

Practical Hazardous Material Transportation Costing, Scheduling and Oversight with TCAT (Transportation Costs Analysis Tool) - 11330

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ABSTRACT

Turnkey Transportation Portal Integration Technologies incorporates modular based software tools that facilitate an automated, direct link between hazardous material characterization and DOT determination to expedite the requirements for packaging, preparation for shipment, and transportation of hazardous material. The Transportation Cost Analysis Tool replace multiple, orphaned pieces of software that Transportation Specialists and Facility Managers are currently using throughout the DOE environment.

TCAT enables users to input characterization data and expeditiously determine the DOT proper shipping name, type of container needed to transport the waste to the end disposal site as well as determine if the waste meets the disposal facility profile limits. In addition, the system will perform Waste Class calculations, generate the 741 form and backup information for NMC&A and the facility management aspect will keep track of the facility factions. It will replace the need for a up loader tool (for larger shipments), a rad calc. type spread sheet, UHW manifesting software, BoL sheet, includes exclusive use forms, ERG guide information. TCAT will link up with the LWSG NTS program for Nevada Test Site shipments. In addition, it has the ability to prints Hazardous waste, Non-hazardous, NTS labels, etc..

The application guides the user toward the most economical packaging, transportation and disposal scenarios thus reducing change orders and requests for equitable adjustments due to manual decision making processes.

INTRODUCTION

Turnkey Transportation has developed a comprehensive costs estimating tool for transporting hazardous materials. TCAT (Transportation Costs Analysis Tool) provides an interactive framework for estimating and comparing the total costs involved with transporting hazardous materials. The system calculates costs against various forms of transportation modes available using simple, user provided data. These calculations are based on waste volumes, packaging requirements, on-site logistics, and destination site logistics. These include packaging and loading costs, radiological surveys, demurrage and trans-loading of the shipment. There are constraints within the system with limits to Percent (%) Enrichment and Grams per Package on campaigns.

TCAT solicits you to enter the location of the waste generator and the disposal facilities location in which you are wanting to ship to. TCAT also takes into account the most economical transportation methods based on the generating site and the destination facility, i.e. Rail vs. highway vs. onsite disposal. TCAT can also provide your cost "cradle to grave" in addition to your total transportation costs. All fees associated with transporting hazardous materials across state lines are also included in the transportation costs. The system calculates number of shipments using supplied and volumes based on historical or user defined material densities from existing D&D and shipping activities. There are constraints in the

application to refine transportation options based on Package Type, Material Description and DOT Classification.

The transportation of waste is the movement of waste over a specific area by trains, tankers, trucks, barges, or other vehicles. The types of waste streams that can calculate range from municipal garbage to radioactive or hazardous wastes.

Several modes of transportation cost options are provided for project. This application is useful for transportation professionals, planners, economists, policy analysts and environmentalists.

Once the waste streams have been identified for the different competing alternatives, the objective is to calculate the total life-cycle costs for each alternative. Because dollars spent at different times have different values to project stakeholders', the projected activity costs for a project alternative cannot simply be added together to calculate total life-cycle cost. TCAT gathers negotiated tender rates as well as regional labor rates to ensure the formulas are as accurate as possible. TCAT allows Governing agencies the ability to quickly estimate a building or a project's total cost of disposal for long term planning and budgeting purposes. TCAT demonstrates how easily cost estimates can be applied to specific planning and policy decisions when scoping a project.

TCAT has been tested against actual data from Q1 and Q2 2010 for the K25 building D&D at the East Tennessee Technology Park in Oak Ridge, Tennessee.

The results showed that the original estimated net volumes per load were higher than actual. We were able adjust the calculated net volume to equal actual and define the difference both in number of shipment and cost, demonstrating potential opportunities for improving performance.

TCAT incorporates the limited user defined data elements and creates a schedule based on the type of material and suggested packaging and transportation method. It then aggregates general labor rates associated with handling and packaging of the hazardous materials and feeds the total cost estimates. The scheduling module allows you to view the number of FTE's (Full Time Employees) type and quantity of transportation method suggested for use and number of turns per day they must complete in order to meet the suggested schedule.

TCAT makes use of the calculated baselines for scheduling purposes; it accepts a direct feed from the RFITS program (Radio Frequency Identification Transport System). This allows TCAT to receive updates to actual shipments on a real time basis. This can be access from a remote website or mobile device allowing an individual to see data points about a specific or multiple waste profiles, projects, contractors, or DOE sites.

