

Waste Information Management System-2010 10296

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ABSTRACT

The Waste Information Management System -2010 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 -2010 allows identification of total forecasted waste volumes, material classes, disposition sites, choke points, technological or regulatory barriers to treatment and disposal, along with forecasted 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 -2010 is a web-based information management system, designed, developed, deployed and maintained by the Applied Research Center (ARC) at Florida International University (FIU) 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 updated features 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.

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 instructions 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.

FIU has received a list of changes/feedback from DOE which was incorporated into WIMS-2010. These feedback/changes have impacted all the modules of the system. WIMS development and enhancement processes were initiated to integrate all the changes before the next data call. One of the significant updates was to include the names and locations of the commercial treatment and disposal facilities into the system.. The system was updated to replace secured commercial site names with real ones in the Forecast data, Disposition maps, GIS maps, Transportation and Reports modules. Another request by DOE is to develop the system to handle complex relationships of multiple input-output streams to be displayed in the successor stream disposition maps. This feature displays the relationship between original waste stream(s) and any secondary waste stream(s) that are created via waste processing or treatment. The multiple successor stream disposition map module was updated to handle multiple complex input output stream relationships. In addition, legends were modified across all modules of WIMS, adding various codes to the help file, etc.

RESULTS AND DISCUSSION

Waste information currently displayed in WIMS was collected in 2009 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 August 2009 and is shown in the following

figures. The WIMS home page is shown in Figure 1. An example disposition map is shown in Figure 2 and an example GIS map is shown in Figure 3.

Waste Information Management System

Home Contact Us Help Profile Logout Admin

Welcome Himanshu Upadhyay to WIMS

Forecast Data Disposition Map GIS Map Transportation Reports

Welcome to WIMS Waste Information Management System

Receives, organizes, and displays DOE waste forecast data
Automatically generates DOE waste disposition maps
Automatically generates DOE waste pathway GIS maps

WIMS is developed to provide DOE Headquarters and site waste managers with the tools necessary to easily visualize, understand, and manage the vast volumes, categories, and problems of forecasted waste streams.

WIMS meets this need by providing a user-friendly online system to gather, organize, and present waste forecast data from DOE sites. This system provides a method for identification of waste forecast volumes, material classes, disposition pathways, and potential check points and barriers to final disposition.

Disclaimer: Disposition facility information presented is for planning purposes only and does not represent DOE's decisions or commitments. Any selection of disposition facility will be made after technical, economic, and policy considerations.

NOTE: Additional wastes are expected to be generated and disposed from the cleanup activities funded by the American Recovery and Reinvestment Act. These wastes are currently not included.

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Fig. 1. WIMS home page.

