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Radioactive Waste Management - It's not all Science and Engineering

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Science and engineering provide the necessary answer to the ultimate question in radioactive waste management and disposal: How safe is the management approach and the repository system? The credibility of that answer is founded on underlying processes and systems that demonstrate the reliability of the information used to answer this singularly important question. This technobureaucratic culture is often assumed to be effortless and is taken for granted, and assumptions like this can lead to unacceptable results.

These non-technical processes fall into two broad but related categories—regulatory compliance and information/knowledge management. In addition to specific technical regulatory requirements, in the United States (U.S.), the U.S. Nuclear Regulatory Commission (NRC) requires compliance with several abstract concepts that it views as essential to demonstrating that an organization has the requisite wherewithal to be a licensee, such as Nuclear Safety Culture, Safety Conscious Work Environment, and Quality Assurance. These concepts greatly influence all the technobureaucratic processes and systems that support the science and engineering work.

This paper presents a generic framework for an organization and the functions of the organizational elements necessary to execute a generic radioactive waste repository development effort. These organizational elements reflect a workforce's functional composition and the practices that facilitate meeting all of the NRC's expectations.

Successful implementation of a plan to develop a repository requires an effective organization and infrastructure designed to execute the effort in compliance with regulatory expectations. The discussions in this paper are based on the current U.S. statutory and regulatory framework. Notably, the context in which the organization's work will be conducted differs substantially from that of the typical research, development, and demonstration (RD&D) environment. First, there are work elements that are not customarily included in RD&D work, such as regulatory compliance, a corrective action program, technical configuration controls, and requirements/commitment management. Secondly, the rigor with which organizational assurance and quality assurance functions need to be applied and practiced is greater than necessary in the typical RD&D environment.

One all-too-frequently overlooked component of a compliance-oriented endeavor is the importance of having an outcome-aware management and business organization, technical support, and information management technologies. Successfully accomplishing such an endeavor requires more than world-class science and engineering. It is equally important that the technical team be supported by an experienced and proficient non-technical infrastructure.

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Country or International Organization

United States of America

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