HANFORD SITE WASTE TREATMENT/STORAGE/DISPOSAL INTEGRATION

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ABSTRACT

In 1998 Waste Management Federal Services of Hanford, Inc. began the integration of all low-level waste, mixed waste, and TRU waste-generating activities across the Hanford site. With seven contractors, dozens of generating units, and hundreds of waste streams, integration was necessary to provide accurate waste forecasting and planning for future treatment activities. This integration effort provides disposition maps that account for waste from generation, through processing, treatment and final waste disposal. The integration effort covers generating facilities from the present through the life-cycle, including transition and deactivation. The effort is patterned after the very successful DOE Complex EM Integration effort.

Although still in the preliminary stages, the comprehensive onsite integration effort has already reaped benefits. These include identifying significant waste streams that had not been forecast; identifying opportunities for consolidating activities and services to accelerate schedule or save money; and identifying waste streams which currently have no path forward in the planning baseline. Consolidation/integration of planned activities may also provide opportunities for pollution prevention and/or avoidance of secondary waste generation.

A workshop was held to review the waste disposition maps, and to identify opportunities with potential cost or schedule savings. Another workshop may be held to follow up on some of the long-term integration opportunities. A change to the Hanford waste forecast data call would help to align the Solid Waste Forecast with the new disposition maps.

INTRODUCTION

Waste Management Federal Services of Hanford, Inc. (WMH) is the waste management subcontractor for the Hanford Site, responsible for hazardous waste (HW), low-level waste (LLW), mixed low-level waste (MLLW), transuranic and transuranic mixed (TRU/M) waste-generating activities, as well as treatment, storage, and disposal of these wastes. For the wastes of these types generated at Hanford, coordinating this effort involves integrating the activities of seven contractors, dozens of waste generating units or activities, and literally hundreds of individual waste streams.

For years WMH and the waste management project have coordinated with generators to obtain an annual waste forecast [WMH, 1998]. This forecast is a planning document that allows us to determine the need for additional storage buildings or disposal trenches, determine what types of treatment capabilities need to be developed, etc., not just in the near term, but for the lifecycle of the Hanford project. The forecast, combined with existing waste inventories,

provides information relative to Hanford waste to the Accelerated Cleanup Paths to Closure (ACPC) [DOE/RL, 1998], and the DOE-EM integration effort, and will be used in the development of the Solid Waste Environmental Impact Statement [DOE/RL, 1997].

As part of the *Hanford Waste Management Project Strategic Plan* [WMH, 1998] WMH has a stated goal to "coordinate all solid and liquid waste functions, beginning at the point of generation, for each of the Project Hanford Management contractors." This requires a level of involvement and integration that was more detailed than simply obtaining a waste forecast from each generator.

At the same time, WMH personnel had been representing Hanford in the EM Integration Initiative to coordinate the disposition of wastes throughout the DOE complex. This effort proved valuable to all involved, providing an understanding of wastes to be generated, and the treatment and disposal capacities needed at the various sites. It also provided an understanding of the interfaces needed between sites to enable the complex to meet its goal of accelerating cleanup. The effort was so successful that it received a national award for engineering excellence.

The product of the EMI effort was a series of "disposition maps" for each DOE site, for each major waste type. These maps showed present and planned waste volumes, and provided details of the processing path that would be necessary for each waste stream, and finally the ultimate disposition of the waste, usually disposal. WMH decided that a similar product, internal to Hanford, could provide the greater level of detail necessary to achieve integration of waste generating activities across the Hanford site. Such an internal integration effort would hopefully lead to increased efficiency in managing the Hanford waste, with accompanying cost saving opportunities.

DISCUSSION

Initial Steps

The first step in developing internal disposition maps was to obtain the support from senior management of each of the three major contractors at the Hanford site, thus ensuring the participation of the waste experts who would be able to develop the maps. Senior management from WMH joined with executives from Fluor Daniel Hanford (FDH), the Project Hanford Management Contractor; Bechtel Hanford, Inc. (BHI), the environmental restoration contractor; and Battelle, which operates the Pacific Northwest National Laboratory at Hanford. These managers comprised the Integration Steering Committee in support of the integration effort.

Once contractor management support was established, knowledgeable personnel from the WMH Strategic Planning organization met with each of the waste generators to define their generating processes. This included analyzing the different waste streams from each generating process, and understanding the processing steps the generator needs to use the get the waste to the treatment, storage, or disposal facility. The analysis also aligned each waste stream with the appropriate waste stream on the National disposition map.

