Waste Information Management System with Integrated Transportation Forecast Data – 9097

H.Upadhyay, W.Quintero, P.Shoffner, L.Lagos
Applied Research Center, Florida International University
10555 West Flagler Street, Suite 2100, Miami. FL 33174

ABSTRACT

The Waste Information Management System with Integrated Transportation Forecast Data was developed to support the Department of Energy (DOE) mandated accelerated cleanup program. 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 and transportation information regarding the volumes and types of waste that would be generated by the DOE sites over the next 40 years. Each local DOE site has historically collected, organized, and displayed site waste forecast information in separate and unique systems. However, waste and shipment information from all sites needed a common application to allow interested parties to understand and view the complete complex-wide picture. The Waste Information Management System with Integrated Transportation Forecast Data allows identification of total forecasted waste volumes, material classes, disposition sites, choke points, technological or regulatory barriers to treatment and disposal, along with forcasted waste transportation information by rail, truck and intermodal shipments. The Applied Research Center (ARC) at Florida International University (FIU) in Miami, Florida, has deployed the web-based forecast and transportation system and is responsible for updating the waste forecast and transportation data on a regular basis to ensure the long-term viability and value of this system.

INTRODUCTION

The Waste Information Management System with Integrated Transportation Forecast Data is a web-based information management system, designed, developed, deployed and maintained by the Applied Research Center (ARC) at Florida International University for the United States Department of Energy (DOE) and site waste managers. This system enables stakeholders to easily visualize, understand, and manage the vast volumes, categories, and problems of forecasted waste streams and their associated forecasted shipments. This system integrates waste stream and transportation information from various DOE sites and facilities to waste treatment and disposal facilities, including commercial ones. It provides forecasting of waste disposal volumes through the year 2050, filtered by various selection criteria such as waste sites, disposal facilities, year range and material types. This system can be accessed from the web address http://wims.arc.fiu.edu/wims.

Waste stream information is collected from various sites and is imported into the centralized database. The data collected for each waste stream include the attributes important to the stakeholders. Waste stream forecast information is presented over the web through an integrated forecasting system based on the established selection criteria and processes. Waste stream data are rolled up based on their attributes and are presented to the users over the web as disposition and GIS maps. The system allows users to filter the information based on different parameters and to generate custom integrated disposition and GIS maps which can be printed using standard web browsers. A few waste streams have special characteristics and are processed through multiple facilities. These streams can be displayed using a successor stream disposition map process. This system also provides the ability to generate reports and export forecast

information in various standard formats such as PDF, MS Excel, MS Word, etc. The system has been enhanced to integrate additional sites and facilities and provide forecast information through 2050.

In this paper, FIU ARC will present the new features and modules that have been added to the system. New features include updated waste forecast data from the DOE sites, for a current total of 40 sites and 24 disposition facilities. Additional new features include a transportation display module, a transportation report module, and a help module.

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 and custom reports based on DOE requirements.

This system was built on a Microsoft.net framework, SQL server 2000 and SQL server reporting services. Visual Studio 2003, Dream Weaver and Photoshop were also used as development tools to construct the system.

Since the initial requirements were met, a transportation system was designed, developed and integrated with the existing system to display waste shipping forecast information through the year 2050 by transportation mode – rail, truck and intermodal.

The help module provides instruction for printing and margin/layout settings to assist users in using their local printers to print maps and reports. It also details system features with screen shots for Registration, Login, Forecast Data, Disposition Maps, GIS Maps, Transportation, and Profile, etc.

RESULTS AND DISCUSSION

The Waste Information Management System with Integrated Transportation Forecast Data can be accessed from web address http://wims.arc.fiu.edu/wims/.

Waste information currently displayed was collected in December 2007 and represents project planning information at that time. The data does not take into account any subsequent changes to forecasts. The information includes low-level and mixed low-level radioactive waste information supplied by all DOE programs. The waste information was successfully updated in March 2008 and is shown as a disposition map in Figure 1 and a GIS map in Figure 2.

