Waste Information Management System: One Year After Web Deployment - 8500

P.A. Shoffner, T.J. Geisler, H. Upadhyay, W. Quintero
Applied Research Center, Florida International University
10555 West Flagler Street, Suite 2100, Miami, FL 33174

ABSTRACT

The implementation of the Department of Energy (DOE) mandated accelerated cleanup program created significant potential technical impediments. The schedule compression required close coordination and a comprehensive review and prioritization of the barriers that impeded treatment and disposition of the waste streams at each site. Many issues related to site waste treatment and disposal were potential critical path issues under the accelerated schedules. In order to facilitate accelerated cleanup initiatives, waste managers at DOE field sites and at DOE Headquarters in Washington, D.C., needed timely waste forecast information regarding the volumes and types of waste that would be generated by DOE sites over the next 30 years. Each local DOE site has historically collected, organized, and displayed site waste forecast information in separate and unique systems. However, waste information from all sites needed a common application to allow interested parties to understand and view the complete complex-wide picture. A common application allows identification of total waste volumes, material classes, disposition sites, choke points, and technological or regulatory barriers to treatment and disposal. The Applied Research Center (ARC) at Florida International University (FIU) in Miami, Florida, has completed the deployment of this fully operational, web-based forecast system. New functional modules and annual waste forecast data updates have been added to ensure the long-term viability and value of this system.

INTRODUCTION

The Applied Research Center (ARC) has developed a Waste Information Management System (WIMS) to receive and organize the DOE waste forecast data from across the DOE complex and to automatically generate waste forecast data tables, disposition maps, and other displayed reports. This system offers a single information source to allow interested parties to easily visualize, understand, and manage the vast volumes of the various categories of forecasted waste streams in the DOE complex. The successful web deployment of WIMS with waste information from 24 DOE sites occurred in May 2006. Individuals may visit the web site at http://wims.arc.fiu.edu/wims.

In this paper, FIU ARC will present the new features and various modules that have recently been added to the WIMS. New features of WIMS include updated waste forecast data from the original DOE sites and the addition of waste forecast data from 17 new DOE sites for a current total of 41 sites. Additional features include print modules for forecast data, geographical information system (GIS) maps, and disposition maps. Print modules allow WIMS users to print forecast data tables, GIS maps, and disposition maps locally from any internet connection.

MATERIALS AND METHODS

The initial requirement from DOE Headquarters was to consolidate waste forecast information from separate DOE sites and build forecast data tables, disposition maps and GIS maps on the web. An integrated system was needed to receive and consolidate waste forecast information from all DOE sites and facilities and to make this information available to all stakeholders and to the public. As there was no off-the-shelf computer application or solution available for creating disposition maps and forecast data, ARC built a DOE complex-wide, high performance, n-tier web-based system for generating waste forecast information, disposition maps, GIS Maps, successor stream relationships, summary information

and custom reports based on DOE requirements. This system was built on Microsoft.net framework1.1 and SQL server 2000. Visual Studio 2003, SQL server reporting services, Dream Weaver and Photoshop were also used as development tools to construct the system.

Since the initial requirements were met, additional features have been developed and deployed on WIMS, including the addition of new DOE sites and the capability to print forecast data, disposition maps, and GIS maps. Features under development include a transportation module that will display waste volumes to be transported in numbers of truck, intermodal, and rail shipments; a waste summary module to provide a high level summary of the waste forecast data; and a user help module.

RESULTS AND DISCUSSION

Anyone with internet access may register and use WIMS (http://wims.arc.fiu.edu/wims/). The updated WIMS home page is shown in Figure 1. As shown on the homepage, the data currently displayed in WIMS was collected in December 2006 and represents project planning information at that time. The data does not take into account any subsequent changes to forecasts. The data includes low-level and mixed low-level radioactive waste data supplied by all DOE programs. The data set in WIMS will be updated in early 2008 with data collected in December 2007 and is expected to include transuranic waste data as well as transportation information (waste volume as forecasted number of shipments by truck, intermodal, and rail). A mock-up of the transportation module display under development is shown in Figure 2.

