, waste minimization policies, applicable state and federal regulations, and DOE Orders.

Construction impacts were evaluated. An estimated 18.6 hectares (46 acres) of land would be disturbed with an estimated 14.6 hectares (36 acres) of priority shrub-steppe habitat being destroyed during site clearing activities. This land disturbance represents approximately 1.5 percent of the Hanford Site's 200 West Area. A mitigation strategy for the Hanford Site is being developed for mitigation of lost priority shrub-steppe habitat area. Habitat loss from the proposed action would be mitigated in accordance with the sitewide strategy. Habitat loss would be compensated for at a ratio of 3 to 1.

A Cultural Resource Review and a Biological Review of the proposed construction site has been conducted. No sensitive areas such as wetlands, floodplains, archaeological sites, or structures of historical significance were identified. The historic White Bluffs Road is eligible for listing on the National Register of Historic Places. However, the State Historic Preservation Officer has determined that the segment of the road which runs through the 200 West Area is a non-contributing section due to its loss of physical integrity and location within the fenced 200 West Area. Work could proceed in this non-contributing section without further loss of integrity to the road as a whole. In addition, two bird species, the loggerhead shrike (federal candidate and state candidate) and sage sparrow (state candidate) were observed in the area of the proposed action and would be impacted because of lost shrub-steppe habitat. Although the northern sagebrush lizard was not observed in the area of the proposed action, the loss of sagebrush could impact this species that relies on the shrub-steppe habitat. Because the presence of the loggerhead shrike and the sage sparrow has been determined in the habitat at the site, project construction schedules would be adjusted to minimize impact on these species by avoiding site clearing and preparation activities during the nesting season (March through July).

One postulated accident was evaluated for the retrieval activity having an estimated frequency of occurrence of about two times every one million years. Less than one latent

cancer fatality (LCF) to the general public is projected to occur as a result of this accident. Similarly, a postulated accident with an estimated frequency of occurrence of about once every one thousand years was evaluated for the storage activity having a calculated LCF to the general public of less than one. In the event of either the postulated retrieval accident or the postulated storage accident, no LCFs would be expected to the general public.

The proposed action was evaluated regarding potential socioeconomic and environmental justice impacts. There would be a small, temporary increase in construction workers. There would not be a disproportionate adverse impact to any minority or low income segment of the community.

Glossary

Acronyms

ALARA	As Low As Reasonably Achievable
CEDE	collective effective dose equivalent
CFR	*Code of Federal Regulations*
CRR	Cultural Resources Review
CWSC	Central Waste Support Complex
CY	Calendar Year
DCG	Derived Concentration Guidelines
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
DOH	State of Washington Department of Health
EA	Environmental Assessment
Ecology	State of Washington Department of Ecology
EDE	effective dose equivalent
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FR	*Federal Register*
FY	fiscal year
GTC3	contact-handled Greater-Than-Category-3
HCRL	Hanford Cultural Resources Laboratory
HDW-EIS	*Final Environmental Impact Statement: Disposal of Hanford Defense High-Level, Transuranic and Tank Wastes, Hanford Site, Richland, Washington*, (DOE, 1987)
HSRCM	Hanford Site Radiological Control Manual
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
LCF	latent cancer fatality
LLMW	low-level mixed waste
LLW	low-level waste

Acronyms (cont.)

MEI	maximally exposed individual
NDE/NDA	Nondestructive Examination/Nondestructive Assay
NEPA	*National Environmental Policy Act of 1969*
OSHA	Occupational Safety and Health Administration
Retrieval	Solid Waste Retrieval Complex
RL	U.S. Department of Energy, Richland Operations Office
Storage Facility	Enhanced Radioactive and Mixed Waste Storage Facility
PFP	Plutonium Finishing Plant
PNL	Pacific Northwest Laboratory
PSE	Preliminary Safety Evaluation
RCRA	*Resource Conservation and Recovery Act of 1976*
rem	roentgen equivalent man
ROD	Record of Decision
SWOC	Solid Waste Operations Complex
TLV	threshold limit value
TRU	transuranic
TRUM	transuranic mixed
TSD	treatment, storage, and/or disposal
USFWS	U.S. Fish and Wildlife Service
WAC	*Washington Administrative Code*
WDFW	State of Washington Department of Fish and Wildlife
WRAP	Waste Receiving and Processing

Definition of Terms

As Low As Reasonably Achievable - ALARA. An approach to radiological control to manage and control exposures (individual and collective) to work force and to the general public at levels as low as reasonable, taking into account social, technical, economic, practical and public policy considerations. ALARA is not a dose limit but a process that has the objective of attaining doses as far below the applicable controlling limits as is reasonably achievable.

