

The Transportation Resource Exchange Center (T-REX) Website: A Case Study

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ABSTRACT

This paper examines the Transportation Resource Exchange Center (T-REX), the first Virtual Library that is dedicated to providing information about the transportation of radioactive materials to all stakeholders or interested parties. The U.S. Department of Energy (DOE) National Transportation Program (NTP), which coordinates transportation activities for all DOE non-classified shipments of radioactive and mixed wastes and provides information about these shipments to Non-DOE and DOE stakeholders, recognized the need for greater outreach on the topic and responded. In June 1998, through a cooperative agreement, the DOE NTP authorized the ATR Institute (ATRI), a research organization at the University of New Mexico, to develop and maintain a Virtual Library that would be dedicated to serving as a single-point source of information about the transportation of radioactive materials for Non-DOE and DOE stakeholders. The ATRI created The Transportation Resource Exchange Center (T-REX) to serve as an online “one-stop shop” national clearinghouse for information. The overarching goal for the T-REX Center is to become the permanent repository and principal distributor of documents and information on the transport of radioactive wastes and materials. The T-REX Center is positioned as a public interface for public outreach. The T-REX Virtual Library is a vital conduit linking those stakeholders who are in need of information and those who produce public information on issues about radioactive waste transport.

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INTRODUCTION

This paper examines, as a case study, the Transportation Resource Exchange (T-REX) Center, at <http://www.trex-center.org/>, which is the first Virtual Library dedicated to providing information about the transportation of radioactive materials to all stakeholders, or interested parties. The T-REX Virtual Library is designed to serve as a “one-stop shop” national clearinghouse. The paper is organized into five sections: the Introduction, Background Research, Description of the Website and Databases, Usability and Ongoing Evaluation, and Future Plans.

The ATR Institute (ATRI) of the University of New Mexico created the T-REX Website under a cooperative agreement with the National Transportation Program (NTP) of the U.S. Department of Energy (DOE). Based on the cooperative agreement, the ATRI identified five primary goals for the T-REX Virtual Library:

- Supply pertinent information to diverse audiences,
- Build relationships that promote user assistance in developing and maintaining the T-REX,
- Develop training for utilizing the T-REX,
- Improve the management and dissemination of needed information, and
- Provide reference and research services without charge.

BACKGROUND RESEARCH

Analysis of Audience and Content Factors

Stakeholders are diverse and hold varying levels of knowledge and expertise, regarding radioactive materials transport. They also possess varying knowledge and experience in using the Internet to search for information. In conceptualizing the project, the T-REX Center realized that the creation of an effective Virtual Library for all stakeholders on the transport of radioactive materials would be a challenging endeavor. The management and dissemination of information, as well as the overall design of the T-REX Website itself, must necessarily meet the differing needs of the several widely diverse audiences. In addition to consideration of the types of audiences who could be potential users of the T-REX Virtual Library, factors of content and context also were appraised for communication challenges. Four primary content considerations were identified. (1) Information regarding the transportation of radioactive wastes and materials could be polarizing to some audiences. (2) The information that existed, and had become available since the end of the Cold War, was thought to be massive in amount and complex in nature. (3) The information would necessarily come from a multitude of disparate, diffuse sources. (4) The information was so specialized that stakeholders might not know where to begin to look, or might not know if the answers they sought could be found within the public domain.

The T-REX Center determined that research instruments and stakeholder feedback mechanisms developed prior to creation of the T-REX Virtual Library would prove advantageous for the following reasons:

- Input from potential users of the site would enhance the T-REX Website’s ability to meet the needs of its different audiences.
- Feedback from stakeholders would assist the T-REX Center in the acquisition of a deeper understanding of the diverse roles fulfilled by stakeholders.
- By incorporating the input of stakeholders into the design of the Website and developing information products, the T-REX Center would be better able to accommodate specific requirements in the service capabilities of the Virtual Library.

To provide the necessary feedback, three research tools were developed by the T-REX Center. “The T-REX User Needs Assessment”(Jordan, unpublished data) and “The National Transportation Information Resource Survey,” (Jordan, unpublished data) were completed *before* the T-REX Website

was created. “The Content Analyses of US Department of Energy Environmental Impact Statements (EISs) Comments and Responses,” (Bennett, Jordan, & White, unpublished data) was begun shortly after the Website was launched. These tools were developed to identify the gaps between potential users’ questions and the information that was available regarding stakeholder issues, to ensure that content needs, user friendliness, and application utility might be maximized by the Website. These three research instruments are available upon request to the T-REX Center.

