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Institutional Controls Implementation Guide for Use with DOE P 454.1, *Use of Institutional Controls*

[This Guide describes suggested nonmandatory approaches for meeting requirements. Guides are not requirements documents and are not to be construed as requirements in any audit or appraisal for compliance with the parent Policy, Order, Notice, or Manual.]

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PREFACE

This Guide provides information to assist Department of Energy (DOE) program and field offices in understanding what is necessary and acceptable for implementing the provisions of DOE P 454.1, *Use of Institutional Controls*. It identifies issues that need to be addressed when considering the use of institutional controls to support DOE's diverse missions. DOE P 454.1 helps ensure that institutional controls will be integrated into the environmental management system (EMS) implementation framework to help protect the public and the environment established in accordance with the requirements of DOE O 450.1, *Environmental Protection Program*.

As much as possible, DOE sites should consider using existing processes, programs, or documentation for addressing the provisions of DOE P 454.1 in the development, implementation, and management of institutional controls.

This Guide is available for use by all DOE elements, including the National Nuclear Security Administration (NNSA), and their contractors. Suggestions for corrections or improvements to this Guide should be addressed to—

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Guides are part of the DOE Directives System issued to provide nonmandatory supplemental information about acceptable methods for implementing requirements, including lessons learned, suggested practices, instructions, and suggested performance measures. Guides may identify acceptable ways to implement requirements by referencing appropriate Technical Standards, but they shall not impose additional requirements. See Attachment 1 for references applicable to this Guide.

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CHAPTER I. INTRODUCTION

1. Policy Commitment.

DOE P 454.1 documents a commitment to the effective and appropriate use of institutional controls, establishes a general framework for a consistent approach to the use of institutional controls throughout the Department, and recognizes that DOE sites need flexibility to tailor institutional controls to specific needs, jurisdictions, and time periods. DOE P 454.1 delineates how DOE, including the National Nuclear Security Administration (NNSA), will use institutional controls in the management of resources, facilities, and properties under its control and in the implementation of programmatic responsibilities.

DOE uses a wide range of institutional controls as part of efforts to:

- appropriately limit access to, or uses of, land, facilities and other real and personal properties;
- protect the environment (including cultural and natural resources);
- maintain the physical safety and security of DOE facilities; and
- prevent or limit inadvertent human and environmental exposure to residual contaminants and other hazards.

The purpose of DOE P 454.1 is to ensure that DOE programs—

- reaffirm a DOE-wide commitment to use institutional controls effectively;
- establish a consistent approach to the implementation, delegation, documentation, maintenance and re-evaluation 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; and
- apply institutional controls in a cost-effective way and maximize the use of low-maintenance institutional controls to the extent possible.

DOE's major environmental directive—DOE O 450.1, *Environmental Protection Program*, promotes implementation of sound stewardship practices that are protective of the air, water, land and cultural and ecological resources impacted by DOE operations, and by which DOE meets or exceeds compliance with applicable environmental, public health and resource protection laws, regulations and DOE requirements in a cost-effective way. DOE O 450.1 requires DOE elements to ensure that the site Integrated Safety Management System (ISMS) includes an environmental management system (EMS). (This integration of the EMS into ISMS is referred to as ISMS/EMS).

The ISMS/EMS approach, as described in DOE G 450.1-1, *Implementation Guide for Use with DOE O 450.1, Environmental Protection Program*, dated 2-18-04, emphasizes continuous improvement of each environmental management program structured in four phases—

- planning and aspects identification,
- implementation and operation,
- checking and corrective action, and
- management review and system maintenance.

