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Current Issues in Siting Safety Reviews

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Siting Safety Review Challenges

- Completed 3 ESPs, in progress 1 ESP and 6 COL/partial COL applications to date
- Some common challenges emerging in hydrology, seismology, meteorology and geotechnical engineering
 - Level of Detail
 - Technical Sufficiency

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Groundwater Hydrology

- The groundwater flow and transport analyses presented in the ESP/COL applications are sometime too laconic and missing important details:
 - Requisite detail obtained through the RAI or Open Item process, however with a substantial schedule burden.
 - Applications should discuss site conceptual models, and provide alternate interpretations of flow pathways given field data uncertainty.
- Key assumptions of groundwater flow, especially post-construction, may require detailed analysis including use of a groundwater model.

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 **Surface Water Hydrology**

- The PMF and dam-failure flooding reviews represent a significant percentage of NRC staff resources for the current ESP/COLs.
- For ESP/COL applications, design-basis hydrology events should be estimated using a hierarchical approach.
 - A bounding and/or simplistic approach to demonstrate that a site meets a design criterion is acceptable and preferred.
 - If a computer model is used:
 - Off-the-shelf software facilitates the NRC staff review and decreases review schedule uncertainty.
 - Software should be readily available for NRC staff use.
 - Solution methods, a complete user's guide, and validation tests procedures should be docketed, and ADAMS controls exist to handle proprietary information.
 - Source code control measures must follow the QAP.

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 **Seismology**

- Probabilistic Seismic Hazards Analysis main focus of staff review.
- Industry proactively updated the ground motion attenuation models in 2004.
- Several applicants also properly updated important seismic source zones
 - New Madrid
 - Charleston
- More attention needed to other source zones

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 **Source Zone Characterization**

- Regulatory guidance permits use of 1986 EPRI PSHA model as a starting point
- New seismic information must also be considered
 - Led to New Madrid, Charleston updates
- Some applications limit consideration of new information
 - Newer hazard studies exist (regional PSHAs or PSHAs for other critical structures)
 - More recent published scientific interpretations
- PSHAs are analysis-intensive

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 **Geotechnical Engineering**

- Complete site characterization essential to begin meaningful review
- Soil site reviews especially challenging
 - Soil dynamic testing
 - Soil-structure interaction
 - Backfill testing
- Many COL applications to date for soil sites lacking in some areas
- Many applicants delaying submittal of key geotechnical data/analysis until later in the application review

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 **Geotechnical Engineering: Areas needing closer attention**

- Complete soil dynamic testing
- Complete dewatering plans
- Complete excavation plans
- Proper consideration of settlement and heave
- Detail of backfill source and testing with ITAAC for compaction after backfill placed

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 **Meteorology**

- Selection of site characteristics
 - 100-year return period
 - Historically reported extreme values
- Impacts of mechanical draft cooling tower operation on plant design and operation
 - Increases in ambient temperature and moisture
 - Moisture and salt deposition
- Input assumptions and parameters for analytical models
 - Control room atmospheric dispersion analysis
 - Cooling tower plume analysis

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Actions to Address Issues

- Industry and NRC continue work to address common issues generically:
 - Closure has been achieved on a number of topics:
 - Soil dynamic testing Interim Staff Guidance issued permitting submittal before full testing is complete
 - High frequency ground motion and evaluation
 - Issues under discussion:
 - Process for updating existing seismic hazard information
 - Formulation of a backfill ITAAC
- Pre-application activities and interactions between the applicant and NRC staff have been useful:
 - To promote an early exchange of technical information
 - Facilitate scheduling of NRC resources to complete the COL/ESP review.

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