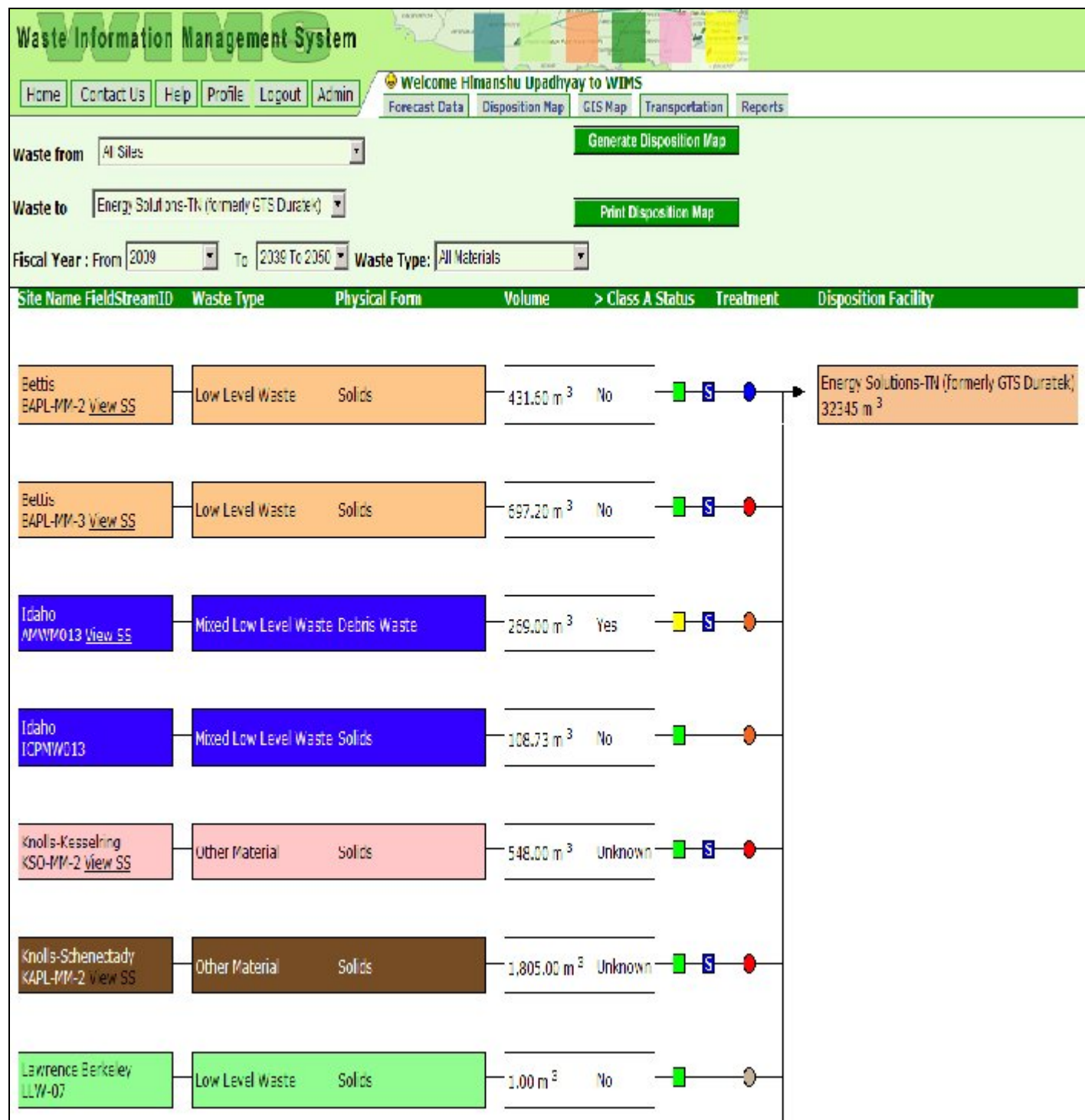


Fig. 2. Disposition map.

