USE OF INSTITUTIONAL CONTROLS BY FEDERAL ORGANIZATIONS IN THE U.S.

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ABSTRACT

A primary risk management goal for Federal agencies is protection of human health from exposure to hazardous materials in the environment. Although there is generally consensus among U.S. Federal agencies on the methods for evaluating risks associated with exposures to hazardous materials, risk management practices have evolved separately. All U.S. agencies use institutional controls as a long-term risk management tool for the disposal of hazardous materials. Regulatory programs depend in part on institutional controls to ensure the integrity of a disposal site is maintained. Yet the emphasis on institutional controls differs among the regulatory programs, as do the specific institutional control requirements. The poster session discusses and compares the historical evolution and current use of institutional controls developed by the U.S. Environmental Protection Agency (EPA), the U.S. Department of Energy (DOE), and the U.S. Nuclear Regulatory Commission (NRC) under their various statutory authorities.

INTRODUCTION

The primary Federal goal for long-term management of radioactive waste and property containing radioactive material is protection of the public and environment. Institutional controls -- actions taken by an institution for long-term site management and control -- are a necessary component of any disposal or control system; other components include natural and engineered barriers and source term controls (i.e., limits on radioactive concentrations or site inventories). Active institutional controls include controlling site access, performing maintenance or remedial actions, controlling or remediating releases, and disposal system monitoring. Passive institutional controls include land ownership or use requirements, markers, and public records, archives, or other methods of preserving knowledge of a site and its hazards.

BACKGROUND AND EVOLUTION OF REGULATORY SYSTEMS

Under the authority of the Atomic Energy Act (AEA), [1] the U.S. Federal government was responsible for the management and disposal of most radioactive material, except for uranium mill tailings. In 1954, the AEA was amended to allow for civilian possession of radioactive material under a licensing program; the Federal government continued its oversight and control of radioactive material and waste from its defense and research activities. In the 1950's and 60's operational considerations continued to be emphasized. Along with the creation of EPA, DOE and NRC in the1970's, more information on the health and environmental effects of exposure to radioactive materials became available; new Federal responsibilities and statutory requirements significantly changed the regulatory landscape. A greater emphasis was placed on public health and environmental protection after operations cease. Risks from non-radioactive hazardous materials was also considered.

Three Agencies have principal Federal responsibility for management of radioactive material and waste. EPA develops generally applicable standards for release of radioactive materials into the environment; site specific regulations to limit the releases from particular disposal facilities; regulates possession and disposal of non-radioactive hazardous materials, and regulates many remediation activities. DOE disposes of waste at its sites and conducts remediation and long-term care activities. NRC develops site-
specific regulations to limit releases from disposal facilities, licenses use of radioactive material, except by DOE, and disposal of radioactive waste, including disposal of particular wastes by DOE in particular facilities.

**PRINCIPAL FEDERAL REQUIREMENTS ADDRESSING INSTITUTIONAL CONTROLS FOR RADIOACTIVE WASTES AND RESIDUAL RADIOACTIVE MATERIAL**

The principal Federal requirements for institutional controls are defined in the following regulatory and guidance documents, developed primarily under the authority of the AEA and related statutes. Additional requirements may be imposed for some radioactive wastes or situations based on the requirements of the Resource Conservation and Recovery Act (RCRA) [2] or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), [3] otherwise known as Superfund. RCRA sets forth a framework for the management and disposal of non-hazardous solid wastes. Superfund is the Federal Government's program to clean up the nation's uncontrolled hazardous waste, from abandoned or active sites contaminated with hazardous or radioactive materials.

**High-Level Radioactive Waste, Transuranic Waste, and Spent Nuclear Fuel**

These regulations cover the disposal of the most highly radioactive wastes. EPA’s standard in 40 CFR 191 sets generally applicable standards for all three types of waste. The EPA regulation for the Waste Isolation Pilot Plant and NRC’s regulation for a HLW geologic repository implement 40 CFR 191. Active institutional controls are limited to 100 years for analysis purposes. Passive controls are required permanently, but limited effectiveness must be assumed for analysis.

2) NRC 10 CFR 60, Disposal of High-Level Radioactive Wastes in Geologic Repositories. [8]

**Uranium Mill Tailings**

These standards cover remediation and disposal for waste (or tailings) generated as a byproduct of the extraction of uranium or thorium from ore. EPA has established generally applicable environmental standards in 40 CFR 192 and NRC and DOE have developed regulations that implement EPA’s standard. Institutional controls are an essential feature for isolating the waste, and include both government ownership and a long-term care license which cannot be terminated.

1) EPA 40 CFR 192, Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings. [9]
2) DOE directives for remediation of uranium mill tailings and long-term surveillance and maintenance of uranium and thorium mill tailings. [10,11]
3) NRC 10 CFR 40, Domestic Licensing of Source Material, including Appendix A, Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content. [12]
Low-Level Radioactive Waste

These standards cover the land disposal of low-level radioactive wastes, or wastes other than high-level waste, transuranic waste, spent nuclear fuel, or uranium mill tailings. This category also does not include wastes from naturally-occurring radioactive materials, or NORM. Active institutional controls are assumed effective for up to 100 years, and government ownership is required.

1) NRC 10 CFR 61, Licensing Requirements for Land Disposal of Radioactive Waste. [13]
2) DOE 435.1, Radioactive Waste Management, and DOE 5400.5, Radiation Protection of the Public and Environment. [14]

Property Released Under Restricted Use

These standards cover the control of property when a facility is decommissioned, or a site remediated. Institutional controls may be needed to ensure that any residual radioactivity will not affect public health and safety, or the environment. The standards below define the nature and extent of institutional controls.

(1) NRC Subpart E, Radiological Criteria for License Termination of 10 CFR 20, Standards for Protection Against Radiation. [15]
(2) DOE 5400.5, Radiological Protection of the Public and Environment. [16]

SUMMARY

Institutional controls are a necessary component of any risk management system. Active institutional controls protect against intrusion and ensure that a facility is performing as designed. Passive institutional controls are generally more long-term and assure that a facility will not be compromised by future intruders or forces of nature. Combined with other system components such as engineered and natural barriers and source term control, institutional controls help to assure protection of the public and the environment. Hence, although there are differences in the reliance on institutional controls for different wastes or situations, these differences should not be considered out of context. For example, although there is greater reliance on active institutional controls for long-term management of uranium mill tailings than for high-level radioactive waste or transuranic waste, the overall risk management system in all cases is protective of the public and the environment.

REFERENCES


FOOTNOTES

*EPA and NRC are developing standards for the proposed Yucca Mountain geologic repository in 10 CFR 63 and 40 CFR 197, respectively. 10 CFR 60 will not apply to Yucca Mountain. Neither will the disposal standards of 40 CFR 191.


*cThe Federal Register (FR) is a legal newspaper published every business day by the U.S. Federal government. It contains Federal agency regulations; proposed rules and notices; and Executive Orders, proclamations, and other Presidential documents.