Quick Look and Final Trip Report

Travel Dates: March 10-16, 2007

Location: Vienna, Austria

Organization/Committee: International Atomic Energy Agency (IAEA)

Desired Outcome:

Development of a final draft guidance document for security of radioactive waste that provides a scheme for categorizing or prioritizing waste streams and determining the security measures required to protect these wastes. The document should be consistent with other draft IAEA documents such as the IAEA "*Code of Conduct on Safety and Security of Radioactive Sources*."

Results Achieved:

The desired results were achieved. A draft document that was consistent with the basic security approach in other IAEA documents was developed. The document provides a scheme for categorizing (graded approach) radioactive waste and identifies security measures for different security levels.

Summary of Trip:

On March 12 through 15, 2007, IAEA convened a Technical Meeting (TM) - 33122 in Vienna, Austria, to review and propose revisions to IAEA draft Nuclear Security Series Implementing Guide entitled, "Security of Radioactive Waste." The meeting was attended by approximately 30 representatives from 25 member States. Mr. Leigh from U.S. Department of Energy also attended and represented the U.S.

This meeting was hosted by Messrs. P. Legoux, IAEA Office of Nuclear Security and J. Rowat, IAEA Waste Safety Section. Mr. Legoux, the Scientific Secretary for TM-33122, convened the meeting and introduced the agenda and the terms of reference for this technical meeting. Agenda and terms of reference are enclosed for information. He highlighted that the development of enhanced security measures for radioactive waste has a relatively profile at IAEA, resulting from concerns that arose after the events of September 11, 2001.

The purpose of this implementing guide is to provide general guidance for Regulatory Authorities and waste facility operators to identify the measures required for the physical protection of radioactive waste within a graded system of protection based on the States evaluation of the threat. The specific objectives are: (1) to identify particular radioactive wastes that should be protected to prevent malevolent use; (2) to provide a security categorization scheme for radioactive wastes based on the potential to cause harm if used for malevolent purposes; and (3) to provide guidance on security measures within a graded system.

The technical meeting was divided into two working groups. The first working group was tasked with reviewing and revising the portion of the guidance document that determined which

radioactive materials were to be addressed by the guidance document, the number of security levels, and security level thresholds.

The first step in the process of establishing security requirements was the characterization of the activity of waste stored in a facility (i.e., the maximum expected inventory of radioactive waste in the facility and its corresponding radionuclide activity levels). Where appropriate, the facility may be divided into independent areas where the waste is located. For characterization purposes, a dimensionless number, $R_{i\ (individual)}$ for each radionuclide activity level was determined. This dimensionless number, R_i is a ratio of the specific radionuclide activity divided (scaled) by the corresponding "D" value as used in the *"Code of Conduct"* and "*Security of Radioactive Sources*" documents. A dimensionless number, $R_{t\ (total)}$ representing the hazard of the total activity was calculated by summing these scaled radioactivity levels to the "D" values. To be compatible with the security principles for radioactive sources developed from the "*Code of Conduct*," the same thresholds were used. In particular, the highest level of security is associated to a R_t value greater than 1000. Four categories of security were prescribed, ranging from security category W1 (highest level) to security category W4 (lowest level).

Using R_t, a default security category was then assigned for theft and another for radiological sabotage associated with the highest level of security that should be considered for the facility. This initial categorization assumed a worst case with the radioactive waste concentrated in a small volume and is dispersible. Because all facilities posed different risks, the application of modifying factors was developed to allow for a reduction in the security levels to an appropriate level based on the risk of the material. For theft, the initial security category could be reduced based on the weight of the package(s). Examples of other modifying factors that could be considered were the physical form of the material in the waste (solid, liquid, ashes, powder or granulate), concentration of the activity, combustibility, containment, toxicity, homogeneity of the radioactivity and accessibility of the material. The security categorization of the facility or independent area is the higher of the two categories for theft or for radiological sabotage.

The second working group was tasked with revising the draft guidance requirement's sections for the various security levels. For each corresponding security level, TM used the previous CSM documents and ensured security measures were compatible with draft IAEA document, "*Security of Radioactive Sources*."

Next Steps:

Because many of the IAEA documents used to develop this document were draft documents, IAEA staff plans to provide this document to other IAEA staff members for review to ensure the philosophy is consistent between documents. As part of their internal review, IAEA Scientific Secretary for this TM indicated that IAEA may elect to send this document to the TM participants for quick informal review to ensure that the document has not been significantly changed. On completion of the internal review and rewrite, the document will be sent out for 120 day member State review.

Policy Issues:

No new policy issues for the NRC were identified. The issue of IAEA's implementation of a sound process for developing security guidance documents continues to be raised. The

process would then address questions about the need for specific documents, the relationship between documents, and a review process to ensure consistency between documents.

No formal trip report will be prepared.

Contact Information:

Francis Young, Team Leader
Materials, Transportation, and Waste Security Branch
Division of Security Policy
Office of Nuclear Security and Incident Response

Enclosures:
1. Agenda
2. Terms of Reference