The Radio Frequency Identification Transport System (RFITS) uses RFID handhelds to write shipping data to passive RFID tags mounted to assets identified vehicles, B25 boxes, drums, etc. Automated unattended waypoints automatically identify vehicles at designated checkpoints along a pre-defined route, thus giving the system visibility into real-time material tracking in locations where infrastructures may be non-existent. Encrypted tag data is captured by the RFID towers and transferred to a centralized RFID middleware system. The RFID middleware system applies filtering, formatting and logic so the data can be processed by the backend system like ATMS, etc... RFITS provides enhanced transportation logistics

through advanced shipping notices and calculated times of arrival for shipments entering the disposal facility.

TCAT can receive this data feed and aggregate specific performance metrics which are viewable from a web browser or custom application launched from a Blackberry or iPhone. This allows a flow up of data to ensure projects are on schedule and executing within the defined scope.

TCAT OPERATIONS

TCAT was developed as a direct result to accurately estimate packaging and transportation activities associated with D&D efforts across the complex. As operational costs continue to become an area of increased scrutiny, the cost of correctly identifying the correct packaging supporting the characterization efforts as well as the most cost effective mode of transportation for a project is critical in maintaining continuity of operations and financial sustainability as DOE continues to support its mission.

With an ever increasing focus to support Executive Order 13514 and other environmentally sustainable initiatives, TCAT will support an integrated, automated process for collecting and analyzing cost effective solutions for packaging and transporting hazardous materials in addition to supporting pre-defined handling, packaging and transporting templates based on past performance across the DOE complex. Using TCAT will drive personal and organizational behavior changes to across the complex as a fundamental strategy to reduce energy use, increase performance and increase data quality. This will be accomplished by addressing policy, procedural and operational challenges that limit adaptability for sustainable system integration.

Capturing data electronically and tracking volumes and density factors based on standardized formulas allows DOE to data mine sites, contractors, projects or buildings contributing to improved data quality which will inform operations with timely information, thus improving the decision making process. Once TCAT collects and aggregates data, the system will segregate characterized materials into reportable statistics supporting Waste Diversion, percentages of recyclable or reusable materials as well as report cost comparisons supporting waste diversion costs vs. disposal cell expansion costs.

TCAT will exist in the Enterprise Architecture as a service oriented architecture accessible through a cloud computing architecture. Both RFITS and TCAT will follow this support model and aggregate data from supporting sites.

TCAT Integration with RFITS

Once you have created an account within the system, you can access it from any web browser. TCAT combines the success of RFITS –Radio Frequency Identification Transport System – by allowing a real-time data feed from projects using RFITS. This allows TCAT to receive information regarding actual volumes and weights in real-time from projects across the DOE complex.

The combination of TCAT and RFITS will build upon existing efforts to strengthen environmental, energy and transportation management initiatives. TCAT becomes the light weight project management tool which collects limited information needed to rollup data to DOE. TCAT would not replace or compete with performance measuring COTS packages that Prime contractors would have integrated into

their business processes; it would merely integrate or compliment existing systems. This same scenario is representative of how RFITS would provide an ‘in-the field’ extension of systems like ATMS and other shipping systems.

As TCAT captures a baseline for packaging and transporting hazardous materials, RFITS feeds it with daily actual rolling data up to an integrated dashboard or reports for senior management and DOE representatives.

TCAT SCREEN SHOTS

Login Page (Example)



The screenshot shows the login page for the TCAT (Transportation Cost Analysis Tool) application. The header features the Turnkey Transportation Services, LLC logo on the left, a central banner image of various trucks, and the 'TCAT' logo on the right. Below the banner, the title 'Transportation Cost Analysis Tool' is displayed. The main content area contains a 'Login' form with fields for 'User Name: *' and 'Password: *', a 'Log In' button, and a 'Create Account' link. A note below the form states '* indicates a required field'. The footer includes the Turnkey logo, copyright information for 2009-2010, and the company name.

Create Account Page (Example)



The screenshot shows the create account page for the TCAT application. The header is identical to the login page. The main content area features a 'Create Account' form with the heading 'Sign Up for Your New Account'. The form includes fields for 'User Name:', 'Password:', 'Confirm Password:', 'E-mail:', 'Security Question:', and 'Security Answer:'. A 'Create User' button is located at the bottom of the form. The footer contains the Turnkey logo, copyright information for 2009-2010, and the company name.

Account Creation Confirmation Page (Example)

TURNKEY
Transportation Services, LLC

TCAT

Transportation Cost Analysis Tool

Create Account
Complete
Your account has been successfully created.
Continue

Powered by...
TURNKEY
Transportation Services, LLC

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Disposal Site Selection (Example)

Shipment Information

Package Type: --Select--

Material Description: --Select--

Material DOT Hazmat Classification: --Select--

Fissile Material: --Select--

Percent (%) Enrichment:

Grams Per Package:

Total Volume to Ship (CY):

Schedule (No of Days):

Total Shipping Weight:

Rail Service (check all that apply)

Existing service onsite?