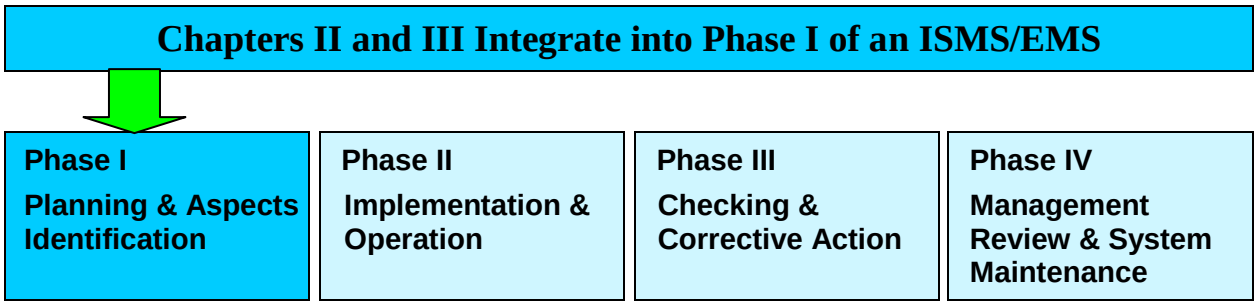
INSTITUTIONAL CONTROLS

The term ―institutional controls" has diverse, and often not consistent, meanings, depending on the driver for the controls. DOE P 454.1 does not define the term ―institutional controls" but rather, applies the term broadly so as to encompass all topic-specific regulations and guidance documents and the various institutional controls used throughout DOE in a consistent yet flexible, policy framework. Under DOE P 454.1 ―institutional controls" may include administrative or legal controls, physical barriers or markers, and methods to preserve information and data and inform current and future generations of hazards and risks. DOE P 454.1 does not intend to alter the definition of ―institutional controls" in existing laws, regulations or guidance documents, but instead to emphasize that: 1) diverse uses, requirements and definitions of institutional controls exist; 2) institutional controls may overlap and differ; and 3) institutional controls need to be integrated effectively on a site-wide basis.

Institutional controls fit well into an ISMS/EMS because their use and implementation align closely with these four key ISMS/EMS phases. Since institutional controls can be used or affected by any operations and activities at a facility, implementation of site ISMS/EMS should provide a consistent, systematic means to ensure that all efforts related to the use of institutional controls at DOE sites are integrated within a site-wide program, taking into account mission needs. Institutional controls are essential elements of ISMS/EMS related to radioactive waste disposal and waste management activities, facility operations, restoration and closure, land use planning, cultural and natural resources management, and legacy management activities at sites that will require use restrictions.

2. Benefits of a Site-Wide Approach to the Use of Institutional Controls.

Incorporation of institutional control considerations in a site ISMS/EMS will help facilitate cost-effective planning, implementation, and management review of site-wide protection activities - across different programs and activities. ISMS/EMS allows DOE sites to address mission needs while providing the flexibility necessary to tailor institutional controls to unique site features such as physical setting, history, and local or regional cultural characteristics, and to consider input from stakeholders and external regulators. A site-wide ISMS/EMS approach also can address the need for long-term protection, surveillance, and maintenance and allows the institutional controls to be adapted to changes over time and provides better assurance that the need for controls and their maintenance, as well as any changes, will be documented and available in the future.



CHAPTER II. PLANNING FOR INSTITUTIONAL CONTROLS

During the planning phase of a site-wide ISMS/EMS DOE sites should identify and list existing, as well as new or proposed activities, products and services and note how these interact with the environment in order to identify environmental aspects. (Environmental aspects are the attributes of a site's activities, products, and services that can interact with the environment). As part of a site-wide ISMS/EMS, DOE sites should evaluate the need for institutional controls and identify areas where institutional controls will be necessary or required (e.g., where unrestricted use or unrestricted release of property is not desirable, practical, or possible, institutional controls are necessary to DOE efforts to protect its facilities and operations and human health and the environment, including natural and cultural resources). DOE sites should establish procedures to identify and maintain the environmental aspects of the activities, products, or services that they can control and over which the sites can be expected to have an influence.

1. Identify Institutional Controls for Existing, New, or Proposed Programs and Activities at DOE Sites.

   DOE sites commonly need and use institutional controls for programs and activities related to the following:

   - radiation protection of workers, the public and the environment,
   - radioactive waste management and disposal,
   - environmental protection,
   - environmental restoration and cleanup,
   - cultural resources management and historic preservation,
   - operational continuity and security, and
   - property or legacy management and stewardship.

