

The background of the slide features a silhouette of a person climbing a dark rock face on the right side. The sun is low on the horizon, creating a bright orange and yellow glow with a starburst effect. The overall scene is set against a dark sky and a hazy landscape of mountains in the distance.

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Third-Party NPP Oversight Options for Newcomer Countries

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ADVANCING CLEAN, SAFE ENERGY TECHNOLOGY

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NUMARK is a technical support contractor assisting nuclear regulatory authorities and private sector clients worldwide in the safety, environmental, and security areas. Our services include the development of regulatory infrastructure; review of license applications and amendment requests; training and procedure development; regulatory research supporting both advanced reactors and existing light water reactors; inspection support; and licensee performance assessment.

NUMARK has served as a Technical Support Organization to the US Nuclear Regulatory Commission since 2007 and the UAE Federal Authority for Nuclear Regulation since 2010. In parallel with its nuclear-related services, NUMARK supports the U.S. Agency for International Development in global projects addressing Clean Energy, Energy Poverty, Energy Sector Governance and Reform, and Energy Security.



Where do we want to be?

- NPP units sited, designed, constructed and operated with the confidence of the utility customer and the regulatory bodies that oversight comparable to that of the leading regulatory bodies and INPO/WANO is in place and effective.

Consideration of Regulatory Oversight Options for Newcomer Countries

- Full regulatory body staffing of NRC-like capabilities
- Technical Support Organization (TSO) funded by regulatory body to augment staff capabilities
- Independent TSO funded by regulatory bodies to augment regulatory bodies' staffs
- **Third-party licensing oversight required by regulators to develop safety evaluation (SER) [funded by owner or vendors but managed by regulator]**
- Third-party construction/manufacturing oversight (could include Lloyd's Register shipbuilding model for parts of construction/manufacturing)
- Third-party oversight of training, startup, operations

USNRC Experience with Third-Party Oversight

- ASME Code implementation overseen by National Board of Boiler and Pressure Vessel Inspectors
- A few past NRC Orders issued for root-cause analysis of management issues at NPPs
- INPO Accreditation - National Academy for Nuclear Training
- Independent Design Verification Program – Qualified third-party contracted by Operating License applicant to determine, before startup was authorized, whether the plant design had been carried out in conformance with the application and NRC requirements

Origin of NRC IDVP

- An intensive Integrated Design Inspection was performed by the NRC at a number of the 30 units completed after the TMI accident
- A team of a dozen or more NRC inspectors and specialist contractors spent several person-months off-site and on-site reviewing and questioning the adequacy of calculations and equipment that performed key safety functions in an accident environment
- For the off-normal conditions postulated, the equipment could not be shown to be satisfactory by test, so an examination of the design calculations was required

Origin of NRC IDVP - 2

- Limerick plant proposed that they contract for a third-party inspection to establish design adequacy
- An architect-engineer firm not associated with the Limerick project or vendor was proposed as the third-party inspector
- This concept was approved by NRC and successfully implemented with periodic NRC inspections to assure that the independent review was being carried out in accordance with the proposal
- This process was successfully implemented during several other Operating License reviews (NRC Manual Chapter 2535)

Potential for Application of Third-Party Regulatory Reviews in Newcomer Countries

- Third-Party regulatory review
 - Construction License
 - Operating License
 - Vendor Design Certification
- Advantages
 - Leverages limited regulatory agency resources by requiring owner (or the vendor) to fund the third-party review, which would be overseen by the regulatory body
 - Could provide a faster time line for a design certification than a certification from established regulatory bodies
 - Oversight cost becomes part of the business case for the new design

Third-Party Regulatory Oversight Organization Qualifications

- Independence from NPP enterprise (vendor/architect-engineer/plant owner) organizations
- Technical competence to review, qualitatively (and, if needed, quantitatively) the entire spectrum of SAR topics - see NUREG-0800 LWR topics, for example
- Regulatory competence to assure that the resulting Safety Evaluation Report presented to the host country satisfies national requirements and IAEA guidance
- Management competence to assure a uniform high quality product and coordinate the large number of contributing technical disciplines

Conclusion

- Many regulatory oversight approaches can work (and have worked)
- Reliance on the methods of established regulatory programs will not, I think, provide a timely path for nuclear power to meet the need for a carbon-free future on a global scale
- To address the multiple new reactor designs and the large potential number of newcomer countries, new approaches to regulatory oversight need to be examined
- My view is that these new approaches can most efficiently come from nuclear industry initiatives