Collective dose equivalent - CDE. The sum of the dose equivalents of all individuals in an exposed population. Collective dose equivalent is expressed in units of person-rem.

Committed dose equivalent. The calculated dose equivalent projected to be received by a tissue or organ over a 50-year period after a known intake of radionuclide into the body. It does not include contributions from external dose. Committed dose equivalent is expressed in units of rem.

Contact-handled waste. Waste or waste containers whose external surface dose rate does not exceed 200 millirem per hour thus permitting close and unshielded manipulation by workers.

Effective dose equivalent - EDE. The summation of the products of the dose equivalent received by specified tissues of the body and a tissue-specific weighting factor. This sum is a risk-equivalent value and can be used to estimate the health-effects risk of the exposed individual. The tissue-specific weighting factor represents the fraction of the total health risk resulting from uniform whole-body irradiation that would be contributed by that particular tissue. The effective dose equivalent includes the committed effective dose equivalent from internal deposition of radionuclides and the effective dose equivalent due to penetrating radiation from sources external to the body. Effective dose equivalent is expressed in units of rem.

Greater-Than-Category 3 waste -GTC3. The nomenclature given to the Hanford Site's low-level waste that is similar to the Greater-Than-Class C classification as established by the U.S. Nuclear Regulatory Commission and defined in 10 *Code of Federal Regulations* 61.55. This low-level waste has a concentration of radionuclides that exceeds the U.S. Nuclear Regulatory Commission Class C classification and is considered a high activity waste requiring special handling in accordance with DOE Order 5820.2A. The waste is not suitable for near-surface disposal. It is defined in the Hanford Site Solid Waste Acceptance Criteria (WHC 1993a).

Low-level waste. Waste that contains radioactivity and is not classified as high-level waste, transuranic waste, or spent nuclear fuel or byproduct material where the concentration of transuranic radionuclides is less than 100 Nci/g.

Millirem. A unit of radiation dose that is equal to one-thousandth (1/1000) of a rem.

Mixed waste. Waste containing both radioactive and hazardous components requiring treatment, storage, or disposal in accordance with the *Resource Conservation and Recovery Act of 1976* regulations.

Newly generated TRU waste. TRU waste generated at the present time and forecasted into the future, prior to being retrievably stored.

Plutonium equivalent. The amount of plutonium-239 that would present the same risk, or hazard, as other elements or a mixture of isotopes.

Rad. Unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs per gram or 0.01 joules per kilogram.

Rem. Unit of dose equivalent. Dose equivalent in rem is numerically equal to the absorbed dose in rad multiplied by a quality factor, distribution factor and any other necessary modifying factor.

Remote-handled waste. Packaged waste with an external surface dose rate that exceeds 200 millirem per hour requiring shielding from and distance between it and workers.

Retrievably stored. The emplacement of waste in buildings or other structures, or out of doors on bermed pads, with the intent of reclaiming it in the future for treatment or disposal.

Suspect transuranic. Waste retrievably stored as transuranic waste which, due to administrative changes in the definition of transuranic waste over time, may or may not currently be defined as transuranic waste (see definition of transuranic waste).

Transuranic waste. Waste containing alpha-emitting radionuclides with an atomic number greater than 92 and half-lives greater than 20 years, at concentrations greater than 100 Nci/g. In addition, radium-226 and uranium-233 sources are managed as TRU waste at the Hanford Site in accordance with DOE Order 5820.2A. (Note: Previous administrative levels have been in effect. Since May 1970, solid waste classed as or suspected of being TRU waste was designated as TRU waste. In 1973, the official level for segregation and storage became 10nCi TRU/g of waste. In 1984, the basis for classification as TRU waste was established as 100 Nci TRU/g and remains the designated level today).

Metric Conversion Chart

If you know	Multiply by	To get
Length		
centimeters	0.394	inches
meters	3.2808	feet
square meters	10.76391	square feet
kilometers	0.62	miles
Area		
hectares	2.471054	acres
square kilometers	0.39	square miles
Mass (weight)		
kilograms	.001102	tons
Volume		
liters	0.26	gallons
cubic meters	35.3134	cubic feet

Source: Adapted from *CRC Handbook of Chemistry and Physics,* Robert C. Weast, Ph.D., 70th Ed., 1989-1990, CRC Press, Inc., Boca Raton, Florida.

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