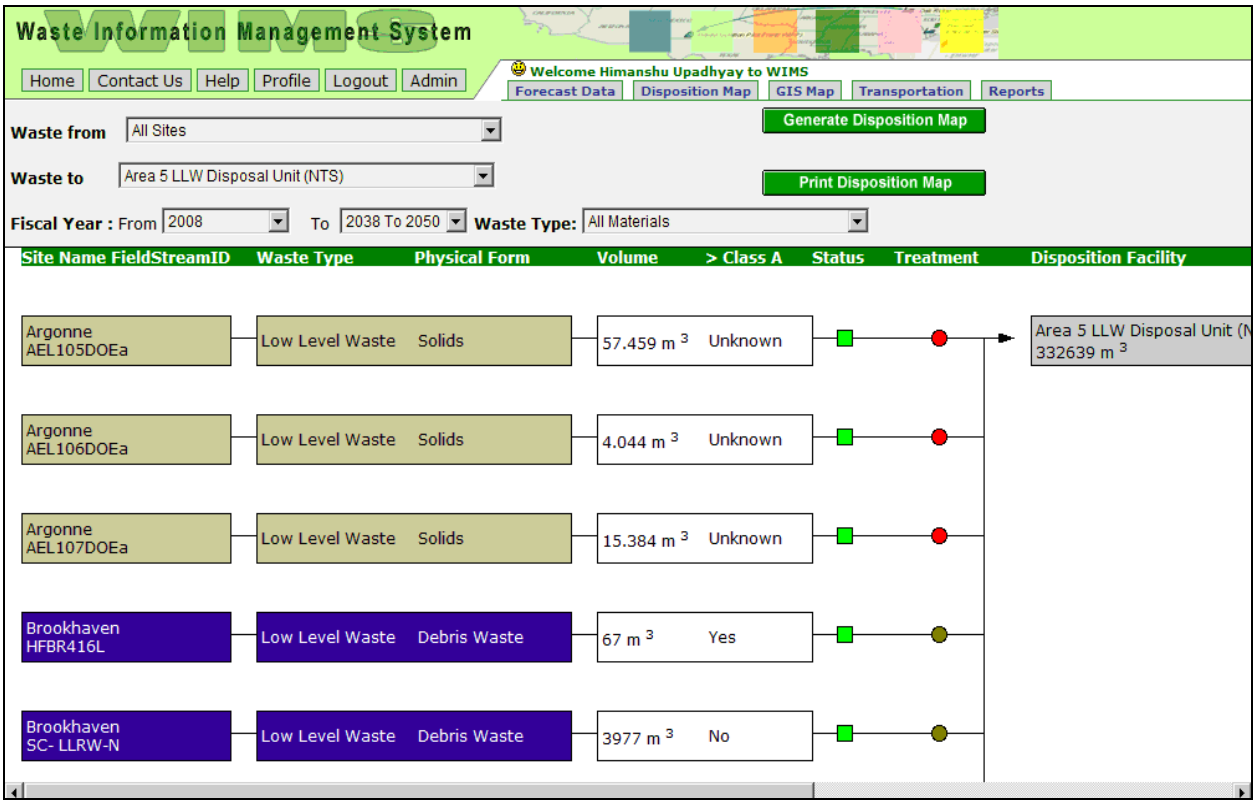


Figure 1 Disposition Map