   Examples of statutes, regulations, and DOE directives that serve as drivers for DOE's uses of institutional controls in these generalized areas are listed in Appendix A.

INSTITUTIONAL CONTROLS CLASSIFICATIONS

The following classifications used to describe institutional controls are not mutually exclusive. For example, a permit condition to maintain certain records about a site would be a Government control that could have both active (e.g., data collection and reporting) and passive (e.g., records maintenance) aspects. Similarly, structural controls such as surface covers and monuments may be considered passive controls while fences and gates may be active controls. Individual control functions may span several types. For example, excavation permits could be categorized as both land and ground water management. The appropriateness of access controls should be considered when establishing criteria. The mix of restrictions in place often will vary across a given DOE site to reflect risks and costs associated with maintaining restrictions.

- Government Controls use Federal, State or local authority to impose restrictions. Examples include Federal ownership, notations on Federal ownership records, zoning restrictions, restrictions on use of ground water and land (e.g., State well-drilling regulations), building and other permits, issuance of advisories warning of potential risk, and hazardous waste site registries.
- Proprietary Controls are based on private property law and are designed to restrict or limit use. Proprietary controls can be placed in the property's chain of title and can be transferred from one owner to the next. Examples of proprietary controls include easements, covenants, and real estate use licenses/permits.
- Structural Controls include features constructed to control access (e.g., fences; gates; engineered covers) and physical devices (e.g., signs and monuments to warn of dangers or restrictions).
- Non-structural Controls include mechanisms that rely on legal and administrative initiatives (e.g., security, preventive maintenance, inspections, vegetative buffer zones, materials labeling, materials handling improvements, hunting licenses or permits, employee training on radiation safety, and best management practices).
- Active Controls rely on the significant presence of humans to fulfill safeguard and maintenance responsibilities (e.g., security guards to monitor and control site access; airspace restrictions; environmental sampling to monitor contaminant migration; controlling or cleaning up site releases; disposal system performance monitoring; and waste package, storage facility, or equipment inspection and maintenance).
- Passive Controls are designed to warn and inform future generations about the nature and location of site hazards without significant human intervention (e.g., permanent markers and monuments; barriers such as earthen berms; public records and archives; Government ownership; land or resource use regulations; or preserving knowledge to warn future generations of site hazards to minimize inadvertent human exposure).

Institutional controls used at DOE sites generally fall into one of the following categories:

a. Government ownership (e.g., Federal or State);

b. warning notices (e.g., no trespassing signs, notification signs for hazardous and sensitive areas);

c. entry restrictions (e.g., requirements for security badges, fencing, training for persons entering hazardous or sensitive areas);

d. resource-use management (e.g. land use and real property controls, excavation permits, ground water use restrictions); and

e. site information systems (e.g., information tracking systems on the location and nature of waste sites or geographic based-information archives).

Appendix B provides a generic table illustrating these types of site-wide institutional controls as well as corresponding mechanisms and objectives.

2. Planning Checklist for Institutional Controls.

During the planning phase, DOE sites can develop and use a checklist for identifying, evaluating, and selecting appropriate institutional controls for use at their sites. A checklist example follows:

√ Document risk exposure assumptions.

√ Describe expected future land use, as well as any known prohibited uses that might not be obvious on the basis of anticipated land uses.

√ Describe the end state that currently is envisioned for the property.

√ Describe the need for the institutional controls (e.g., security, public risk, site integrity, etc.).

√ State performance objectives.

√ Generally describe the institutional controls, the rationale for their selection and a consequence assessment if they are not used.

√ Provide maps and figures showing boundaries of the planned institutional controls.

√ Describe the necessary duration.

√ Identify monitoring and reporting needs.

√ Identify roles and responsibilities for selection, implementation, maintenance, reporting and termination of institutional controls.

√ Provide a list of institutional controls considered or evaluated for the purpose of selecting appropriate institutional control mechanisms to be implemented.

√ Describe how the effectiveness of the institutional controls will be measured.

√ If applicable, provide a comparison of institutional controls to be implemented at the site with requirements for institutional controls stipulated in the appropriate documentation.

