



DOE-HDBK-1240-2021, Institutional Controls Implementation Handbook for Use with DOE P 454.1, *Use of Institutional Controls*

ERAD Presentation

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Institutional Controls



- What are Institutional Controls?
- What do Institutional Controls do?
- Why are Institutional Controls necessary?



Institutional Controls



- Implementation – programs and field offices
- Department of Energy (DOE) Policy (P) 454.1, *Use of Institutional Controls*
- DOE Order (O) 458.1, *Radiation Protection of the Public and the Environment*
- DOE O 435.1, *Radioactive Waste Management*



Institutional Controls



- DOE Site's Integrated Safety Management System (ISMS)
- Environmental Management System (EMS)
- Assist in facilitating cost-effective planning, implementation, and management review
- Look at use restrictions, radioactive waste disposal and management, facility operations, property storage, restoration, and closure



Policy Commitment



- DOE P 454.1 *Use of Institutional Controls*
 - Commitment to the effective and appropriate use of Institutional Controls.
 - Establishes general framework for consistent approach to use of Institutional Controls throughout the Department.
 - Recognizes that DOE sites need flexibility to tailor Institutional Controls to specific needs, jurisdictions, and time periods.
 - Delineates how DOE, including National Nuclear Safety Administration (NNSA) will use Institutional Controls in management of resources, facilities, and properties under its control and in the implementation of programmatic responsibilities.



Policy Commitment



- DOE use of Institutional Controls to:
 - Appropriately limit access to or uses of land, facilities, and other real and personal properties.
 - Protect the environment (cultural and natural resources).
 - Maintain the physical safety and security of facilities.
 - Prevent or limit inadvertent human and environmental exposure to residual contaminants and other hazards.



Policy Commitment



- Purpose of DOE P 454.1, to ensure that DOE Programs:
 - Reaffirm DOE-wide commitment to use Institutional Controls effectively.
 - Establish a consistent approach to the implementation, delegation, documentation, maintenance, and reevaluation of Institutional Controls as an integral part of missions and operational activities.
 - Integrate the use of well-designed effective and reliable tools to manage, monitor, and transfer real and personal property under DOE control.
 - Apply Institutional Controls in a cost-effective way and maximize the use of low-maintenance Institutional Controls to the extent possible.



Policy Commitment



- DOE P 454.1-Policy to encompass all topic-specific regulations, guidance documents, and the various Institutional Controls throughout DOE-consistent flexible policy framework.
- Institutional Controls may include:
 - Administrative or legal controls,
 - Physical barriers or markers,
 - Methods to preserve information and data, and
 - Inform current and future generations of hazards or risks.
- The Policy emphasizes that:
 - Diverse uses, requirements, and definitions of Institutional Controls exist,
 - Institutional Controls may overlap and differ, and
 - Institutional Controls need to be integrated effectively on a site-wide basis.



Policy Commitment



- ISMS and DOE P 450.4A, Integrated Safety Management Policy
- Core safety management functions:
 - Define the scope of work,
 - Analyze the hazards,
 - Develop and implement hazard controls,
 - Perform work within controls, and
 - Provide feedback for continuous improvement.



Planning for Institutional Controls



- Identify Institutional Controls for existing, new, or proposed programs and activities at DOE sites:
 - Radiation protection of workers, public, and the environment,
 - Radioactive waste management and disposal,
 - Environmental protection,
 - Environmental restoration and cleanup,
 - Cultural resources management and historical preservation,
 - Operational continuity and security,
 - Property asset management, and
 - Legacy management and stewardship.
- Appendix A has examples of statutes, regulations, and DOE directives for DOE Institutional Controls.



Classification of Institutional Controls at DOE



Type	Descriptions	Examples
Government Controls	Federal, State, local authority	Federal ownership, zoning restrictions, building permits, water restrictions
Proprietary Controls	Private property law, restrict or limit use	Easements, covenants, real estate use licenses/permits
Structural Controls	Manmade structures to control access; physical structures to limit access	Fences, gates, signs, monuments to warn of dangers or restrictions
Non-structural Controls	Rely on legal and administrative initiatives	Security, preventative maintenance inspections, employee training
Informational Controls	Inform current and future generations about past site activities, contaminated areas, sensitive areas, restricted areas	State and local registries of restricted properties; health advisories, publications, Visitor Centers
Active Controls	Significant presence of humans to fulfill safeguard and maintenance responsibilities	Security guards to monitor and control site access; environmental sampling to monitor contaminant migration
Passive Controls	Warn and inform future generations about nature and location of site hazard without significant human intervention	Permanent markers and monuments, barriers, public records and archives, Government ownership, land or resource use regulations.



