Quick-Look Trip Report: IAEA Consultancy Meeting for Draft Safety Guide DS-405

Travel Dates: March 13–22, 2009

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:
Our goal for this meeting was to provide NRC with a proactive and visible role in developing an international safety guide for evaluating volcanic hazards at sites of nuclear installations. NRC perspectives of risk-informed regulation were adopted in previous drafts of this Safety Standard due to Dr. Hill's prior participation. The desired outcome is a final draft IAEA Safety Standard that is consistent with NRC goals for risk-informed regulation and safe operation of nuclear installations.

Results Achieved:
The team successfully completed revisions to the draft IAEA safety guide on "Volcanic Hazards in the Site Evaluation for Nuclear Installations" (DS-405). These revisions addressed concerns about the need to develop a safety guide for volcanic hazards, and resolved external review comments. The final draft of the IAEA safety guide is consistent with NRC regulatory perspectives for the risk-informed consideration of potential natural hazards in site evaluations.

Summary of Trip:
On March 13–22, I participated in an IAEA consultancy meeting to finalize revisions to the draft safety guide "Volcanic Hazards in Site Evaluation for Nuclear Installations (DS 405)." Along with four other international experts, I worked on the initial draft of this guide in previous meetings at IAEA in 2006 and 2007. The initial draft was discussed, but not formally submitted, to the IAEA Nuclear Safety Standards Committee (NUSSC) in October 2008. The NUSSC recommended strengthening the basis for needing a safety guide for assessing volcanic hazards, and requested review of the draft guide by several internationally recognized experts in volcanology.

Several NUSSC members had raised concerns about the need for this safety guide, because they believed nuclear installations should not be sited near volcanoes. To address these concerns, we strengthened the linkage between the draft guide and over-arching IAEA safety and site evaluation requirements that explicitly discuss volcanism as a potential site characterization issue. We also clarified criteria for determining if old volcanoes have a reasonable potential to erupt in the future, and provided additional discussion on methods to determine if potentially hazardous phenomena could reach the installation site if an eruption occurred. The graded approach for the evaluation of potential volcanic hazards is consistent with approaches used to assess other natural hazards, such as earthquakes or tsunamis.

We resolved technical comments on the draft safety guide that resulted from detailed reviews by three internationally recognized experts in volcanology. Most significantly, we expanded on the need to develop a conceptual model for volcanism in areas with a reasonable potential for future activity. This model provides an important framework to consider how past patterns of activity can be extrapolated to the future. Because volcanic events are infrequent, long-term changes in the geologic setting can affect trends in past patterns of activity. These potential changes must be considered before recurrence rates of past events can be extrapolated to the future.

Volcanic eruptions can produce a wider variety of potentially hazardous phenomena than other natural events, such as earthquakes. Both deterministic and probabilistic methods can be used to assess whether volcanic phenomena have the potential to reach the site, and affect design bases or site

suitability. In response to review comments, we expanded the discussion on different types of deterministic and probabilistic methods that can be used to assess potentially hazardous phenomena. Although deterministic methods often rely on observations from volcanoes to establish maximum distances phenomena can travel from a volcano, numerical models also can be used deterministically to establish these distances.

The draft safety guide has a new section that recognizes the level of support needed in the hazards assessment should be proportionate to the level of hazard represented by the nuclear installation, with nuclear power plants representing the highest hazard category. Thus, simplified methods based on past observations may be sufficient to assess potential volcanic hazards for installations in a low hazard category, whereas detailed site-specific assessments may be needed for an installation in a high hazard category. This approach integrates seamlessly with the graded approach used in the draft safety guide to assess potential volcanic hazards, and appears consistent with a risk-informed regulatory approach to hazard assessment for natural events.

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

Next Steps:
IAEA plans to complete editorial reviews of the draft safety guide and submit it to the NUSSC for consideration in the June 2009 meeting. If approved by the NUSSC, IAEA plans to submit the draft safety guide to Member States in July 2009 and receive their comments by December 2009.

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

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