



SRS Citizens Advisory Board

Risk Management Working Group - Team A

Meeting Summary

July 21, 1999
District Office of DHEC
Aiken, SC

Team A – Risk Analysis – of the Risk Management Working Group met on Wednesday, July 21, 5:00 p.m. at the District Office of the Department of Health and Environmental Control (DHEC), Aiken, S.C. The purpose of the meeting was to discuss transportation risk analysis, matrix definition changes and the path forward. Those in attendance were:

Stakeholders

Jennifer Hughes, DHEC
Jerry Devitt
Todd Crawford
Martha Ebra
Lee Poe

DOE/Contractors

Jerry Nelsen, DOE
Roy McLain, DOE
Gerry May, DOE
Carl Sossman, WSMS
Douglas Cramer, WSMS
George Morton, WSMS
Erich Opperman, SRTC
Jim Moore, WSRC

Jennifer Hughes, Team A Lead, welcomed those in attendance and asked them to introduce themselves. Jim Moore stated that Lynne McGrath had called and said she could not make the meeting and would like copies of all the handouts. Ms. Hughes reviewed the evening's agenda and then asked Erich Opperman, SRTC, for the presentation on transportation packaging risk analysis.

Mr. Opperman stated that his presentation was on Radioactive Material (RAM) Transportation Packaging on the SRS. He said that before he talked about packaging on site, he needed to talk about packaging requirements off site.

Mr. Opperman stated that the Department of Energy (DOE) ships approximately 600,000 items annually of which only about 4% or 24,000 are Hazardous Materials. Modes of transportation are 78% by Air, 12% by truck and less than 1% by rail. Radioactive shipments are made up of 55% medical/research isotopes, 15% waste, 11% uranium compounds, 2% nuclear fuel; .02% spent (irradiated) fuel and approximately 17% miscellaneous and empty containers. This data is based on 1994 data.

The Department of Transportation (DOT) regulates shipments of hazardous materials in commerce. DOE safety is based on understanding the material shipped by identifying, categorizing the hazard, packaging, markings, labels, and placard and shipping papers. Transportation requirements are based on the International Atomic Energy Agency (IAEA) Safety Series 6 (SS6) regulations, DOT 49 CFR 171-180 (173 Radioactive) and Nuclear Regulatory Commission (NRC) 10 CFR 71. The Regulations are Performance Based with primary safety provided by the package – Containment, Shielding and Subcriticality.

A graded approach is applied to RAM transportation packaging as follows:

- Low curie – Industrial Packaging
- Medium curie – Type A Packaging
- High curie – Type B Packaging

Mr. Opperman showed pictures of examples of the different Packages.

Mr. Opperman referenced the Type B packaging and certification and reviewed the different testing methods used to verify Type B package performance. They were: Dropping from 30 feet, Crush Test with a 1100 lb. plate dropped 30 ft, Dropped 40 inches on a six inch steel pin, Burned for 30 minutes and Immersion. Development and certification of new Type B packaging takes three to five years and many millions of dollars. The Safety Analysis Report for Packaging (SARP) demonstrates the package design meets the performance standards of 10 CFR 71 and covers the following areas: General, Structural, Thermal, Containment, Shielding, Criticality, Operations, Acceptance Tests & Maintenance and Quality Assurance. Structural criteria requirements are graded or categorized according to curie level, the higher the curie level, the greater the requirements. Mr. Opperman showed pictures of actual accidents and staged accidents where the Package remained in sound condition even though the mode of transportation was destroyed.

DOE follows the DOT regulations for off site shipment of all hazardous materials and NRC regulations for Type B packages. The 9975 Type B package is used to ship plutonium oxides and metals.

Mr. Opperman stated that on site, hazardous material is transported in accordance with DOE 460.1A within the "access controlled" boundaries of the SRS. Because of the controlled areas of the site, guidance is specified to be "equivalent to" the performance provided by DOT packaging. DOE guidance considers Containment, Communications and Control. Mr. Poe asked if he could see the documentation that showed the comparison between the DOT packaging and the DOE "equivalent to" packaging.

There are approximately 40 different on site package designs for transfer of RAM. DOT packages are used when technically, economically and ALARA practical. Alternate Onsite Packages are used if DOE packaging is not appropriate. Some examples of credible events for onsite truck transfers less than 1000 miles/yr. are as follows:

	<u>Off Normal</u>	<u>Emergency</u>	<u>(DOT/NRC)</u>
Free Drop	5 ft.	15 ft.	(30 ft.)
Puncture	6 in.	20 in.	(40 in.)
Fire	5 min.	15 min.	(30 min.)

