Quick-Look Trip Report: IAEA Headquarters, Vienna, Austria

Travel Dates: August 6–10, 2007

Location: IAEA Headquarters, Vienna, Austria

Organization/Committee:
International Atomic Energy Agency, Division of Nuclear Installation Security
Consultancy Meeting for Safety Guide DS-405

Desired Outcome:
The goal of this meeting was to provide NRC with a proactive and visible role in developing an international safety guide for siting nuclear installations in areas of potential volcanic hazards. NRC perspectives on risk-informed regulation were not included in a 1997 provisional IAEA safety standard on this subject. The desired outcome is that the revised IAEA safety guide incorporates risk-informed methods, which are consistent with NRC goals for regulating safety at nuclear installations in areas of potential hazards.

Results Achieved:
We successfully completed major revisions to the draft IAEA safety guide for volcanic hazards (DS-405). Although a preliminary draft of the safety guide was completed in November 2006, significant reorganization and revision were needed to clarify the guidance. The revised safety guide recommends a graded approach to assessing volcanic hazards, which can use deterministic or probabilistic methods. Either method must consider the effects of uncertainty in data and models, and provide a transparent basis for considering or precluding volcanic hazards as potential design basis events. The final draft of the IAEA safety guide appears consistent with NRC regulations for the risk-informed consideration of potential hazards in site evaluations.

Summary of Trip:
On August 6–10, I participated in an IAEA consultancy meeting to complete revisions to the draft safety guide "Volcanic Hazards in Site Evaluation for Nuclear Installations (DS 405)." Along with four other international experts, I had worked on the initial draft of this guide in previous meetings at IAEA in 2006.

Based on comments received from IAEA reviews of other draft safety guides, IAEA staff requested significant revisions to the organization and presentation of material in the draft volcanic hazards safety guide. A representative from the Japan Nuclear Energy Safety Organization also presented the results of a scoping study that used deterministic methods in the draft safety guide to assess volcanic hazards at two undeveloped sites. IAEA staff requested that we incorporate insights from this study into our revisions, as warranted.

We significantly revised the guide to provide clear guidance on using a graded approach to assess potential volcanic hazards at a site. These revisions were strengthened by insights from the scoping study conducted by the Japan Nuclear Energy Safety Organization. Initial screening for potential hazards can generally use existing information to determine if a future eruption is credible in a region. If a future eruption appears credible, the physical characteristics of volcanic eruption phenomena then should be used to identify a subset that appears capable of reaching the site. Subsequent analyses may need to consider the likelihood of only those specific hazards occurring, or need more detailed information.

The recommended approach for initial screening on conditional hazard is different from most other external hazard analyses, which first screen on the likelihood of the hazardous event occurring. This approach was developed because volcanic events are infrequent and have limited historical occurrence. Uncertainties associated with estimating event likelihoods are relatively large. In contrast, the physical characteristics of potential hazards (e.g., lava flow lengths) can be readily determined from the geologic record and have relatively small uncertainties. Thus, initial screening on conditional hazard, rather than hazard likelihood, provides a less uncertain basis for decision making. This approach also increases efficiency by reducing the need to extensively characterize volcanic phenomena that are physically unable to extend to a site.

We also developed or significantly revised additional guidance on assessing uncertainties in the geologic record, determining the capability of a volcano to produce hazards, and on using deterministic and probabilistic approaches for volcanic hazards assessment. We revised the recommendations for active measurements of volcanic phenomena and included guidance for quality assurance programs. Revisions to the draft safety guide were agreed to by all participants during the meeting, and final revisions were completed by the end of meeting.

This quick-look report documents the results of this trip and no additional reporting is planned.

Next Steps:
IAEA will complete editorial and external peer reviews of the draft safety guide, with the goal of submitting the preliminary safety guide to the IAEA Nuclear Safety Standards Committee in the Spring of 2008. The consultant team may need to respond to comments from the external reviewers or the Nuclear Safety Standards Committee before the safety guide is circulated to member states for consideration.

Policy Issues:
No policy issues or other items of Commission interest were raised at this meeting.

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