“The T-REX User Needs Assessment” (Jordan, unpublished data), which was conducted by telephone interview, assessed the information needs and preferences of potential users representing DOE and Non-DOE stakeholders. The participants in this study were selected from the Transportation External Working Group (TEC), one of several external coordination mechanisms established by the DOE to implement parts of the Transportation Management team, the Emergency Management Team, the Liaison and Communications Program, and the Civilian Radioactive Waste Program. TEC members include representatives from national, state, tribal and local government organizations, labor, industry and professional groups. Members meet semiannually to participate in plenary sessions, breakout work sessions, and in more specialized topic groups. Participants in this T-REX study were surveyed about their daily work experiences, information use, wants and needs in securing information, and the availability and accessibility of information. The telephone interviews ranged between thirty minutes to two hours in length, depending on how much information each participant had or wanted to share. The study commenced in October 1998 and concluded in January 1999. Thirty-seven participants were DOE stakeholders, and 41 were Non-DOE stakeholders.

“The National Transportation Information Resource Survey” (Jordan, unpublished data) was a four-page questionnaire conducted by mail that surveyed 250 state libraries, state Department of Transportation libraries, Special Libraries, DOE Reading Rooms, libraries at the DOE National Laboratories and other federal repositories of transportation information. The names of contacts at these sundry information repositories were garnered by searches of identified Web pages, transportation directories, Special Libraries Association publications, the Directory of Transportation Libraries and Information Centers in North America, the National Center for Education Statistics, and the Directory of Federal Libraries and Information Centers. The survey assisted in determining the availability and existence of documents related to radioactive materials transport. Approximately 125 surveys were completed and returned. All interviews were transcribed, numbered, and coded. The results of the survey were compiled in mid-January 1999.

The third research tool was “The Content Analyses of US Department of Energy Environmental Impact Statements (EISs) Comments and Responses,” (Bennett, et al., unpublished data) a T-REX Center study which identified, compiled, and categorized all public comments/responses from 1995 to the present regarding transportation issues from 35 DOE EISs. The EIS is a detailed report to the US Environmental Protection Agency. The DOE, as well as other federal agencies, are mandated by the National Environmental Protection Act to write an EIS whenever they seek to implement proposed actions that may affect the environment. At specified times in the EIS process, the DOE, or other agency, is required to provide early notification to interested parties, the stakeholders, and to solicit their views. During the comment periods, the stakeholders may ask questions or offer comments/responses orally or in writing to the federal agency in charge, regarding the environmental impact or proposed remedies of the action. In the study conducted at the T-REX Center, the EIS comments and responses were analyzed, coded by category, and counted to determine the frequency an issue category was mentioned by stakeholders. The T-REX Center was not required by the DOE to use EIS comments and responses as a source of user information.

Research Results

The background research did provide the T-REX Center with a rich resource for obtaining insights into key stakeholder issues. “The T-REX User Needs Assessment” (Jordan, unpublished data) also revealed primary information preferences of potential Non-DOE and DOE users of the T-REX Virtual Library.

Potential patrons wanted very specialized information. They wanted information on national, tribal, state, county, municipal, and site levels, regarding a variety of topics. Potential users preferred to access the information they needed via searchable databases or to have the URLs of Websites, which contained the information they sought emailed to them. They wanted real-time, electronic updates of regulations, orders, laws, nuclear news, and public outreach efforts to be available on the T-REX Website. An added benefit of “The National Transportation Information Resource Survey” (Jordan, unpublished data) was that the T-REX Center was able to follow-up by requesting documents that were available from these repositories.

Non-DOE Stakeholder Information Needs

Results from the T-REX User Information Needs Assessment (Jordan, unpublished data) indicated that Non-DOE stakeholders wanted the following types of information:

- DOE decisions on routing and programs,
- Transportation protocols,
- County, State, and Tribal regulations,
- Entities responsible for shipping,
- Environmental assessments and impact statements,
- Access to real-time graphic mapping and monitoring of shipments,
- Cultural information related to Tribal governments,
- News articles provided in a real-time manner, and
- Training materials and/or kits.

