

Integration of Complex-Wide Mixed Low-Level Waste Activities for Program Acceleration and Optimization

Prepared for the U.S. Department of Energy



Fluor Daniel Hanford, Inc.

Richland, Washington

Hanford Management and Integration Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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INTEGRATION OF COMPLEX-WIDE MIXED LOW-LEVEL WASTE ACTIVITIES FOR PROGRAM ACCELERATION AND OPTIMIZATION

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Abstract

In July 1996, the U.S. Department of Energy (DOE) chartered a contractor-led effort to develop a suite of technically defensible, integrated alternatives which would allow the Environmental Management program to accomplish its mission objectives in an accelerated fashion and at a reduced cost. These alternatives, or "opportunities," could then be evaluated by DOE and stakeholders for possible implementation, given precursor requirements (regulatory changes, etc.) could be met and benefits to the Complex realized.

This contractor effort initially focused on six waste types, one of which was Mixed Low-Level Waste (MLLW). Many opportunities were identified by the contractor team for integrating MLLW activities across the DOE Complex. These opportunities were further narrowed to six that had the most promise for implementation and savings to the DOE Complex. The opportunities include six items: 1) the consolidation of individual site analytical services procurement efforts, 2) the consolidation of individual site MLLW treatment services procurement efforts, 3) establishment of "de minimus" radioactivity levels, 4) standardization of characterization requirements, 5) increased utilization of existing DOE treatment facilities, and 6) using a combination of DOE and commercial MLLW disposal capacity.

The results of the integration effort showed that by managing MLLW activities across the DOE Complex as a cohesive unit rather than as independent site efforts, the DOE could improve the rate of progress toward meeting its objectives and reduce its overall MLLW "program" costs. Savings potential for MLLW, if the identified opportunities could be implemented in toto, could total \$224 million or more. Implementation of the opportunities also could result in the acceleration of the MLLW "work off schedule" across the DOE Complex by five years.

Introduction

In July 1996, the U.S. Department of Energy (DOE) Assistant Secretary for Environmental Management (EM) chartered a contractor-led effort to develop a suite of technically defensible, integrated alternatives which would allow the EM program to accomplish its mission objectives in an accelerated fashion and at a reduced cost. The contractor teams participating in this effort, composed of representatives from the 11 major DOE Sites and numerous contractors, were encouraged to think "outside of the box" in development of the integrated alternatives by crossing traditional Site boundaries in favor of alternatives which benefited the Complex as a whole. It was understood that the alternatives developed by the integrated team would require evaluation by the DOE and Stakeholders, and might require resolution of a considerable number of precursor requirements (regulatory, etc.) prior to possible approval and implementation.

The outcomes of this effort are most recently documented in the report "*A Contractor Report to the Department of Energy on Environmental Management Baseline Programs and Integration Opportunities (Discussion Draft)*," INEL/EXT-97-00493, dated May 1997. This paper will focus on the optimization and acceleration opportunities identified and recommended by the Mixed Low-Level Waste (MLLW) Integration Team. Discussion

The integration effort used a prescriptive systems engineering approach which included defining requirements, developing alternatives, and conducting trade studies. The team developed and evaluated integration alternatives against established baselines, provided technically-defensible recommendations, and identified cost savings opportunities. It should be noted that the cost savings opportunities were not always favorable from the perspective of the individual sites but were favorable from a DOE Complex perspective.

The majority of the integration opportunities evaluated were encompassed by several high-level strategies. These strategies include the effective utilization of DOE Complex-Wide system resources (eliminate redundancy and minimize underutilized, existing capabilities), crossing of program boundaries where technically feasible and cost effective, challenging requirements, applying site successes and lessons learned across the DOE Complex, and implementing national procurement strategies to fill unique DOE Complex-wide needs.

