A Web-Site to Demonstrate the
Safety of Radioactive Material Transportation Packages

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INTRODUCTION

The U.S. Department of Energy National Transportation Program (NTP) is committed to dissemination of accurate and reliable information about radioactive material (RAM) transportation. Pursuant to this commitment, NTP has sponsored the development of SAFE, a web-based tool, by Sandia National Laboratories (SNL) for demonstrating to the public, the media, stakeholders, and interested parties the safety of the transportation of radioactive materials. Recent public interactions during shipment campaigns have indicated a need for improved means of communicating the high level of safety inherent in compliance with current regulations and practices. This paper describes the SAFE web-site (Figure 1) and the philosophy behind its development. In addition, it shows how it can be used to improve communication about RAM transportation.

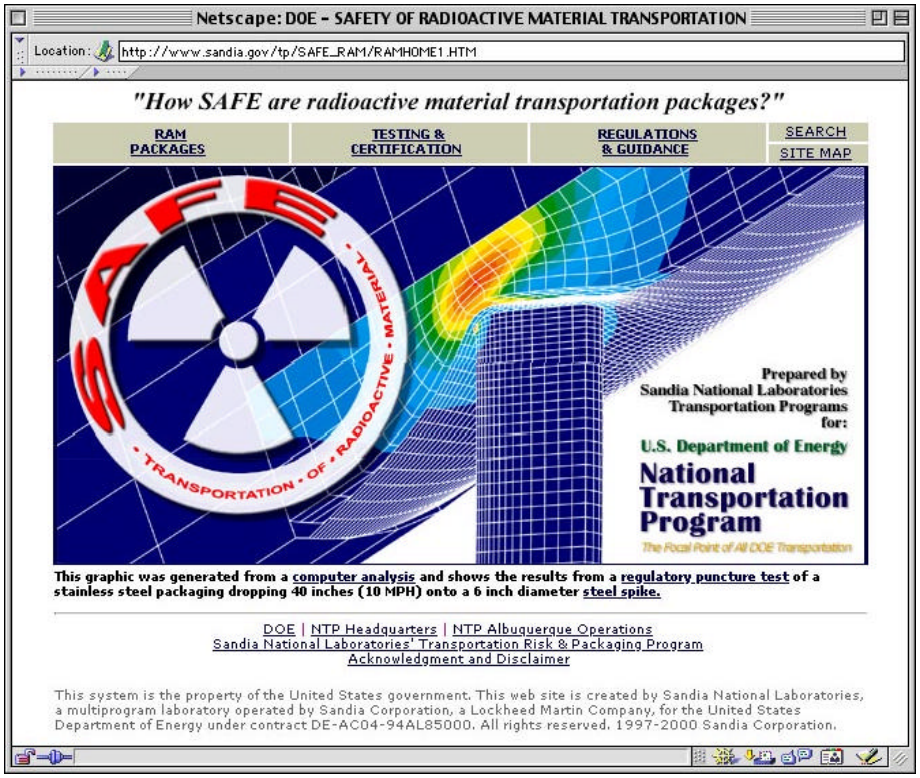

Figure 1: Home Page of the SAFE Web-Site

[1] Sandia National Laboratories is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy under Contract DE-AC04-94AL85000.

The SAFE web-site, located at http://www.sandia.gov/tp/SAFE_RAM/RAMHOME1.HTM is divided into three main areas: RAM Packages, Testing and Certification, and Regulations and Guidance. The RAM Packages area (Figure 2) provides information on packages, regulations, modes of transportation, shippers, carriers, and regulators.