3. Application of a Defense-in-Depth or Layering Approach.

During the planning phase, DOE sites should consider the following:

a. What levels and types of protective measures (e.g., physical, administrative, etc.) are appropriate for the associated risks?

b. How much redundancy (layers of protection) does each situation warrant?

c. How effectively will institutional controls address the specific conditions (e.g., prevent exposure to contaminated ground water) for the necessary period?

d. How effectively will the institutional controls survive future changes that may occur in—

(1) the status of property (e.g., change in property ownership, or transition from operations to disposition in a facility's life cycle),

(2) contamination (e.g., decay or migration),

(3) exposure pathways (e.g., cross media impacts), or

(4) receptors (e.g., change in site use or demographics)?

e. What potential consequences could be envisioned if an institutional control fails to perform as expected?

Since institutional controls often must perform far into the future, it is possible for temporary lapses of some controls to occur over time. A DOE site may plan to use a defense-in-depth strategy for institutional controls to provide a reasonable expectation that if one control temporarily fails, other controls will remain in place or actions will be taken to mitigate the potential consequences of a temporary failure. Defense-in-depth uses multiple layers of protection to ensure that safety is not dependent solely on any single element of design, construction, maintenance, or operation – that is --a single failure will not significantly compromise safety, health, or environmental protection.

It may be useful to prioritize institutional controls based on their potential effectiveness and consequences of failure such that there is a primary group of controls that provide the primary protection and a secondary group that provides backup protection should the primary controls fail. Such categorization may be helpful in prioritizing maintenance activities and resource allocations.

Three examples of how DOE sites apply a defense-in-depth strategy to institutional controls follow. In each case, the individual institutional controls provide protection in different ways and together provide enhanced protection of the public and the environment.

- A site plans Federal ownership with continued DOE custody and accountability for a disposal cell and surrounding buffer zone in conjunction with restrictions on soil excavation and alteration of topography or vegetation in the area between the buffer zone and the site boundary.

- A site uses continued Federal ownership, compliance with State well-drilling regulations, notation on the Federal ownership record, an interpretive center, and historic markers.

- The Waste Isolation Pilot Plant (WIPP) plans a defense-in-depth strategy for passive institutional controls to provide layers of information and warnings with redundant messages by using a number of components, each with its own message and method of communication. Components of the WIPP passive institutional controls are—

  - monuments to define the boundary of the withdrawal area,
  - markers that consist of perimeter monuments, an earthen berm, an information center, two buried rooms and randomly-spaced buried markers,
  - sets of records distributed to national and international archives,
  - sets of records distributed to records centers locally, nationally and internationally,
  - Government control and land use restrictions, and
  - other means of communication such as encyclopedias, textbooks, and maps.

In situations where the consequences of loss of institutional controls are expected to be small, the need for redundant controls could be minimal. The rigor of the institutional controls needs to be commensurate with the associated hazards. Application of a graded

approach (or tailoring)[1] during the planning stages recognizes that specific factors (e.g., physical characteristics of the site that limit future land use, land uses that are acceptable and land uses that should be prohibited, hazard of the real or personal property, cost of monitoring and maintenance, and jurisdictional limitations) affecting risk vary from site to site. A graded approach allows DOE sites to evaluate the appropriateness and consider the benefits associated with available institutional controls and to tailor and layer choices from among a variety of institutional controls that can be implemented. For example—

- A deed restriction against well drilling that cannot be guaranteed to apply to all subsequent owners of the property may not be appropriate for restricting use of a site at which well drilling would result in exposure to hazardous contaminants for a 100-year period.

- 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 last example, if consequences of such an intrusion posed a significant risk then additional controls should be considered. However, 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.

4. Funding Considerations.

Cost is an important factor in decisions to use institutional controls, in comparisons of available controls and in long-term budget planning. To the extent possible, DOE sites should consider the cost of available institutional controls as well as the cost of different combinations of the controls early in planning and decision making. Cost considerations should include the costs of implementation, maintenance, monitoring, assessment and periodic reassessment activities over time, and termination costs.

