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TSO SUPPORT TO SAFETY AUTHORITIES IN EMERGENT NUCLEAR COUNTRIES

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OVERVIEW

- Background on Utilization of Technical Support Organizations (TSO)
- TSO Utilization Prerequisites
- Scope of TSO Services
- TSO Organizational Options

BACKGROUND ON UTILIZATION OF TSOs

TECHNICAL STAFFING WITHIN SAFETY AUTHORITIES

- Authorities have varying degrees of expertise on the different reactor technologies and in the licensing process
- May augment in-house staff with experts from other countries
- May hire TSOs to support in-house staff

ADVANTAGES OF USING TSOs

- Extensive range of technical resources
- Global NPP regulatory expertise
- Enables knowledge transfer, and reasonable time to develop internal staff and expertise, without delaying immediate program needs
- Flexibility of short- or long-term support
- Work performed locally or remotely
- Increases quality/effectiveness of technical review; enhances international institutional acceptance and public confidence

WHEN ARE TSOs UTILIZED?

- When is it needed:
  - To enhance technical capabilities of the safety authority
  - To develop regulatory processes and documents
  - To train in-house personnel
  - When administratively advantageous
- Well-suited to the needs of countries with emergent nuclear power programs

HOW ARE TSOs UTILIZED?

- Safety authority must possess minimum technical capabilities in house. Responsible for all decisions; must be competent to oversee its TSO(s). IAEA GSG-4 states:
  - The regulatory body should have, at a minimum, adequate core competence in every core regulatory function, in order to retain the ability both to frame and to manage its requests for advice and to comprehend and act on the advice when it is received.
- Authority selects and utilizes TSO(s) for various types of technical support and training
- Authority's use of foreign TSO services is parallel to operator/applicant importing reactor technologies from nuclear supplier states.

HOW ARE TSOs UTILIZED? (2)

- Variety of models, depending on needs of the agency:
  - Limited scope technical expertise, e.g. structural/seismic analysis
  - Broad scope, for all aspects of safety/environmental review;
  - Management expertise, including regulatory review strategy and implementation of the technical review
- Onsite vs. remote

TSO UTILIZATION PREREQUISITES

TSO PREREQUISITES

- Technical Capability and Experience
- Safety Culture, Independence
- Export License
- Confidentiality/Non-Disclosure of applicant's information and review results
- No Conflicts of Interest

AVOIDING CONFLICTS OF INTEREST

- Many TSOs also provide support to industry
- Varying approaches for avoiding conflict and ensuring regulator maintains independence:
  - Fully avoid having TSOs that also work for industry: create and fund a dedicated TSO
  - Utilize non-dedicated TSOs selectively: prohibit them from working on both sides, by applicant and/or by technical issue
  - Where sources are the most limited: utilize non-dedicated TSOs, and recognize/allow firewalls

TSO SCOPE OF SERVICES

PHASES OF TSO SUPPORT

Different phases of licensing may require different resources and skill mix:

- Initial phase: emphasis on developing the regulatory infrastructure
- Licensing review
- Inspection
- Operation

MANAGEMENT SUPPORT

- Regulatory strategy and implementation plan
- Development of regulatory infrastructure
  - Regulations and guides
  - Regulatory review instructions
  - Process and work instructions
- Management and organization
- Document Control
- Advisory support , e.g. in support of enforcement actions, licensing decisions

TECHNICAL SUPPORT

- Technical review of license application in various areas:
  - Electrical, mechanical, civil, structural, seismic, thermal-hydraulics, nuclear fuel, nuclear plant systems, radiation protection, technical specifications, safety analysis, and severe accidents
- Providing Safety Evaluation Reports
- Site and environmental reviews
- Fukushima lessons-learned
- Confirmatory Analysis

TECHNICAL SUPPORT (2)

- Training and knowledge transfer
- Project management, technical review management
- Staff augmentation
- Audits/inspections of suppliers
- On-site inspections during construction and operation

INTEGRATION SUPPORT

- Integration of the regulatory review:
  - Develop SER templates to ensure consistent review and documentation across all SAR sections
  - Develop processes, instructions and forms to guide the reviewers and ensure consistency in preparing SERs
  - Manage document control system to process SERs, RAIs, and applicant's submittals
- Systematic approach to licensing process

TSO DELIVERY CHALLENGES

- Adapting to the regulatory authority's licensing strategy and culture
- Blending expertise and skill sets to optimize quality, schedule, and cost constraints
- Performing work remotely and delivering work products across time zones
- Language and time zone differences

TSO
ORGANIZATIONAL OPTIONS

TYPES OF TSOs

- Government mandated organization (sometimes a single national TSO)
- Commercial entities
- Research organizations
- Academic experts; other individual experts

TSO ORGANIZATIONAL CHALLENGES

- Alignment with the safety authority's organization and management
- Provide single points of contact for the safety authority – technical, administrative, accounting, contracts
- Differences in culture and language

TSO ORGANIZATIONAL OPTIONS

- Options:
  - Single entity
  - Consortium or joint venture
  - Multiple TSOs
- Considerations:
  - Extent of resources available from TSO(s), and depth of expertise
  - Single point of contact with the safety authority vs. separate entities requiring coordination and cooperation
  - Safety authority command and control over TSO(s)
  - Document sharing and management among authority and TSO(s)
  - If multiple TSOs, may assign integration services to one

EXAMPLE
TSO FUNCTIONAL ORGANIZATION

- Project Manager: primary interface with the safety authority PM. Authorizes work for TSO personnel. Oversees budget, schedule, quality; supervises Technical Managers.
- Technical Managers: primary interface with the safety authority staff; lead the tasks, e.g. reviews of specific FSAR chapters; supervise technical personnel; responsible for budget, schedule, quality.
- Integration Manager: develop schedules; provide integrated status reports (budget, schedule, technical); develop formats for SERs, RAIs; develop processes and work instructions; oversee technical editing.
- Reviewers, inspectors, others

CONCLUSIONS

TSOs are important element for expanding the safe worldwide utilization of nuclear power, by:

- Providing expertise and review assistance to a safety authority in a cost-effective and timely manner;
- Allowing safety authorities to take advantage of past worldwide experience on the regulatory side, and avoid licensing pitfalls;
- Enhancing local and international acceptance of the authority's activities, as well as public confidence;
- Providing knowledge transfer and time for the authority to develop its own internal staffing and expertise.