The development of internal disposition maps was a laborious and time-consuming process. The result, however, has been found to have many uses. First, it provides a detailed view of the generating processes used at the Hanford site, by facility or contractor. This will be used as a validation of the waste forecast for each generator. In fact, the map development identified at least six waste streams which were not included in the prior Solid Waste Forecast. Second, it provides a view of similar wastes, or similar generating processes, across facilities and contractors, enabling an integrated approach to waste management. This allowed WMH to identify some areas where waste processing capabilities can be consolidated. Such consolidation has the potential to reduce costs, to accelerate cleanup schedules, and to reduce the generation of secondary wastes.

The internal disposition maps discussed above show the disposition of waste, beginning with the process which generates the waste, through the individual waste streams, and including all processing steps the generator must take to get the waste to an approved T/S/D. As shown in Figure 1, an example of part of a map from one facility, the first column represents the generating process, of which each facility may have many. The second column represents the waste stream or streams that result from the generating process. The center column shows processing steps the generator must take to prepare the waste for shipment to the T/S/D. And the last column shows the T/S/D and the specific waste stream. The waste stream numbers in this column correspond to waste streams on the national disposition maps prepared as part of the EM Integration effort.

A major use of the information from the internal disposition maps is for planning waste treatment, storage, and disposal requirements for the Site. The maps also show which wastes do not have defined treatment paths because of technical or policy considerations, and thus they can point out the requirements for new treatment technologies. In addition, the maps can be a tool for improving waste management operations, by showing how similar wastes are handled at different facilities.

A second set of internal disposition maps was developed showing treatment steps that must occur for each waste stream at the treatment or storage facility, before the waste can be sent to final disposal. An example of part of the internal disposition map for mixed waste treatment is given in Figure 2. The first column shows the waste