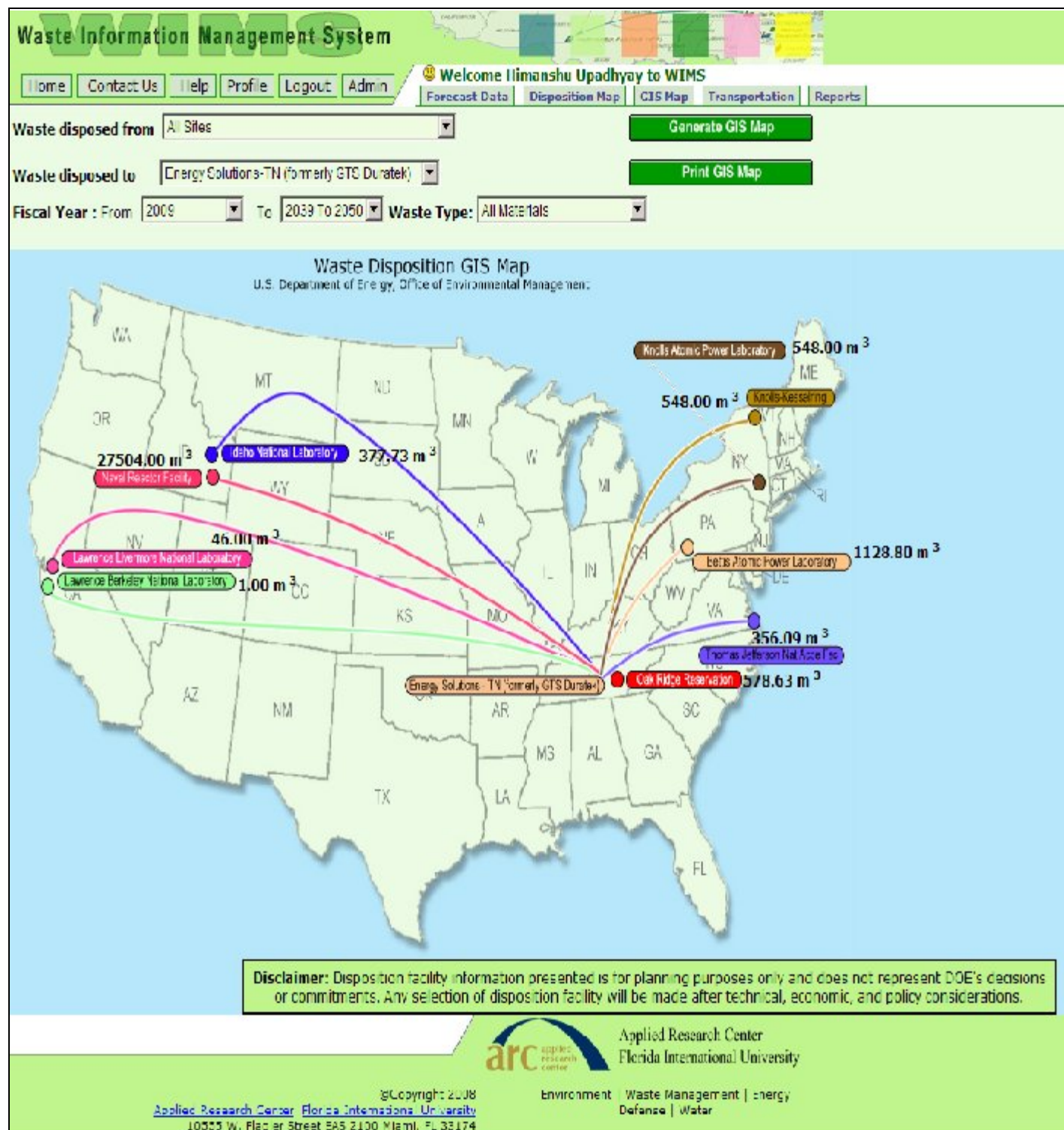


Fig. 3. GIS map.

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 June 2009 and reflects the shipping forecast information at that time. Any subsequent forecast changes are not reflected here. The transportation module is shown in Figure 4.