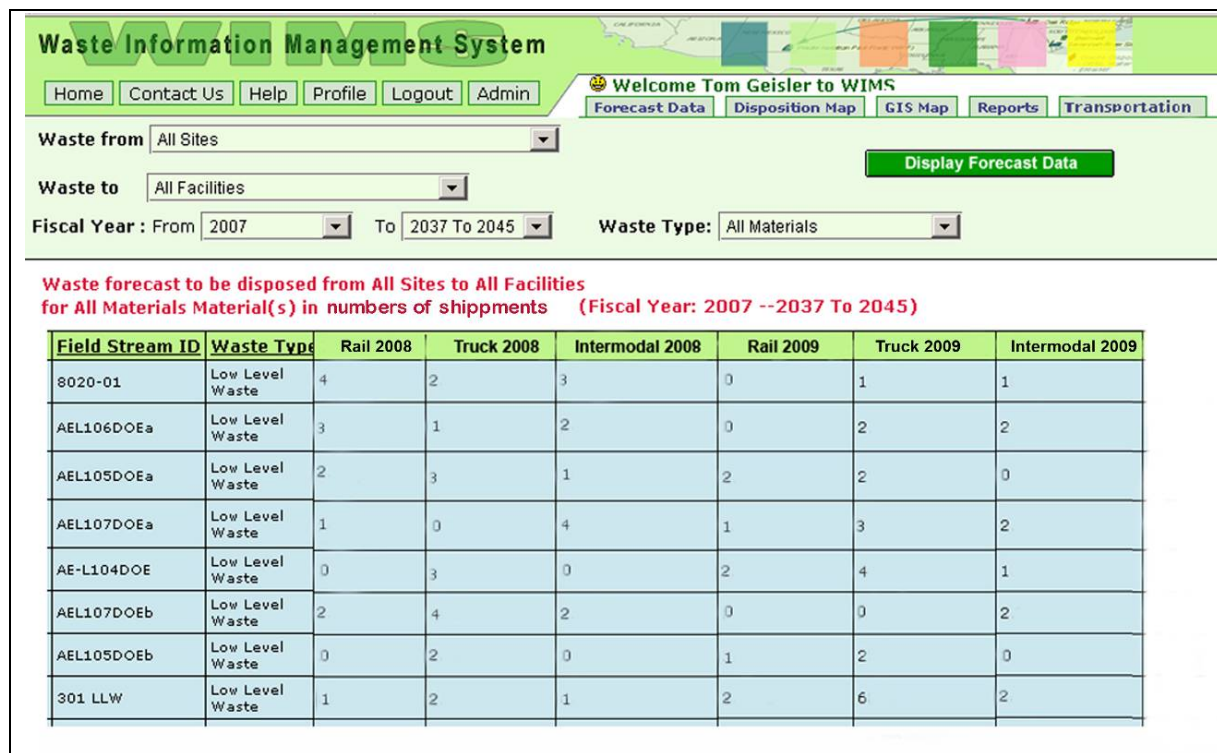**Fig. 1. Updated WIMS website home page with data explanation.**

Fig. 2. Mock-up of WIMS transportation display module (under development).

Upon entrance into WIMS, the information for display as a forecast data table, a disposition map, or a GIS map can be filtered in many ways through the provided drop-down menus. The updated filtration choices for each field of data are shown in Table I.

Table I. Updated Pick-List Choices for Filtering Data

Waste From	Waste To
All Sites	All Facilities
Ames Laboratory[a]	LLW Disposal Cell (FEMP)
Argonne National Laboratory	**200 Area Burial Ground (HANF)**
Ashtabula Environmental Management Project	ERDF (HANF)
Battelle Columbus Laboratories	Integrated Disposal Facility (HANF)
Bettis Atomic Power Laboratory	RMW Trenches/IDF (HANF)
Brookhaven National Laboratory	**INL CERCLA Cell (INL)**
Energy Technology Engineering Center	**RWMC (LLW disposal) (INL)**
Fermi National Accelerator Laboratory	Area 5 LLW Disposal Unit (NTS)
Fernald Environmental Management Project	Area 3 LLW Disposal Unit (NTS)
Hanford Site-RL	Pit 3 (Area 5) MLLW Disposal (NTS)
Hanford Site-RP	TSCA Incinerator (ORR)
Idaho National Laboratory	EMWMF Disposal Cell (ORR)
Inhalation Toxicology Laboratory	E-Area Disposal (SRS)
Kansas City Plant	TA 54/Area G (LLW disposal) (LANL)
Knolls Atomic Power Laboratory - Kesselring	TRU Storage (LANL)
Knolls Atomic Power Laboratory - Schenectady	Waste Isolation Pilot Plant
Lawrence Berkeley National Laboratory	Commercial-1
Lawrence Livermore National Laboratory	Commercial-2