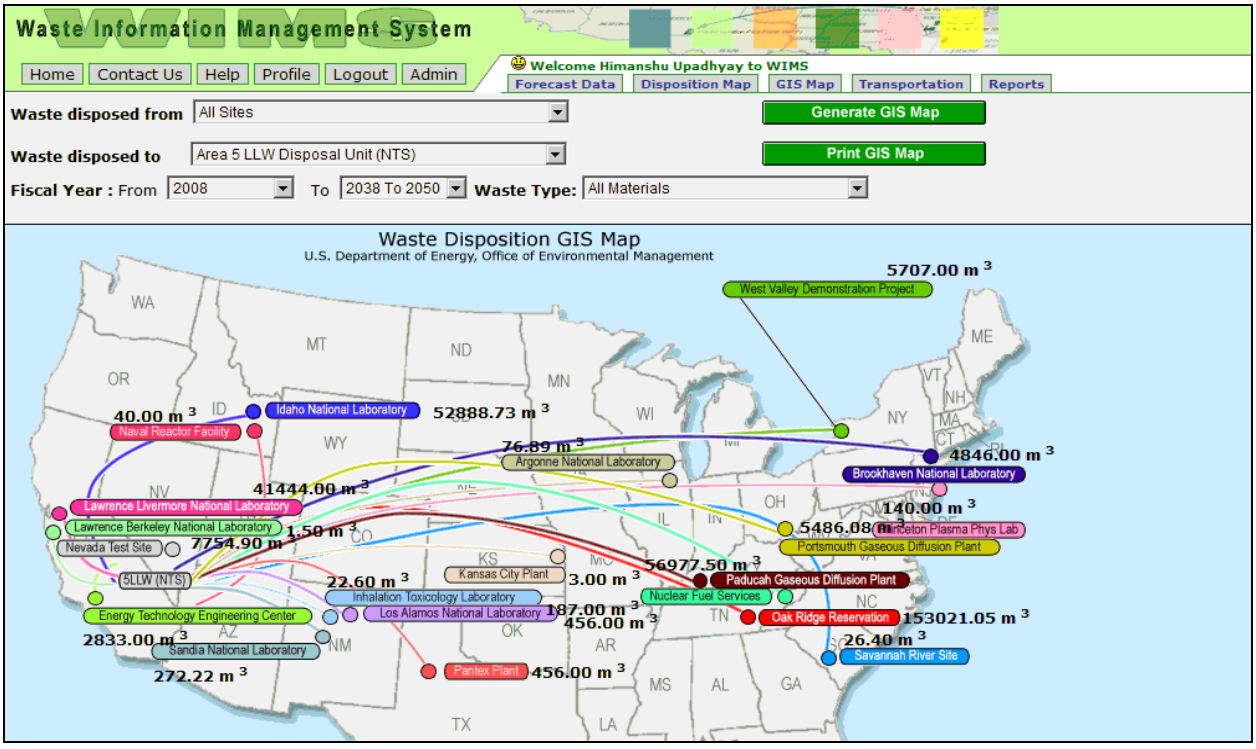
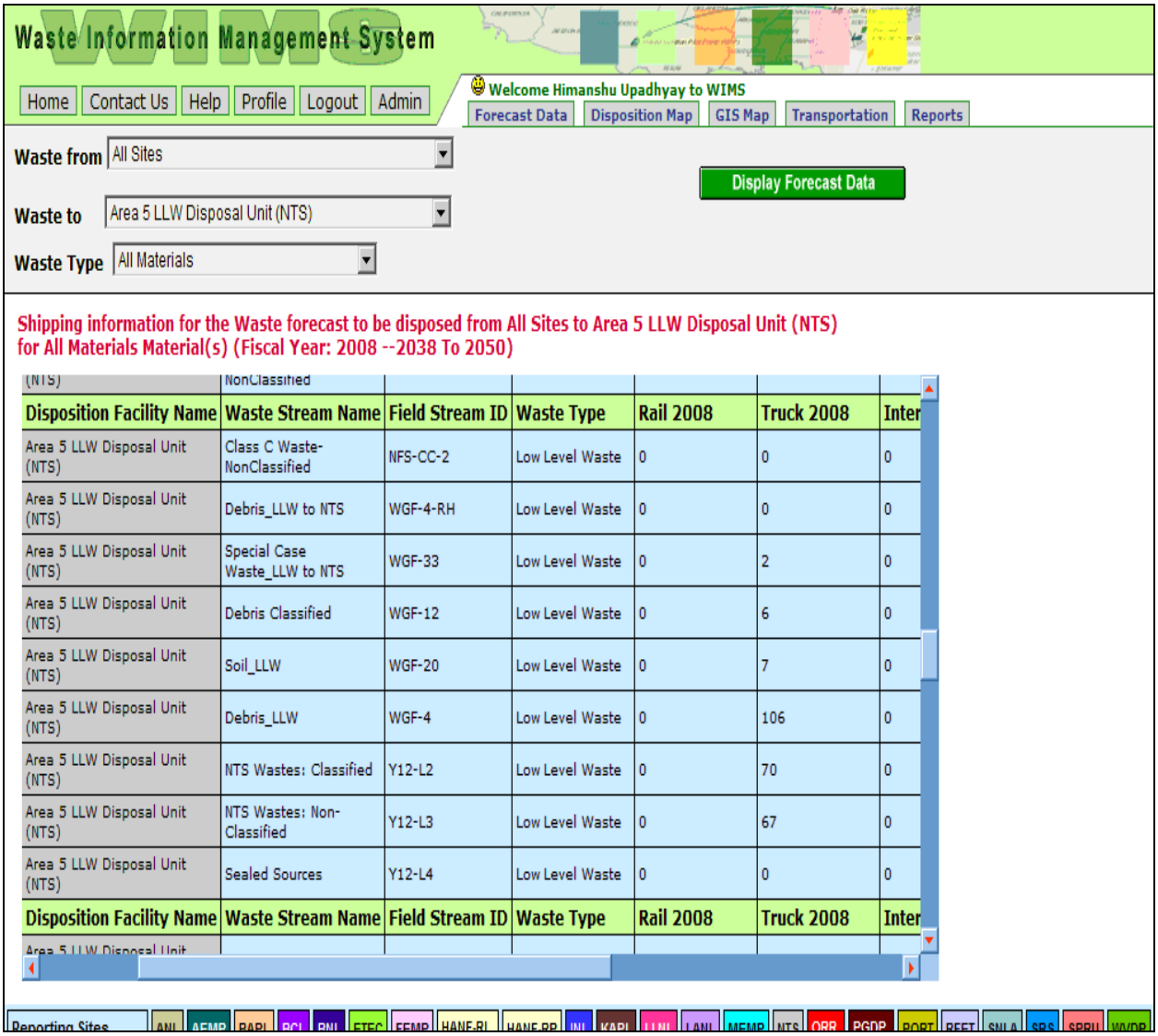