Repair existing service? How many ft?

Install new service? How many ft?

Analyze Now

Generation Site: --Select--

Disposal Site: Clive

Map Satellite EMWMF Terrain

Map data ©2010 Google - Terms of Use

Generation Site Selection (Example)

Shipment Information

Package Type:

Material Description:

Material DOT Hazmat Classification:

Fissile Material:

Percent (%) Enrichment:

Grams Per Package:

Total Volume to Ship (CY):

Schedule (No of Days):

Total Shipping Weight:

Rail Service (check all that apply)

Existing service onsite?

Repair existing service? How many ft?

Install new service? How many ft?

Generation Site:

--Select--

- Select--
- Argonne National Laboratory
- Bettis Atomic Power Laboratory
- Brookhaven National Laboratory
- Bryan Mound SPR Site
- East Tennessee Technology Park
- Fermi National Accelerator Laboratory (Fermilab)
- Hanford Site
- Idaho National Laboratory
- Knolls Atomic Power Laboratory
- Lawrence Berkeley National Laboratory
- Lawrence Livermore National Laboratory
- Los Alamos National Laboratory
- Mound Plant
- Nevada Test Site
- Oak Ridge National Laboratory
- Pacific Northwest National Laboratory
- Paducah Gaseous Diffusion Plant
- Pantex Plant
- Portsmouth Gaseous Diffusion Plant
- Sandia National Laboratory
- Savannah River Site
- Waste Isolation Pilot Plant
- Y-12 Plant
- Other

Disposal Site:

Clive

Mapped Route (Example)

Shipment Information

Package Type:

Material Description:

Material DOT Hazmat Classification:

Fissile Material:

Percent (%) Enrichment:

Grams Per Package:

Total Volume to Ship (CY):

Schedule (No of Days):

Total Shipping Weight:

Rail Service (check all that apply)

Existing service onsite?

Repair existing service? How many ft?

Install new service? How many ft?

Generation Site:

Hanford Site

Disposal Site:

EMWMF

Package Type Selection (Example)

Shipment Information

Package Type: --Select--

Material Description: --Select--

Material DOT Hazmat Classification: General Design (173.410)

Fissile Material: Type A

Percent (%) Enrichment: Type A - Fissile

Grams Per Package:

Total Volume to Ship (CY):

Schedule (No of Days):

Total Shipping Weight:

Rail Service (check all that apply)

Existing service onsite?

Repair existing service? How many ft?

Install new service? How many ft?

[Analyze Now](#)

Generation Site: Hanford Site

Disposal Site: EMWMF

Map | Satellite | Hybrid | Terrain

Material Description Selection (Example)

Shipment Information

Package Type: General Design (173.410)

Material Description: --Select--

Material DOT Hazmat Classification: Construction Debris

Fissile Material: Asbestos - Friable

Percent (%) Enrichment: Asbestos - Non-Friable

Grams Per Package: Concrete - Chunk

Total Volume to Ship (CY): Concrete - Rubble

Schedule (No of Days): Concrete - Slab

Total Shipping Weight: Soil

Total Shipping Weight: WL 6.999

Rail Service (check all that apply)

Existing service onsite?

Repair existing service? How many ft?

Install new service? How many ft?

[Analyze Now](#)

Generation Site: Hanford Site

Disposal Site: EMWMF

Map | Satellite | Hybrid | Terrain

Material DOT Hazmat Classification Selection (Example)

Shipment Information

Package Type:

Material Description:

Material DOT Hazmat Classification:

Fissile Material:

Percent (%) Enrichment:

Grams Per Package:

Total Volume to Ship (CY):

Schedule (No of Days):

Total Shipping Weight:

Rail Service (check all that apply)

Existing service onsite?

Repair existing service? How many ft?

Install new service? How many ft?

Generation Site: Hanford Site

Disposal Site: EMWMF

The map displays a blue route starting at point A (Hanford Site) in Washington and ending at point B (EMWMF) in Kentucky. The route passes through Oregon, Idaho, Wyoming, Nebraska, Kansas, Missouri, Illinois, Indiana, Ohio, Pennsylvania, and West Virginia. The map includes state names and major cities. Map controls for 'Map', 'Satellite', 'Hybrid', and 'Terrain' are visible at the top right of the map area.

Fissile Material Selection (Example)

Shipment Information

Package Type:

Material Description:

Material DOT Hazmat Classification:

Fissile Material:

Percent (%) Enrichment:

Grams Per Package:

Total Volume to Ship (CY):

Schedule (No of Days):

Total Shipping Weight:

Rail Service (check all that apply)

Existing service onsite?