Los Alamos National Laboratory	Commercial-3
Miamisburg Environmental Management Project	Commercial-4
Naval Reactor Facility	Commercial-5
Norfolk Naval Shipyard	Commercial-6
Nuclear Fuel Services, Inc.	Commercial-7
Nevada Test Site	Commercial-8
Oak Ridge Reservation	Commercial-13
Pacific Northwest National Laboratory	Commercial TBD
Paducah Gaseous Diffusion Plant	To Be Determined
Pantex Plant	
Pearl Harbor Naval Shipyard	
Portsmouth Gaseous Diffusion Plant	
Portsmouth Naval Shipyard	
Princeton Plasma Physics Laboratory	
Puget Sound Naval Shipyard	
Rocky Flats Environmental Technology Site	
Sandia National Laboratories - NM	
Savannah River Site	
Separations Process Research Unit	
Stanford Linear Accelerator Center	
Thomas Jefferson National Accelerator Facility	
Waste Isolation Pilot Plant	
West Valley Demonstration Project	

Fiscal Year From	Fiscal Year To	Waste Type
2007	2007	All Materials
2008	2008	Unknown
2009	2009	Low Level Waste
2010	2010	Mixed Low Level Waste
2011	2011	11e(2) Byproduct Material
2012 to 2016	2012 to 2016	Other Material
2017 to 2021	2017 to 2021	Transuranic Waste
2022 to 2026	2022 to 2026	
2027 to 2031	2027 to 2031	
2032 to 2036	2032 to 2036	
2037 to 2042	**2037 to 2042**	

[a] Bold text indicates the picklist choice is an addition to WIMS since the system was deployed.