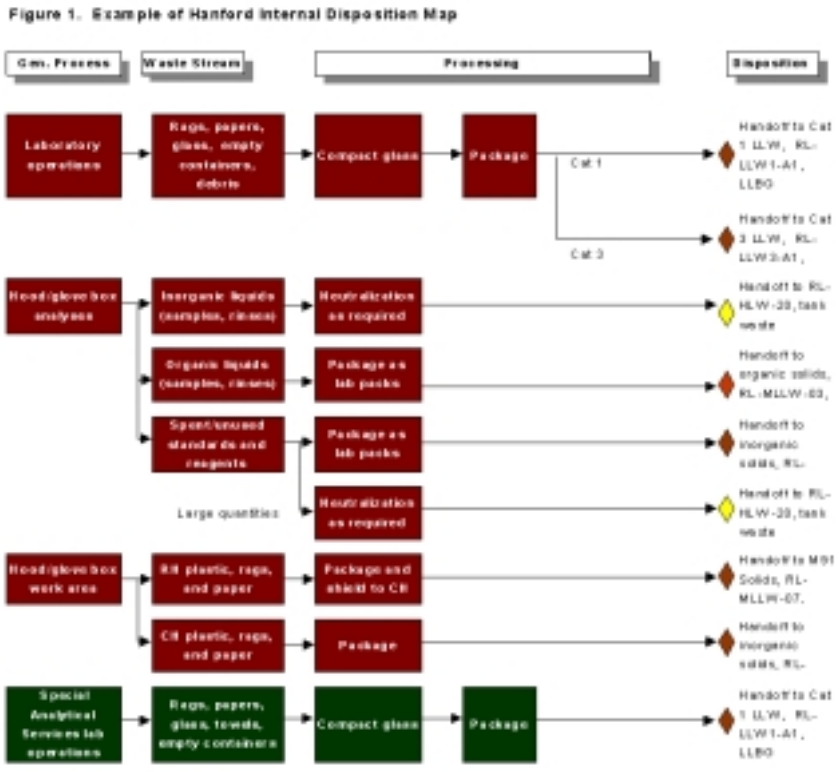

Figure 1. Example of Hanford Internal Disposition Map

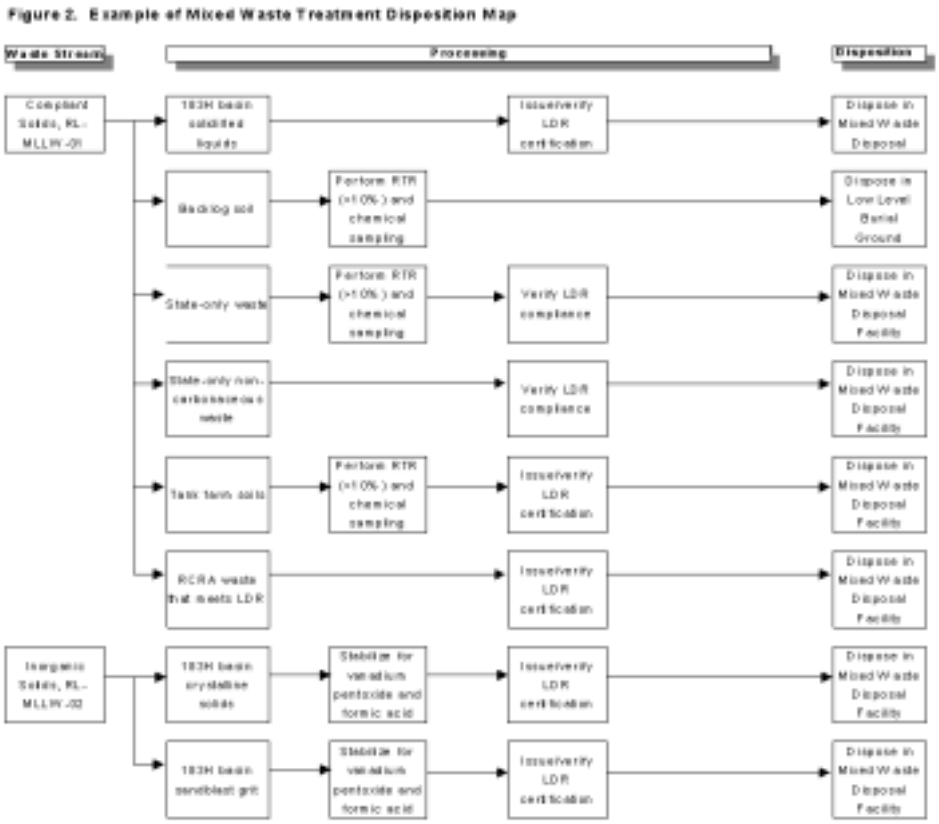

Figure 2. Internal Disposition Map Showing Mixed Waste Treatment

stream number, corresponding to the waste stream number on the national disposition map. The next few columns represent processing steps, including dividing the waste stream into sub-streams, any verification or characterization activities, and the appropriate treatment so the waste meets Land Disposal Restrictions. The final column shows the final disposal of the waste. In this case, all of the waste will be disposed of in the mixed waste disposal facility that is part of the Hanford low-level burial grounds.

Workshop

In August 1998, a workshop was held to bring the disposition map developers and others involved in the waste generation process together for the first time. Prior to this time, strategic planning personnel had met with individual generators one at a time, but this approach did not provide the synergy that can be achieved when many get together to pursue a common goal. During the workshop facility experts were available to update their disposition maps. Of the 28 facilities, maps for 14 were updated, with updates often resulting from discussing waste generating activities with personnel from other facilities. A set of rules for map development and updating was developed. These rules include standard formats, standard categories and

common nomenclature, and relating each waste stream to the corresponding waste stream in the Solid Waste Forecast [WMH, November 1998].

Also during the workshop, facility experts created a capabilities matrix. Table 1 shows a portion of the matrix, representing the treatment/storage/disposal facilities. The matrix developed during the workshop included all 28 waste generating facilities. The matrix identifies the specific capabilities of each facility. The intent of the matrix is to assist in identifying redundancies and to identify planned facility needs that can be matched to existing capabilities. Workshop participants identified 14 new ideas or opportunities for integrating waste management activities across the site. Most of these involve combining one effort with another, or utilizing a given facility for a use that may not have been apparent. Each opportunity requires some effort to determine it's feasibility, and may require major effort for implementation should Hanford decide to implement, but if implemented, could save time and money needed for cleanup.

Table 1. Facilities Capabilities Matrix

	T PLANT AND ADJACENT FACILITIES	LOW-LEVEL BURIAL GROUNDS	CENTRAL WASTE COMPLEX	WASTE RECEIVING AND PROCESSING FACILITY	M-91 FACILITY
HANDLING	CH	CH/RH	CH	CH	CH/RH
PACKAGING	Drums, boxes	Drums, boxes, bulk items, bulk media	Drums, boxes	Drums, boxes	Drums, boxes, large boxes
WASTE TYPES	LLW, LLMW, TRU	LLW, LLMW, TRU	LLW, LLMW, TRU	LLW, LLMW, TRU	LLW, LLMW, TRU
TREATMENT CAPABILITIES	Sorting, Size Reduction, Stabilization, Neutralization, Decontamination	None	Limited Repackaging	Sorting, Compaction, Stabilization, Neutralization	Sorting, Size Reduction, Stabilization, Neutralization
CHARACTERI-ZATION	Chemical Sampling, Radiation Surveys, Head Gas Sampling	External Dose Rate Surveys	External Dose Rate Surveys	Chemical Sampling, Radiation Surveys	Chemical Sampling, Radiation Surveys
SHIPPING METHODS	Truck, Rail	Truck, Rail	Truck	Truck	Truck
DISPOSAL	None	LLW, LLMW	None	None	None
STORAGE	LLMW	None	LLW, LLMW, TRU	In process waste only	In process waste only