Figure 2 GIS Map

Transportation Module

A transportation module was designed developed and integrated with the existing Waste Information Management System (WIMS). This module shows the shipping details on waste volume as forecasted number of shipments by truck, intermodal, and rail.

This module shows the information that was collected in December 2007 and reflects the shipping forecast information at that time. Any future changes are not reflected here. The transportation module is shown in Figure 3.



Disposition Facility Name	Waste Stream Name	Field Stream ID	Waste Type	Rail 2008	Truck 2008	Inter
Area 5 LLW Disposal Unit (NTS)	Class C Waste-NonClassified	NFS-CC-2	Low Level Waste	0	0	0
Area 5 LLW Disposal Unit (NTS)	Debris_LLW to NTS	WGF-4-RH	Low Level Waste	0	0	0
Area 5 LLW Disposal Unit (NTS)	Special Case Waste_LLW to NTS	WGF-33	Low Level Waste	0	2	0
Area 5 LLW Disposal Unit (NTS)	Debris Classified	WGF-12	Low Level Waste	0	6	0
Area 5 LLW Disposal Unit (NTS)	Soil_LLW	WGF-20	Low Level Waste	0	7	0
Area 5 LLW Disposal Unit (NTS)	Debris_LLW	WGF-4	Low Level Waste	0	106	0
Area 5 LLW Disposal Unit (NTS)	NTS Wastes: Classified	Y12-L2	Low Level Waste	0	70	0
Area 5 LLW Disposal Unit (NTS)	NTS Wastes: Non-Classified	Y12-L3	Low Level Waste	0	67	0
Area 5 LLW Disposal Unit (NTS)	Sealed Sources	Y12-L4	Low Level Waste	0	0	0
Disposition Facility Name	Waste Stream Name	Field Stream ID	Waste Type	Rail 2008	Truck 2008	Inter

Figure 3 Transportation Forecast Data

Help Module

The help module provides help on all features of the WIMS and Transportation forecast data. The help module is shown in Figure 4.