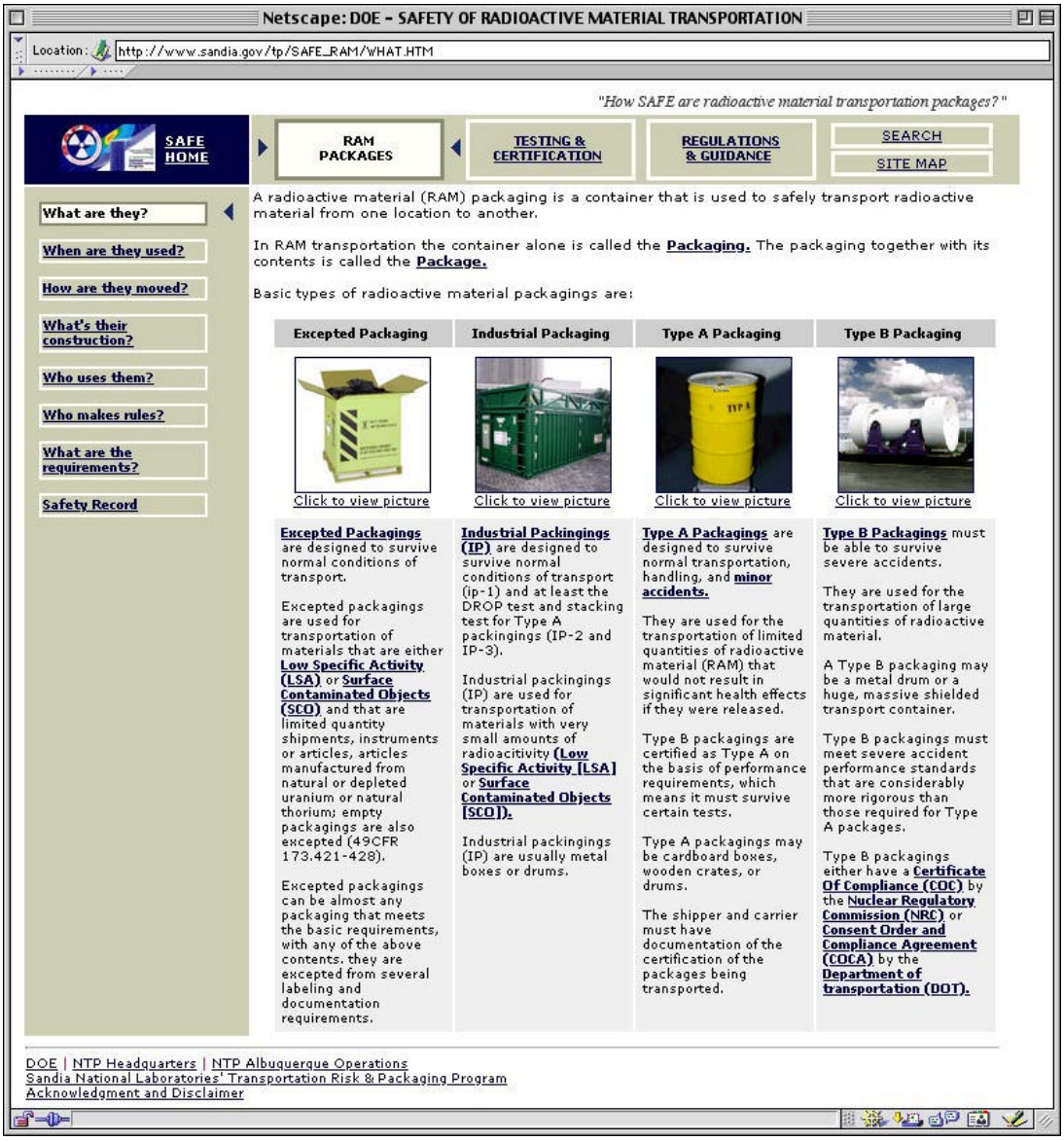

Figure 2: First Page of the RAM Packages area

The Testing and Certification (Figure 3) area provides information on package testing and certification, examples of severe testing, and comparisons of five test requirements to five real-life accidents, which demonstrate the true rigor of the Hypothetical Accident Conditions (drop, crush, puncture, fire, and immersion). The Regulations and Guidance area (Figure 4) provides resources that are useful for individuals who want to learn more about radioactive materials, links to specific on-line regulations, and links to regulatory agencies.

The user has the ability to navigate through the content in this web-site in a linear or non-linear manner. The Graphic User Interface (GUI) allows the user to obtain information on the transportation of RAM and packagings in easily understood text accompanied by illustrative graphics, photos and videos. There is also an embedded Glossary of Nuclear Terms.

One benefit of this web-based tool is that it can address stakeholder concerns related to packaging and transportation of radioactive materials and answer the question: *"How safe is safe, in radioactive material transportation and packaging?"*

Figure 3: First Page of the Testing and Certification area

Considerable attention has been paid to making the SAFE web-site easily to navigate and useful for teaching and demonstration purposes. For example, all of the videos have been converted to ".avi" format to make them maximally compatible with individual user PC configurations, including older configurations. Because of these goals, permission to download and copy all material is granted provided SNL and DOE are given proper attribution.

Figure 4: First Page of the Regulations and Guidance area

SAMPLE APPLICATION

The following is an example of the use of the SAFE web-site to illustrate basic principles of RAM transportation. One often hears this question regarding the impact test for certification – "How could a 30-mph test be rigorous? Highway speeds are much higher." If one goes to the Testing and Certification area main page (Figure 3), one sees the "Package Certification" field with three thumbnails (small pictures), the first one of which is titled "Full-Scale Tests." Clicking on this thumbnail brings up a page that shows five thumbnails, the first one of which is titled "Free Drop Test" (Figure 5). The text under that thumbnail clearly states that:

> *"Dropping a package from 30 feet onto an unyielding target (the unyielding target forces all of the deformation to be in the package, none in the target). The speed on impact is 44 feet per second or 30 miles per hour."*

Because the important term "unyielding target" is one with which the average member of the public is generally not familiar, it is highlighted; clicking on it brings up an illustration of the Sandia target (a 16x36x24-ft rectangular solid of reinforced concrete covered with armor plate).