The process for documentation and approval for Alternate Onsite Packages is comparative to the DOT/NRC process. The conditions bracket 99.7% of the accident scenarios.

Radiation exposure criteria for Alternate Type B packages for both SRS and DOT are as follows:

<u>Credible Event</u>	<u>SRS Limit</u>	<u>DOT Limit</u>
Normal	200 mrem/yr	5000 mrem/event
Anticipated	500 mrem/yr	
Off-Normal	2000 mrem/yr	5000 mrem/event
Emergency	5000 mrem/yr	

In summary, Mr. Opperman stated:

Off Site: DOT specifies safety in terms of three basic performance requirements: Containment, Shielding, and Subcriticality. For each requirement the package is evaluated under normal and hypothetical accident conditions of transport. On Site: Safety for SRS onsite RAM transfers is based on using DOT packaging, or by using Alternative Onsite Packaging with integrated safety equivalent to DOT. Safety is provided by the Package in combination with movement controls and emergency response communications under the actual transfer conditions.

Ms. Hughes asked George Morton to speak on frequency analysis. Mr. Morton, WSMS, stated that when someone wants a risk analysis on transportation, they normally come to him first to do a frequency analysis. If the frequency of an event is small enough then the consequences becomes of little or no real concern (even though the harm might be fairly large – like a comet hitting the site). Mr. Morton stated that the guidance and standards are found in WSRC 19Q Transportation Safety Manual, WSRC E7 Conduct of Engineering and Technical Support Manual and DOE-STD-3009-94 Preparation Guide for U.S. DOE non-reactor Nuclear Facility SARs.

The calculation process steps are establish input & assumptions, check assumptions with customer(s), compute results, technical verification, customer(s) review and final sign off. In each step of the process there is feedback for verification of accuracy. Examples of inputs were given such as the number of moves/year and the distance traveled, all road-track crossings well signaled, etc.

The general methodology applies a formula for an overall accident frequency as a sum of products of conditional probabilities (of ways that the accident can happen) and their respective frequencies of occurrence under the conditions given. Mr. Morton showed example of the statistics available by the Federal Railroad Administration (FRA). It is a standard practice to compare the SRS data with national road and railroad statistics to check for consistency.

Mr. Morton reviewed a real case example of waste shipped 2.0 miles on site one time in standard waste boxes securely strapped on a single flat bed truck. It was conservatively concluded the probability was less than $1E-6$. This indicated that it was safe to make the shipment without further packaging requirements. Mr. Morton stated that not all scenarios were that straightforward. Most answers require careful scenario developments, searching for the available statistics and an application of engineering judgement. Mr. Morton said that SRS has a build in safety margin. It is a controlled environment. Train speeds are slower; there is better control of roads and safer more responsible drivers in general.

After Mr. Morton's presentation, there was extensive discussion concerning the explanation on the difference between the off site requirements of DOT NRC packaging and the "equivalent to" DOE packaging requirements for SRS based on "access controlled boundaries of the Site". It was generally felt that the message projected by the DOT NRC packaging off site was very solid. This message was worth getting to the public. However it was felt that the DOE "equivalent to" packaging did not show as firm a story. The explanation was not clear. The team got the feeling that because the shipment was on site and frequency of accidents was very low, there was not the same effort of concern for safety. However, the team also knew that was not the case. There is considerable concern for safety on site. There were several approaches suggested as to how the explanation could be better developed. Some of the suggestions to improve the communications were:

- Develop a simple example or two showing the flow in parallel through both the requirements.
- Possibly use probability distribution to show difference between the two.

The matrix definitions, matrix and supplemental page were handed out. They had all the updates from the last meeting. Mr. Poe suggested that everyone spend some time reviewing the information before the review meeting in order to have relevant input. The changes in the definitions were pointed out to Mr. Crawford.

Ms. Hughes stated that the next meeting would be an update on the Integrated Priority List. Mr. Crawford stated that he would not be in town for the September 22 meeting. He asked if the meeting could be changed to October 6. With no objection, the meeting date was changed.

Ms. Hughes adjourned the meeting.

Meeting handouts may be obtained by calling 1-800-249-8155.