DOE Stakeholder Information Needs

Results from the T-REX User Information Needs Assessment (Jordan, unpublished data) indicated that DOE stakeholders wanted the following types of information:

- State, federal and international regulations,
- Interpretation of regulations,
- DOE Orders,
- Shipping program information including manifests, characterization, packaging, and routing,
- Responsibilities for the different aspects of transport,
- Shipping projections,
- Availability of packaging,
- Accident statistics for a variety of materials, modes and geographic areas,
- Lessons learned from shipping programs, and
- Outreach efforts by the DOE.

DESCRIPTION OF THE WEBSITE AND DATABASES

Headlines And Daily News Updates

In response to the research findings, The T-REX Center designed the Website and back-end databases to meet the identified needs of stakeholders. The content and design of the T-REX Virtual Library were driven by the information garnered from this background research. In the most basic sense, the results produced by the research tools informed the T-REX designers of what information related to radioactive material transport is available and which information is the most highly prized by the users. As an example, “environmental issues” and “current news regarding radioactive waste transport” are two of the most-highly prized subjects of both Non-DOE and DOE stakeholders. Daily news updates from the US and around the world related to the environment and the transport of radioactive materials can be found on the Headlines Web page at <http://www.trex-center.org/nuevo.asp>.

Annotated Bibliography Series And Browse by Subject Features

The study of EIS comments/responses was used to determine comment trends and produce a user-friendly set of frequently-asked-questions-and-answers. In addition to the resultant Searchable Database of EIS Comments/Responses, other products emerging from the EIS study include a series of special annotated bibliographies on Environmental Impacts, Risk Communication, Routes, and Safeguards, which are continually updated. These annotated bibliographies are accessible by direct links found on the T-REX Home Page at <http://www.trex-center.org/>. A broad range of subject categories for the T-REX Virtual Library also were compiled based on the background research. The subject categories include: Carriers, Education/Training, Emergency Management, Health, International, Laws/Regulations, Packaging, Public Participation, Routes, States, Students/Teachers, and Tribal, which can be found at <http://www.trex-center.org/facets.asp>.

Reference And Research Services

Because patrons of T-REX Center vary greatly in knowledge and expertise, the T-REX Center offers information reference and referral services to assist stakeholders in finding for themselves or obtaining for themselves the information they need, without charge. As part of UNM, the ATRI, which houses the T-REX Center, has direct access to over 75 citation and full-text commercial databases in the University's Library System. The T-REX Center uses these resources to assist patrons who request information or documents. A toll free telephone information hotline is available at (877) 287-TREX (8739). Stakeholder queries for information can also be made through the email address, trex@unm.edu. The T-REX Center can email the URLs of Websites to patrons or answer information access or access questions by telephone, so that stakeholders, who do not want to or do not have access to a computer, do not need to search the Internet. The T-REX Center can also provide facts and tips to stakeholders having difficulty in their information searches and let them know about pre-existing information that stakeholders may not realize is available. The T-REX-L, the [listserv®](mailto:listserv@unm.edu) to provide periodic email bulletins to T-REX patrons, is located at <http://www.trex-center.org/list.asp>.

Contacts Database

Because the background research revealed that some stakeholders had difficulty in finding contact individuals with particular areas of expertise for information queries, the T-REX staff created the Transportation of Radioactive Materials (TRAM) database to address this information gap. Included among the over 850 individuals or groups listed in the TRAM are representatives from typical stakeholder groups: the DOE and the national laboratories, environmental groups, corporations, health professionals, emergency responders, public interest groups, community organizations, and officials and agencies from all levels of government, and from the sovereign American Indian nations. The TRAM provides information including background or history, corporate affiliates, geographic scope, information products, and contact information of the individuals or organizations on the TRAM.

The keyword-searchable TRAM was designed to provide set of rapid results defined by the user when he or she queries the system for the DOE or Non-DOE individuals/organizations that possess expertise or specific information regarding any aspect of the transportation process. Each General Area of Operation has a pull-down menu of Specific Expertise, Geographic Scope and DOE Status. As an example, the TRAM can search for organizations based on a defined General Area of Operation, such as "carriers," and Specific Expertise category, such as "intermodal," Geographic Scope, such as "international," and DOE status, such as "internal DOE," or "external or Non-DOE." The TRAM pull-down menus are created dynamically from the database and will contain only the entries that have corresponding references. Alternatively, at the bottom of the Web page is a free text search function, which will search for matches in the entire database, regardless of General Area of Operation and Specific Expertise. The TRAM is located at <http://trex-center.org/thetram.asp>. The logical data design capabilities

of the TRAM is also based on the results of the background research, as is illustrated on Tables I and II on pages 11 and 12 at the end of this document.