Appendix B: Examples of Site-Wide Institutional Controls



Categories of Institutional Control	Types of Institutional Controls	Objective	Protects
Warning Notices	Signs, monuments	<ul style="list-style-type: none"> • Provide visual identification and warning of hazardous or sensitive areas. • Provide information on restrictions, access information, contact information, and emergency information. • Limit or restrict access to the site or portions of the site. 	<ul style="list-style-type: none"> • DOE employees • DOE contractors • Site visitors • Inadvertent intruders • Future generations
Entry and Access Restrictions	Procedural and Security Requirements for Access	<ul style="list-style-type: none"> • Control human access to hazardous or sensitive areas or property. • Ensure adequate training for those who enter hazardous or sensitive areas. • Avoid disturbance and exposure to hazardous waste. • Provide a basis for the enforcement of access restrictions. 	<ul style="list-style-type: none"> • DOE employees • DOE contractors • Site visitors • Inadvertent intruders



Planning for Institutional Controls



- DOE sites should consider the following, for example:
 - What levels and types of protective measures are appropriate?
 - How much redundancy (layers of protection) does each situation warrant?
 - How effectively will Institutional Controls address the specific conditions (e.g., prevent exposure to contaminated ground water) for a necessary period?
 - What are any unique public interest issues or stakeholder concerns?



Planning for Institutional Controls



- Sites will want to consider how Institutional Controls will survive future challenges in:
 - The status of property (change of ownership, transition/lifecycle);
 - Contamination (e.g., radioactive decay or changes in contaminant migration patterns);
 - Exposure pathways (e.g., cross media impacts);
 - Environmental conditions; or
 - Receptors (e.g., change in site use or demographics).



Planning for Institutional Controls



- Property considerations:
 - Control of hazards (e.g., contaminated soil),
 - Facility security, and
 - Protection of resources (e.g., historic sites, wetlands).
- Management of personal property:
 - Used to ensure the safety and security of chemicals, and
 - Limit exposure to the chemicals.
- Contribute to assurances that:
 - Excess or contaminated items are not released without proper authorization;
 - Equipment is not stolen; and
 - Valuable artifacts are protected.



Planning for Institutional Controls



- Examples:
 - Local zoning ordinances may not apply to activities on DOE-owned property where the Federal Government has exclusive jurisdiction due to Federal ownership and therefore may not be an effective control in a situation where continued Federal ownership is envisioned.
 - A wire fence with “No Trespassing” signs might be appropriate for remote sites with minimal potential for harm and a very low appeal to potential trespassers but may not be appropriate for a site that could be attractive to trespassers (e.g., for use of off-road vehicles or other recreational purposes). In this example, if the intrusion posed a significant risk, then additional controls should be considered. If the hazardous materials were not easily accessible (e.g., waste buried several meters below the surface) fencing may be unnecessary and a combination of signs and markers with use restrictions may be sufficient.



Planning for Institutional Controls



- Planning Checklist for Institutional Controls (partial list)
 - ✓ Document the site-specific risk exposure assumptions.
 - ✓ Describe expected future land use, as well as any known prohibited uses that might not be obvious based on anticipated land uses.
 - ✓ Describe the end state that currently is envisioned for the property.
 - ✓ Describe the need for the Institutional Controls (e.g., physical security, risk to public, site integrity, etc.).
 - ✓ State the performance objectives for the Institutional Controls.



Defense-in-Depth Approach



- Defense-in-Depth or Layering Approach
 - DOE P 454.1 DOE policy to use institutional controls as essential components of a defense-in-depth strategy that uses multiple, relatively independent layers of safety to protect human health and the environment.
 - If one institutional controls temporarily fails, other controls will remain in place or actions will be taken to mitigate the potential consequences of the failure.
 - Uses multiple layers of protection to ensure that safety is not dependent on any single element of design, construction maintenance (failure does not compromise safety, health, or environmental protection).
 - Prioritize primary group of controls and secondary group of controls as backup.