Repair existing service? How many ft?


Install new service? How many ft?


Generation Site: Hanford Site


Disposal Site: EMWMF

The map displays a blue route starting at point A (Hanford Site) in Washington and ending at point B (EMWMF) in Kentucky. The route passes through Oregon, Idaho, Wyoming, Nebraska, Kansas, Missouri, Illinois, Indiana, Ohio, Pennsylvania, and West Virginia. The map includes state names and major cities. Map controls for 'Map', 'Satellite', 'Hybrid', and 'Terrain' are visible at the top right of the map area.

Total Volume to Ship (Example)







Welcome ssanders - Logout

Shipment Information

Package Type:

Material Description:

Material DOT Hazmat Classification:

Fissile Material:

Percent (%) Enrichment:

Grams Per Package:

Total Volume to Ship (CY):

Schedule (No of Days):

Total Shipping Weight: 159,300,000 lbs

Rail Service (check all that apply)

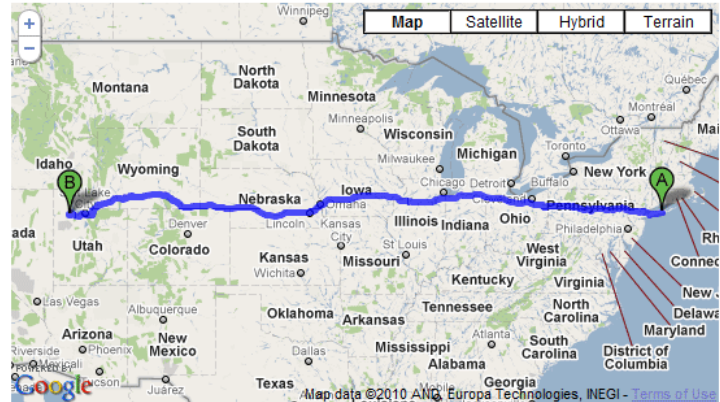
Existing service onsite?

Repair existing service? How many ft?

Install new service? How many ft?

Generation Site:


Disposal Site:



Analysis
Price List
Containers

	Campaign Method	Per Unit Cost	Per CY Cost	Total Campaign Cost	Shipment Count	Sched Cont	Turns P/Day
Rail	Low-Sided Gondola to Clive	\$19,371.20	\$171.44	\$17,143,512.00	885	0	0.00
Rail	High-Sided Gondola to Clive	\$19,371.20	\$171.44	\$17,143,512.00	885	0	0.00
Highway	Dry Van to Clive	\$4,982.14	\$198.44	\$19,843,863.62	3983*	0	0.00
Highway	Flatbed Trailer to Clive	\$4,754.44	\$194.22	\$19,421,887.40	4085*	0	0.00

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Analysis (Example)

Analyze Now

Analysis Price List Containers

	Campaign Method	Per Unit Cost	Per CY Cost	Total Campaign Cost	Shipment Count	Sched Cont	Turns P/Day
Rail	Low-Sided Gondola to Clive	\$19,371.20	\$171.44	\$17,143,512.00	885	39825	0.02
Rail	High-Sided Gondola to Clive	\$19,371.20	\$171.44	\$17,143,512.00	885	39825	0.02
Highway	Dry Van to Clive	\$4,982.14	\$198.44	\$19,843,863.62	3983*	55762	0.07
Highway	Flatbed Trailer to Clive	\$4,754.44	\$194.22	\$19,421,887.40	4085*	57190	0.07

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Price List (Example)

Analyze Now

Analysis Price List Containers

Price	Description
\$165.00	Install New Track (Cost Per Linear Foot)
\$150.00	Repair Track (Cost Per Linear Foot)
\$683.10	Low-Sided Gondola Rental Rates Per Month
\$683.10	High-Sided Gondola Rental Rates Per Month
\$14,776.21	Gondola Line Haul from ETPP to Clive
\$872.85	Loadwrapper for Gondola

1 2 3 4 5

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Containers Page (Example)

Analyze Now

Analysis Price List **Containers**

Transport Mode	Transport Type	Total Payload (lbs)	Max Payload (CY)	Per Intermodal
Low-Sided Gondola	Rail	180000	113.0	0
High-Sided Gondola	Rail	180000	113.0	0
Bi-Modal Articulated Flatcar	Rail	228000	143.1	18
Articulated Flatcar	Rail	389400	244.4	41
Flatbed Trailer	Highway	39000	24.5	0
Dry Van	Highway	40000	25.1	0
Intermodal Van	Highway	34000	21.3	0
Dump Truck (18cy)	Highway	40000	18.0	0
Dump Truck (18cy)	Highway	40000	6.5	0

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