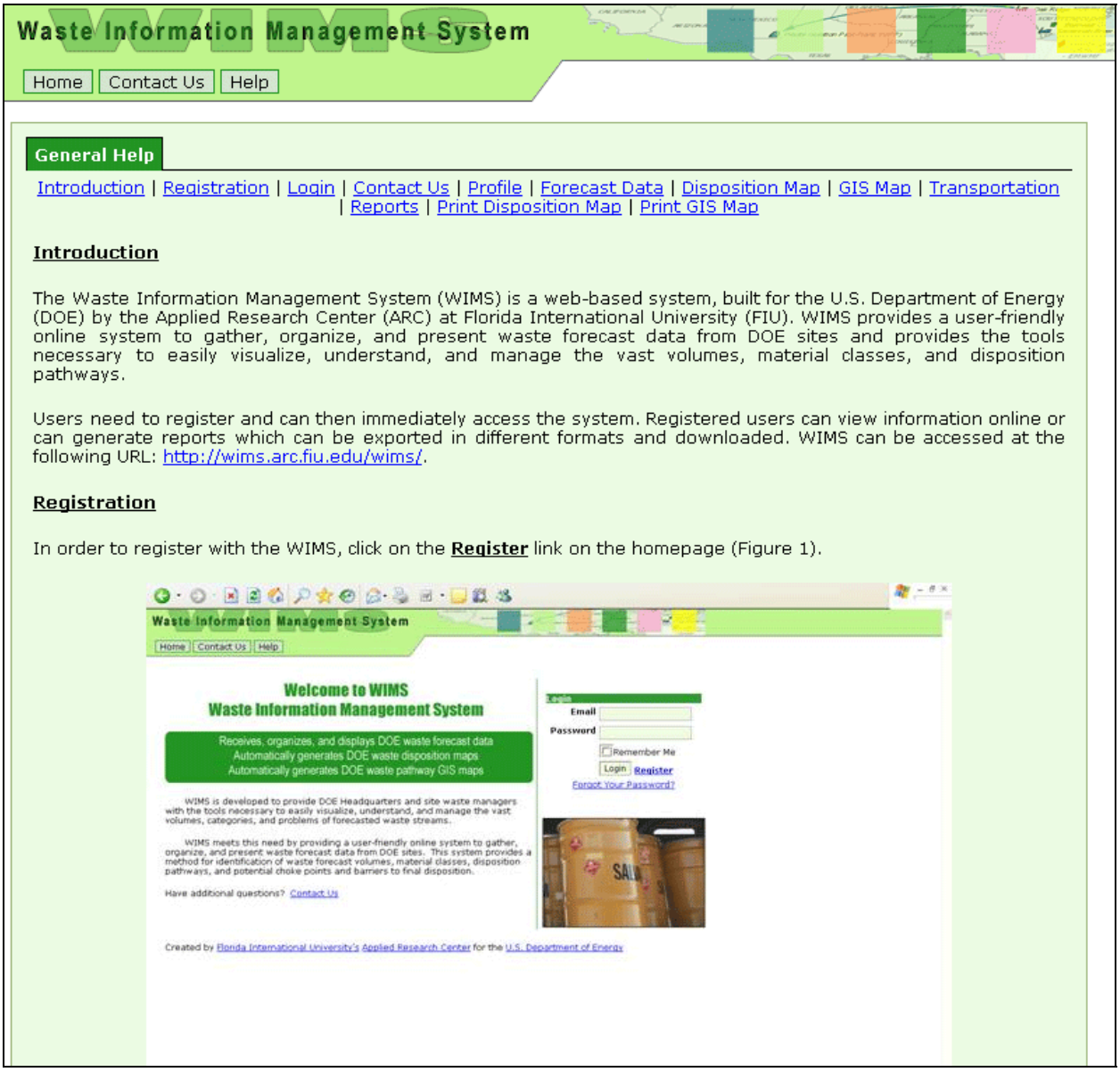


Figure 4 Help Module

Upon entrance into WIMS, the information for display as a forecast data table, a disposition map, GIS map or a transportation data 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. Pick-List for Filtering Data 2008-2009

Waste From	Waste To
All Sites	All Facilities
Ames Laboratory	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
2008	2008	All Materials
2009	2009	Unknown
2010	2010	Low Level Waste
2011	2011	Mixed Low Level Waste
2012	2012	11e(2) Byproduct Material
2013 to 2017	2013 to 2017	Other Material
2018 to 2022	2018 to 2022	Transuranic Waste
2023 to 2027	2023 to 2027	
2028 to 2032	2028 to 2032	
2033 to 2037	2033 to 2037	
2038 to 2050	2038 to 2050	

CONCLUSION

The Waste Information Management System with Integrated Transportation Forecast Data continues to successfully accomplish the goals and objectives set forth by DOE for this project. It has replaced the historic process of each DOE site gathering, organizing, and reporting their waste forecast information utilizing different databases and display technologies. In addition, WIMS meets DOE's objective to have the complex-wide waste forecast and transportation information available to all stakeholders and the public in one easy-to-navigate system. The enhancements to WIMS made since its initial deployment include the addition of new DOE sites and facilities, an updated waste and transportation information, and the ability to easily display and print customized waste forecast, the disposition maps, GIS maps and transportation information. The system also allows users to customize and generate reports over the web. These reports can be exported to various formats, such as Excel, Word and PDF and downloaded to the user's computer.

Future enhancements will include a waste summary display, waste summary report module, security, user/ role management and administration. 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 security module will provide Microsoft.net framework-based security to the application. User/role management will provide a user approval process.