Documents Database

The T-REXDEX is the keyword-searchable database of over 2,008 online documents in the T-REX Virtual Library and is located at <http://trex-center.org/dexsearch.asp>. The keyword searches Titles, Publishers, and Subjects. The collection includes more than 10,000 pages of documents. All materials provided online through the T-REX Website are non-copyright. If the search result of the patron includes a document that is not hyper-linked, the user may contact the T-REX staff via email or telephone toll-free for availability of the document. The T-REX Center continually identifies and obtains additional documents, in both hard copy and online formats. The process of scanning newly acquired printed documents into electronic Adobe Acrobat PDF files is ongoing.

Web Reference Desk And Reciprocal Links

Because the World Wide Web is built on linking, and because the Internet is a network, these technologies used together make it unnecessary to recreate repositories of information that already exist. On T-REX's Reference Desk Web Page, at <http://www.trex-center.org/reference.asp>, the T-REX Center has used the inherent strengths of the World Wide Web and Internet to connect the T-REX Website with DOE Databases, DOE Public Reading Rooms and Libraries, DOE and other pertinent Online Serials, Glossaries, and Fact Sheets. The T-REX staff linked these repositories to the T-REX Website in a programmatic way to generate the intended pages by using simple linking schemes according to a protocol. These sites provide customized instructions to direct users from the starting point to their desired online destinations. Because the informational capabilities of these other Websites are accessible from T-REX with only double-clicks of the mouse, users of the T-REX Website can enjoy value-added information services beyond those found on T-REX. In addition to T-REX's Reference Desk Web Page, the Virtual Library has a separate Web Page for reciprocal links at <http://www.trex-center.org/ recip.asp>.

USABILITY AND ONGOING EVALUATION

Navigation

The T-REX staff carefully planned the layout and design of the Virtual Library because potential patrons would have all levels of knowledge and expertise regarding searching a Website on the Internet for information. The usability of any Website depends on what the designers *and* the users are trying to accomplish. In the case of the T-REX Center, users are seeking information, not surfing the Internet. The kinds of items on Websites generally used to attract viewers who are surfing, such as sites with slow-loading graphics, splash screens, sound effects, and music, are in direct conflict with the goals of users who are on the Internet for information retrieval. As information seekers, T-REX users do not attempt to grasp the site's overall layout in their information quest; their quest tends to take a very focused approach. To meet the needs of patrons, the design intent regarding active links is to make them highly descriptive, yet simple enough so an the information seeker would be able to pursue an information path through the Website. The language used in the links helps T-REX users to successfully predict where each link will lead. Clear navigational aids are required to enhance application utility and user satisfaction. Vague or redundant link language is confusing and frustrating to users.

To make the T-REX Virtual Library more functional, design decisions were made regarding the appearance of links, explanations as to where users can go/where each link will lead, identification of the user's current location, a site map of the information architecture, and creation of easy-to-use, searchable databases. The overall user-centered design, layout, format, and features of T-REX Website so that users are able to perform required tasks with a minimum of stress and a maximum of efficiency. Information specialists at the T-REX Center have worked collaboratively with the Virtual Library's database developers throughout the life of the Website.

T-REX developers created a layout design to enhance navigability. Design features of the T-REX include:

- The T-REX name and logo on every page, with the logo linked to the homepage,
- Straightforward, simple headlines and titles on each page,
- Structuring page sections using a layout,
- Maximizing the use of hypertext on all pages, and
- Having a search capability on each page.

Tracking And Maintenance

Special tracking software was installed to perform comprehensive Website analysis to facilitate maintenance of the T-REX Virtual Library. The software scans the site and checks for online problems, such as broken links, slow pages, orphaned pages, stale content, poor HTML syntax, deep pages, broken anchors or missing meta-tags. Since its inception, the T-REX Website has undergone evaluative assessment by the staff and by UNM students approximately every six months. Periodic usability testing is important because even the most aesthetically pleasing Website can be difficult to use. The T-REX Center created a self-administered questionnaire, which tests the participants' ability to find specific information on Website and asks for the path used to retrieve this information. Reporting software was installed on the server to process Website log files and produce comprehensive reports, including: general statistics, resources accessed, visitors and demographics, activity statistics, referrers and keywords, browsers and platforms. During calendar year 2000, the T-REX Website received approximately 62,000 page visits or hits by users. The number of hits is projected to near 100,000 in calendar year 2001.