Defense-in-Depth Approach



- Two examples of how DOE sites apply a defense-in-depth strategy:
 - Federal ownership with continued DOE custody accountability for a disposal cell and surrounding buffer zone. It has restrictions on soil excavation and alteration of topography or vegetation in the area between buffer zone and site boundary.
 - Continued Federal ownership, compliance with State well-drilling regulations, notation on the Federal ownership record, interpretive center, and historic markers.



Defense in Depth/Layered Approach



- Redundant controls minimal where consequences of loss of Institutional Controls are expected to be small.
- Rigor of Institutional Controls commensurate with the hazard.
- Application of a graded approach during planning stages recognizes that specific factors affecting risk can vary from site-to-site.
- A graded approach allows DOE sites to tailor and layer choices of Institutional Controls from a variety of Institutional Controls that can be implemented.



Inventory of Institutional Controls



- Inventory of Institutional Controls:
 - DOE sites should have reliable inventory of all institutional controls in use.
 - DOE O 430.1C, *Real Property Management*, states Facilities Inventory Management System (FIMS) data must be maintained as complete and current throughout the life cycle of real property assets, including real property related to Institutional Controls.
 - Tracking systems identifies all land areas under restrictions or controls would be useful to develop or to expand.



Inventory of Institutional Controls



- Inventory of Institutional Controls:
 - Land-use plans and real property records.
- Real Property asset management, conducted in accordance with DOE O 430.1C, ensures that:
 - Pertinent real estate and records management activities are conducted consistent with applicable DOE directives.
 - Access constraints on DOE's comprehensive land and facility use planning process for current and future Institutional Controls are recognized and clearly understood.
- Close coordination with site Records Management and Classification offices.



Documentation of Institutional Controls



- Site office or program office management is responsible for maintaining institutional control information.
- Accessible, publically available documentation on DOE site's institutional controls will be of value to both current and future generations.



Monitoring and Periodic Assessment



- Plan-Do-Check-Act Cycle.
- Confirm effectiveness of the “Plan” and “Do” phases and to act on any necessary changes.
- Provide opportunities to analyze and review impacts of any changes to laws, regulations and directives. and ensure compliance.
- Sites ISMS/EMS assessments.
- Reevaluate stakeholders understanding of the situation, determine impacts of changes in resources.



Monitoring, Periodic Assessment, and Corrective Actions



- Complete program covering all facets of monitoring
- Process for periodic review and evaluation
- Provide DOE sites with valuable opportunities to gather information
- Evaluate whether assumptions made are still valid and protective of public health
- Re-evaluate whether the physical and organizational components of Institutional Controls will remain intact for the necessary period



Monitoring, Periodic Assessment and Corrective Actions



- Line management can be kept apprised of the conditions of Institutional Controls;
- Detect conditions that could promote failure;
- Respond to problems that may develop over time;
- Planned and conducted as part of a Site's ISMS/EMS assessment or part of existing site inspection;
- Monitoring, periodic assessment. and corrective actions should be documented;
- Recommend cost effective improvements; and
- Identify need to implement changes or corrective actions based on Institutional Controls performance.



Modification or Termination of Institutional Controls



- Periodic assessments identify the need to modify or terminate Institutional Controls due to changes in conditions or changes in Institutional Controls.
- DOE sites should establish procedures to modify or terminate Institutional Controls when warranted.
- Documented procedures should clearly delineate to assist in determining whether to appropriately modify or terminate Institutional Controls.
- Sites ensure that termination will not harm protection of site or sensitive resources.



Management Review and System Maintenance



- Senior managers or those who have the authority to make decisions for the site or facility, should review the need for or continued use of Institutional Controls.
- Management review ensures that Institutional Controls are used for and continue to be effective for, their intended purpose.
- Allows senior managers of the site to:
 - assess existing institutional controls,
 - evaluate the possible need for changes,
 - provide direction and/or resources for an actions necessary to make the changes, and
 - and to promote continual improvement through their leadership.



Management Review and System Maintenance



- Allow agreement with senior managers and buy-in on decisions impacting Institutional Controls.
- Time frame determined by site or senior managers.
- Reviews should be documented.