Five potential integration opportunities had been identified prior to the workshop. Of these, workshop participants identified two for further development. The two opportunities which were developed at the workshop were 1) integration of waste handling, size reduction, and treatment capabilities for gloveboxes and other large equipment; and 2) development of an understanding of waste streams for the Tri-Party Agreement (TPA) Milestone M-91 facility. TPA refers to the Hanford Federal Facility Agreement and Consent Order, between the

Washington State Department of Ecology, the United States Environmental Protection Agency, and the United States Department of Energy, commonly called the Tri-Party Agreement. A portion of the Milestone M-91 requires the development of a facility to manage remote handled (RH) and oversized packages of mixed low-level waste (MLLW) and RH and oversized packages of transuranic waste (TRU). The development of these two opportunities included developing different alternatives that could accomplish the stated goal, scoring the alternatives, weighing the criteria, and developing action plans to accomplish the selected action.

Some observations and issues, both positive and negative, resulted from the workshop. These observations will be useful in organizing future workshops or working groups to address specific integration opportunities. The workshop was handicapped by not having all of the facility experts present. Some participants were not able to be present the full time due to other commitments. Issues such as these exist anytime a crosscutting event is held, as each participant has their own priorities. The communication was positive among the contracting companies. Few, if any, conflicts between companies/organizations were noted, although there may have been competing workscope in some instances. This type of session was seen as a positive event for the Hanford site.

Future Efforts

Although the effort to develop disposition maps for onsite waste has been very successful, some improvements can be made. First, as noted above, the original disposition maps were not consistent as far as nomenclature and topics. For example, one of the processing steps may have been “compact and package,” as a single step, where another generator may say have said “compact” and “package” as separate steps. Although the intent is the same, they are not consistent. Lists are being developed of standard format and standardized processing steps, and maps will be revised to provide this consistency.

The maps were originally developed by hand and drawn on a spreadsheet program. Each box in the map represents a text box rather than a data field. Efforts are currently underway to convert the maps to data fields to allow efficient computer searches. When this is complete, it will be a simple matter to determine, say, all generators involved in remote handled waste, or all generators that will ship bulk waste, or all wastes going to a certain treatment facility, etc. Currently searches such as these must be done by hand.

Finally, since the Solid Waste Forecast has been found to be such a useful tool, efforts are currently underway to incorporate relevant information from the forecast into the disposition maps. Each waste stream on each map is being annotated with the dates that stream is expected to be generated and the volumes of waste that are expected. This will serve as a validation of the forecast data that was previously supplied, and will allow the forecast to validate the information on the maps.

RESULTS AND CONCLUSIONS

The result of this effort is the development of two series of onsite waste disposition maps. The first series shows the waste generation and processing that occurs at the generator's facility. The second series shows the treatment or processing that must occur at the WMH treatment, storage, or disposal facility before the waste can be disposed. These, combined with the national disposition map for the Hanford site, provide a path for all waste to be generated and/or disposed at Hanford.

The onsite generator disposition maps provide a crosscutting look at waste generating activities across the Hanford site. From this, some opportunities for integrating common activities were identified. For example, it was noted that at least three different facilities would be generating gloveboxes that would require treatment, including size reduction, prior to disposal. Now, instead of three separate efforts to deal with these gloveboxes, attempts are being made to develop a single, concerted effort, thus improving the efficiency of all involved. As another example, it was noted that a number of facilities or organizations are developing assay capabilities. The workshop pointed out that there may be some value in consolidating some or all of these assay activities.

By utilizing a proven process (the national disposition maps) in a new and innovative way, onsite disposition maps were developed showing the generation of waste on the Hanford site. This activity has yielded a number of integration opportunities which, when implemented, can save the government and the taxpayers money, and will support the Department of Energy goal to accelerate cleanup of the Hanford site.

REFERENCES

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