FUTURE PLANS

The process of collection, organization, and dissemination of this public information is complex and time-consuming. The overarching goal for the T-REX Center is to become the permanent repository and principal distributor of documents and information on the transport of radioactive wastes and materials. In striving to attain this goal, the T-REX Center will ensure that Non-DOE and DOE stakeholder groups routinely include the T-REX Center on their document distribution lists for both paper and electronic documents. In addition, the T-REX Center will solicit stakeholders (i.e. citizen advisory boards, national laboratories and government agencies) completed documents and information to add to the Virtual Library. To institutionalize this work practice, the T-REX staff will run a pilot test during FY 2002 with selected stakeholder groups to determine the most reliable process for the automatic information distribution to the T-REX Center. These documents will then be entered into T-REXDEX, the Website's searchable document database.

The recent trend toward international standards and collaboration regarding the transport of radioactive wastes and materials is changing the focus of the T-REX Virtual Library. Some of the T-REX Website already has been translated into the Spanish language. Recursos en Español: or Resources in Spanish are located at <http://trex-center.org/spanish.asp>. If the trend toward international cooperation continues, other sections also may be translated into Spanish and possibly French. The T-REX Center will add any additional international features as they are developed.

In an effort to continue to well serve stakeholders and patrons of the Virtual Library, the T-REX Center will conduct an assessment of user information needs in FY 2002. The results of the assessment interviews will provide feedback that could spark the creation of new information products and features. The assessment will also serve as an outreach function to stakeholders. The T-REX Center will continue the addition of updated material, monitoring, maintenance and editing of the Website, and the development of additional products and features. As an example, an Annotated Bibliography on Emergency Management of Radioactive and Hazardous Materials Transport being prepared that will include emergency preparedness, emergency response, and mitigation.

The renewed attention on nuclear policy issues has increased the demand for available, timely, and accurate public outreach and information that the T-REX Virtual Library provides. The T-REX Center will continue as a national and international information clearinghouse. To ensure that stakeholders have the information they need and that the information is provided with maximum efficiency, user friendliness, and reliability, the T-REX Center will continue to offer reference and research assistance without charge. The T-REX Center is positioned as a public interface for public outreach. The T-REX Virtual Library is a vital conduit linking those stakeholders who are in need of information and those who produce public information on issues about radioactive waste transport.

LIST OF TABLES

TABLE I: Types of Information Problems Identified by Stakeholders and the Corresponding TRAM Features

TABLE II: Information Gaps Identified by Stakeholders and Corresponding TRAM Features

TABLE I: Types of Information Problems Identified by Stakeholders and the Corresponding TRAM Features

Information Problem Type	TRAM Feature
Hard to get	All information available about the organizations involved in the transport of radioactive materials on the Internet can be found in the TRAM.
Hard to use Too voluminous or lengthy Too fragmented Not flexible/searchable	The TRAM is searchable on four levels: Major function of the group, minor function, scope of work and Internal/External DOE status.
Apparently does not exist Never collected Collected in the wrong units Classified	The limited keywords supplied by the TRAM will guide users through performing more precise searches than if users were to conduct searches through free keyword terms.

TABLE II: Information Gaps Identified by Stakeholders and Corresponding TRAM Features

Information Gap	TRAM Feature
State, Federal and International Regulations	Searchable by organizations that create, enforce or interpret Laws and Regulations at the International, National, State or DOE Site levels.
DOE Employee Database, searchable by Responsibility and/or Expertise	Searchable by area of expertise and provides individual contact information when the expert is located.
Future Shipments	Searchable by Waste Generators and DOE sites. These groups frequently have a projected shipments component on their Web sites.
Packaging Availability	Searchable by organizations that develop, test, certify or track packages.
Accident/Risk Data	Searchable by organizations that analyze incidents, assess safety, risks or health effects and improve safety.
DOE Decisions on Routes and Programs	Searchable by organizations that determine routes, enforce route requirements and maintain historic or predict future shipments by route.
A List of Identified Shippers	Searchable by carriers in the areas of air, sea, truck, rail or inter-modal in conjunction with the levels of [DOE] site, state, national or international shipments.
Materials/Funding Available for Training	Searchable by Emergency Management Training according to the levels: [DOE] site, state, national, or international.