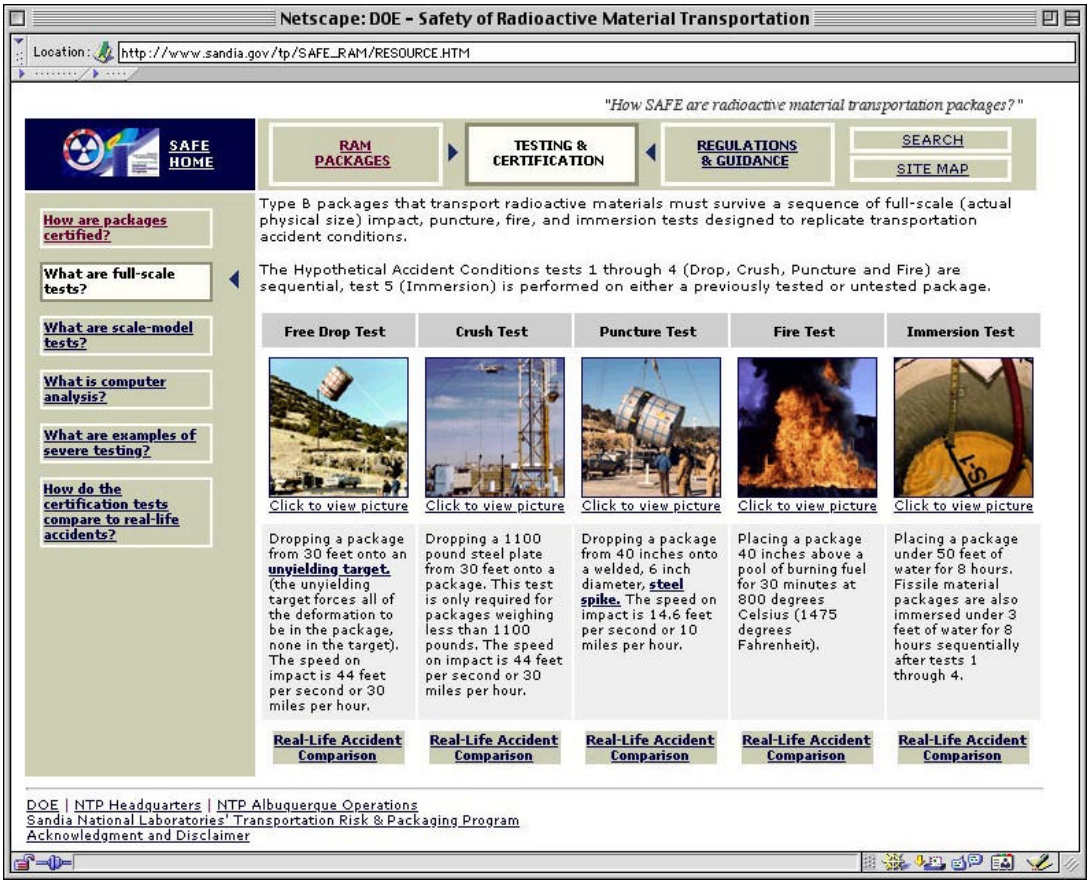

Figure 5: Full-scale Test page in Testing & Certification area

The strong and massive nature of the target, which explains why the package alone absorbs all the deformation forces, is thus graphically illustrated. Finally, the "Real-Life Accident Comparisons" button at the bottom of the field leads to additional text and graphics that show how most of the impact forces in real-life accidents, even at higher speeds, are absorbed by other vehicles and surfaces rather than the RAM package. Thus, a logical train of thought can be unambiguously pursued, via SAFE's GUI; such a pursuit leads to a wealth of textual explanation with embedded graphics constructed so as to consist of a coherent, connected series of web pages, regardless of the user's query or starting point.

SUMMARY

The SAFE web-site developed by Sandia National Laboratories under DOE NTP sponsorship is designed to be a tool for the dissemination of information about RAM transportation to stakeholders, members of the public, and other interested parties. SAFE contains clearly written text, graphics, photometric data, videos, etc. arranged within an easily navigable GUI to communicate the factual and conceptual frameworks that underlie RAM transportation safety in the United States.