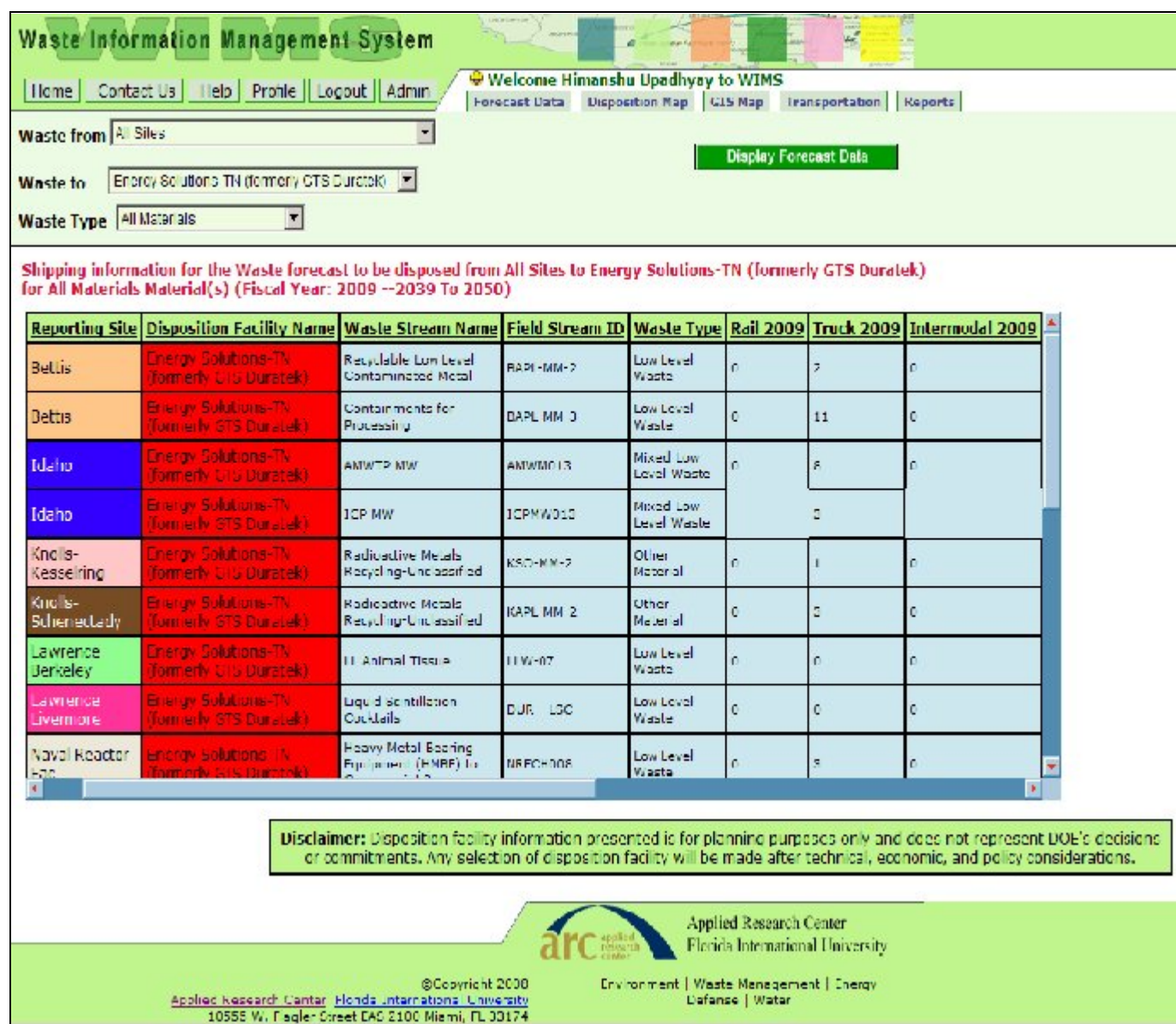


Fig. 4. Transportation forecast data.

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. Updated Pick-List for Filtering Data 2009-2010

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	Clean Harbors
Lawrence Livermore National Laboratory	Energy Solutions -Clive
Los Alamos National Laboratory	Energy Solutions -TN
Miamisburg Environmental Management Project	Perma-fix- Gainesville
Naval Reactor Facility	Perma-fix- Diversified Scientific Svcs.
Norfolk Naval Shipyard	Perma-fix- Northwest
Nuclear Fuel Services, Inc.	Perma-fix- Materials & Energy Corp
Nevada Test Site	Waste Control Specialist
Oak Ridge Reservation	Studsvik /RACE - LLC
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
2009	2009	All Materials
2010	2010	Unknown
2011	2011	Low Level Waste
2012	2012	Mixed Low Level Waste
2013	2013	11e(2) Byproduct Material
2014to 2018	2014 to 2018	Other Material
2019 to 2023	2019 to 2023	Transuranic Waste
2024 to 2028	2024 to 2028	
2029 to 2033	2029 to 2033	
2034 to 2038	2034 to 2038	
2039 to 2050	2039 to 2050	

CONCLUSION

The Waste Information Management System -2010 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 multiple input/output successor streams and database/application migration to the next level. A new data import interface will be developed to integrate 2010-11 forecast waste streams. In addition, the application is updated on a continuous basis based on DOE feedback.