Six integration opportunities for MLLW were identified and proposed as alternatives for further consideration by the DOE Complex and Stakeholders. The integration team, however, was limited by time and expertise and was not able to fully evaluate all six opportunities. As a result, three of the opportunities were evaluated and quantified relative to potential cost savings and schedule advantage to the DOE Complex. The remaining three opportunities were identified as having significant potential benefit to the Complex, and the team recommended that these opportunities should be further

explored and the potential benefits to the Complex better quantified. These six opportunities are described below.

The first opportunity is to "Maximize the Use of Existing DOE Facilities for MLLW Treatment." Some DOE MLLW treatment facilities are funded for full operation but yet are not operating at their optimal throughput capacity. In particular, it was noted that this condition existed with the three DOE Complex incinerators: the Waste Examination and Reduction Facility (WERF) in Idaho, the Toxic Substances Control Act (TSCA) incinerator in Tennessee, and the Consolidated Incineration Facility (CIF) in South Carolina. The utilization of these facilities can be increased by transfers of waste between sites for treatment and/or by priority use of these facilities in lieu of commercially contracted incineration services.

In this opportunity, the use of funded DOE facilities and contracted services would be optimized. Waste streams would be shifted to the existing, funded treatment facilities within the DOE Complex, incurring only the minimal incremental cost of processing. Separate contracting efforts for commercial treatment services would be reserved for capabilities not currently available within the DOE Complex. The construction of additional treatment capacity within the DOE Complex may be avoidable and opportunities for the shutdown of DOE Complex facilities may present themselves as legacy waste is treated and the need for treatment capacity decreases.

"Expanding the Use of National Procurement Contracts for MLLW" is the second opportunity evaluated. This opportunity recommends the use of consolidated, national contracts for MLLW treatment services that do not currently exist within the DOE Complex. The cost benefit of this opportunity could be realized through the "economies of scale" associated with larger, high volume national procurements for treatment services rather than multiple, small volume site procurements. Another cost savings advantage of this opportunity is that if procurements for treatment services are consolidated; then the actual costs associated with developing, evaluating, awarding and managing the contracted services can be reduced.

The third opportunity evaluated was the "Use of a Combination of DOE and Commercial MLLW Disposal Capacity." This alternative involves the continued use of commercial disposal services and the centralization of DOE disposal operations at the Hanford Site (primary) and Nevada Test Site (backup). Given the waste acceptance restrictions at the available commercial disposal sites, DOE must maintain capacity for MLLW disposal within the Complex. The Hanford and Nevada sites currently have MLLW disposal capacity that could be used by the DOE Complex for those wastes that cannot go to commercial disposal sites. If disposal of these MLLW was consolidated at Hanford and/or, the Nevada Test Site, the DOE Complex could achieve considerable unit cost savings due to the effect of "economies of scale."

The implementation of these three opportunities is estimated to have the potential to save the DOE Complex up to \$224 million. These cost savings and investment

requirements for these MLLW opportunities are summarized in Table I and Table II.

Place Table I here

Place Table II here

Three other opportunities were identified which had potential for DOE Complex savings. Although these opportunities were not fully evaluated because of time constraints, and therefore the potential savings were not included in the \$224 million in MLLW savings, they were identified as areas that warranted further study.

The first opportunity is the "Use of Consolidated Procurements for MLLW Analytical Services." This opportunity would implement, where practical and beneficial, consolidated national procurements for analytical services in lieu of individual site analytical service contracts. This opportunity is similar in terms of benefits and justification to the opportunity seeking consolidation of MLLW treatment contracts. Implementation of this opportunity would eliminate duplicate procurements for similar analytical services and redundant audits of the same contract laboratories. The potential also exists for additional savings in unit pricing through of "economies of scale" if more analytical workload could be sent to fewer laboratories.

The second opportunity warranting further study is the "Establishment of De Minimus Radioactivity Levels for MLLW." The establishment of "de minimus" or "below regulatory concern" levels for radioactivity in MLLW would enhance the ability to segregate hazardous-only waste from MLLW. Hazardous-only waste treatment/disposal is not only significantly less costly than MLLW treatment/disposal but also is less complex from a regulatory perspective.