As an additional feature, WIMS now includes the ability to print forecast data tables, disposition maps and GIS maps to the user's local printer with a few clicks of the mouse. New WIMS modules automatically format the display to print on standard paper. An example of a print preview for a disposition map is shown in Figure 3. A user help box pops up when the user clicks the "Print GIS map" or the "Print Disposition map" button, directing the user to adjust the print margins and background printing settings as shown in Figure 4. Once the page set-up has been completed, the user simply uses the internet browser's print function to receive a printout.
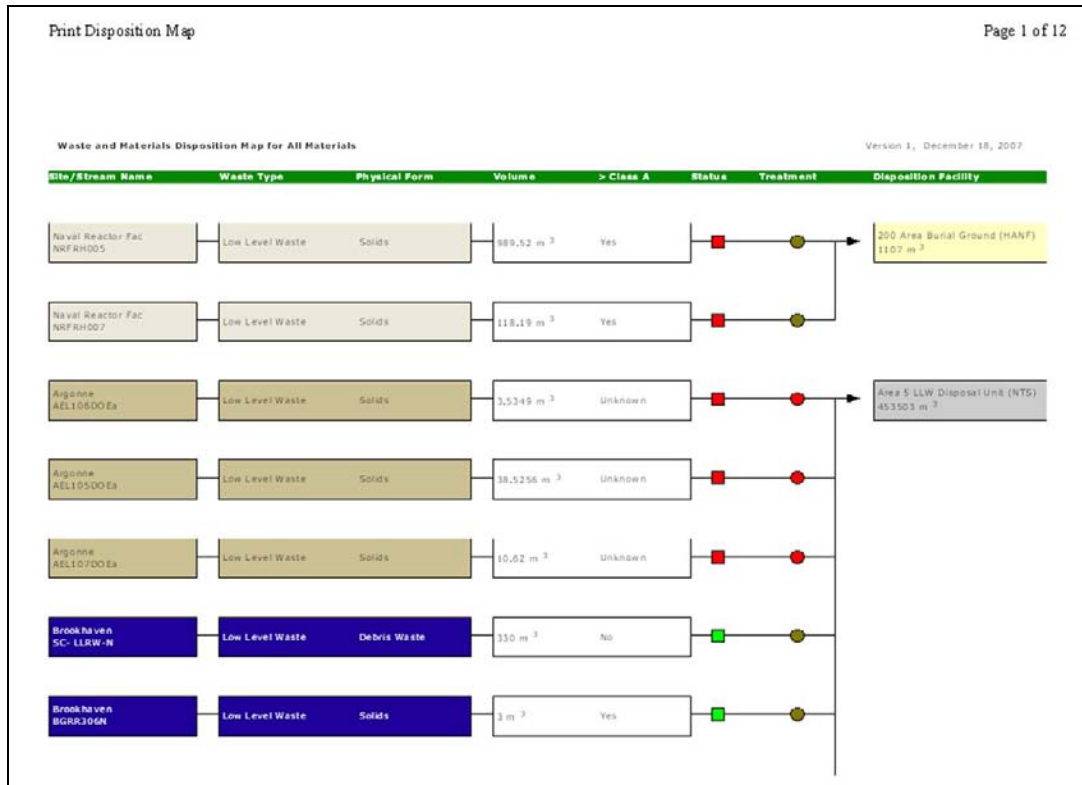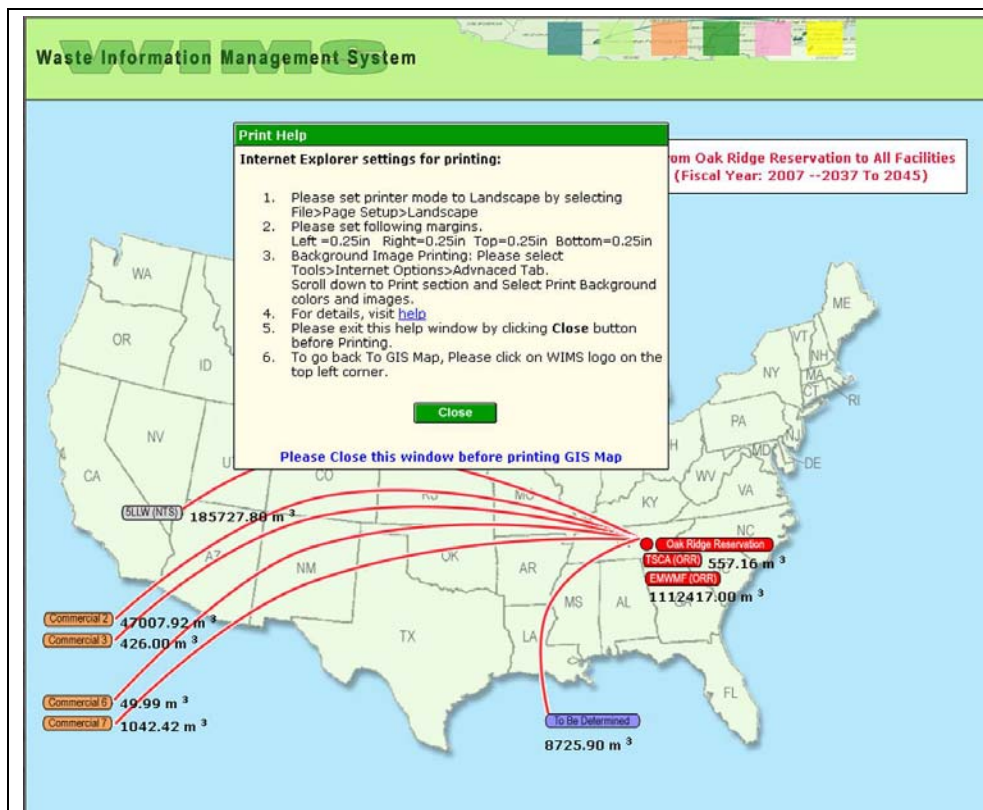
Fig. 3. Print preview of disposition map.

Fig. 4. GIS map print module with user help pop-up window.

CONCLUSION

WIMS continues to successfully accomplish the goals and objectives set forth by DOE for this project. WIMS has replaced the historic process of each DOE site gathering, organizing, and reporting their waste forecast information utilizing different database and display technologies. In addition, WIMS meets DOE's objective to have the complex-wide waste forecast information available to all stakeholders and the public in one easy-to-navigate system. The enhancements to WIMS made over the year since its web deployment include the addition of new DOE sites, an updated data set, and the ability to easily print the forecast data tables, the disposition maps, and the GIS maps.

Future enhancements will include a high-level waste summary, a display of waste forecast by mode of transportation, and a user help module. The waste summary display module will provide a high-level summary view of the waste forecast data based on the selection of sites, facilities, material types, and forecast years. The waste summary report module will allow users to build custom filtered reports in a variety of formats, such as MS Excel, MS Word, and PDF. The user help module will provide a step-by-step explanation of various modules, using screen shots and general tutorials. The help module will also provide instructions for printing and margin/layout settings to assist users in using their local printers to print maps and reports.