The third opportunity is to "Standardization of MLLW Characterization." It was noted that it is common that characterization is performed only to get waste to the next step toward disposal (i.e., to storage) and is not performed with the ultimate disposition path of the waste in mind. Also, there appears to be different standard for characterization for acceptance at various DOE facilities, not all driven by technical or regulatory requirements. This sometimes results in repetitive characterization steps as a waste moves from generation to storage, storage to treatment, treatment to disposal, or as waste is considered for treatment and disposal at other DOE facilities. These multiple steps of characterization create an additional cost to the Complex that could be avoided if a single, broader characterization process was conducted with knowledge of the ultimate disposition path for the waste. This opportunity involves the development of Complex-wide characterization standards which satisfy a common set of "necessary and sufficient" requirements which are applicable to the disposition pathway identified for a waste stream. Such characterization standards would have to be broad enough to address differences at site Treatment, Storage, and Disposal Facilities (TSD) (driven by

Table II
 Summary of Cost Savings and Avoidances by DOE Complex Site
 (\$ in Millions)

Site	TRU Waste	MLLW	LLW	ER	HLW	SNF	Totals
Fernald	0	14	80	320	NA	NA	414
Hanford	304	10	6	TBD	10,070	300	10,690
INEEL	73	12	87	20	4,440	400	5,032
LANL	171	4	6	23	NA	NA	204
NTS	0	0	(52)	14	NA	NA	(38)
Oak Ridge	23	96	103	102	NA	0	324
Rocky Flats	62	62	37	0	NA	NA	161
SNL	4	20	6	7	NA	NA	37
SRS	529	6	160	139	2,474	565	3,873
WIPP	2,531	NA	NA	NA	NA	NA	2,531
WVDP	77	NA	40	NA	770	0	887
Totals	3,794	224	473	625	17,754	1,265	24,135

specific permitting requirements, process requirements, quality assurance, or other factors), but would be limited to what is "necessary and sufficient." This alternative would allow MLLW to be accepted at any TSD in the Complex without multiple, duplicative characterization steps.

A number of site-specific precursor activities (previously referred to as "barriers") were also identified as part of the integration process. These precursor activities must be resolved prior to implementation of the opportunities and may in turn result in changes to the opportunities. These precursor activities include, but are not limited to, determination of transportation requirements for wastes and materials between DOE Complex sites, Stakeholder interests and values (common to most opportunities), State and site equity, and regulatory changes.

Conclusions

With respect to MLLW treatment and disposal, the EM integration effort identified and evaluated six cost reduction/schedule enhancement opportunities for the DOE. Three of the opportunities were evaluated for life-cycle cost savings, cost avoidances and schedule improvements and up to \$224 million in potential savings were identified. These opportunities could also result in acceleration of the current baseline schedules for MLLW treatment and disposal. The other three opportunities were determined to have significant savings potential and recommended for further evaluation.

Table I
 Summary Of Savings and Investments for Integration Opportunities
 (\$ in Millions)

Waste Type	Savings in 10 Year Window	Investment in 10 Year Window	Savings Beyond 10 Year Window	Investment Beyond 10 Year Window	Savings Incorporated	Cost Avoidance	Potential Net Benefit
TRU	23	238	2,722	0	22	1,265	3,794
MLLW	136	0	10	0	68	10	224
LLW	228	68	42	0	124	147	473
ER	199	0	30	0	110	286	625
HLW	120	554	11,814	0	2,504	3,870	17,754
SNF	135	25	50	0	0	1,105	1,265
Totals	841	885	14,668	0	2,828	6,683	24,135

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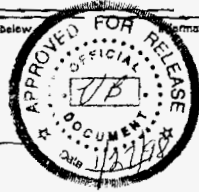
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