Cost estimates for institutional controls will vary from site to site and may rely heavily on factors such as:

- type of institutional control used (e.g., a high-security fence or a three-strand fence);

[1] DOE G 450.3-3, *Tailoring for Integrated Safety Management Applications,* dated 2-1-97, describes factors contributing to and benefits of an effective graded approach.

- site characteristics (e.g., signs may need to be replaced frequently at sites with seasonal floods, inspections to locate any unapproved excavations may be more frequent at sites that are attractive and prone to intrusion);
- location (e.g., remoteness or ease of access to institutional controls);
- need for and frequency of inspections (e.g., quarterly inspections, regular security patrols, etc.)
- level of cooperation with other Government agencies (e.g., local law enforcement); and
- length of time institutional controls needs to be effective.

As part of a site-wide ISMS/EMS, DOE sites and programs should commit to requesting sufficient resources in the annual budgetary process to ensure that funds are available to implement and maintain the institutional controls over time and to sustain an appropriate level of protection. Modification, enhancement, or termination of institutional controls during the later "implementation and operation," "checking and corrective action," or "management review" phases of the ISMS/EMS also may necessitate future DOE resource allocation requests.

5. Property Considerations.

Institutional controls at DOE sites are associated most often with control of hazards (e.g., contaminated soil), facility security, or protection of resources (e.g., historic sites or wetlands) on real property. However, institutional controls also are applicable to the management of personal property (e.g., ensuring the safety and security of chemicals). Institutional controls at DOE sites contribute to assurances that contaminated items are not released without authorization, equipment is not stolen, and valuable cultural artifacts are protected.

REAL AND PERSONAL PROPERTY DEFINED

Real property includes land, rights in land (such as easements, rights-of-way, etc.), ground improvements (such as access roads), utility distribution systems, and most buildings or other structures. Equipment or fixtures (such as plumbing, electrical work and elevators) installed in an improvement in a permanent manner or essential for the purpose of the improvement are part of real property.

Personal property can be moved or is not permanently affixed to or part of real estate and includes equipment, supplies consumed in operations, equipment held for future use, motor equipment, vehicles, aircraft, and watercraft.

Institutional controls may be applied to property that DOE—

- owns or controls and expects to own or control indefinitely,
- may transfer internally to other DOE sites or to another Federal agency,
- transfers out of Federal control, or
- leases to non-Federal entities.

Controls may also be applied to property that—

- may be transferred to DOE from non-Federal control (e.g., certain Nuclear Regulatory Commission (NRC) licensees' property or Formerly Utilized Sites Remedial Action Program (FUSRAP) sites), or
- is owned by others.

Expected future land use and envisioned end state can affect the types of institutional controls. The following should be considered.

- What is the envisioned end state for the property?
- What are the projected needs of future generations (e.g., is continued growth of adjacent communities expected), and what, if any, stresses would such growth place on the natural resources system (e.g., increased demand for water and land)?
- Will DOE retain the property for future use by DOE?
- Will DOE retain the property but allow use by non-DOE entities (e.g., leasing)?
- Does DOE plan to transfer the property (e.g., by sale or grant)?

Complexities related to available options for institutional controls may include—

- the need to place institutional controls on private lands or
- situations where DOE owns the land but not the water or mineral rights and needs to include a notice in the deed.

DOE sites can conduct title searches to ensure that all property owners and parties that have easements or rights-of-way are identified and provided an opportunity to express their views during the planning phase.

When required by law to implement institutional controls for property that it does not own or specifically control (e.g., where DOE is responsible for protecting the public

from contaminated ground water near a former uranium mill tailings site), DOE will provide equivalent assurance for these institutional controls as it provides for properties DOE owns, transfers or accepts. DOE needs to coordinate with States, Tribes and other entities having jurisdiction over the property appropriately when implementing these institutional controls. If necessary, DOE could use its broad authority under the Atomic Energy Act of 1954 (AEA), as amended, to ensure that institutional controls necessary to protect public health and national security are maintained.

DOE O 481.1C, *Work for Others (Non-Department of Energy Funded Work)* establishes requirements and conditions that must be met for the performance of work for non-DOE entities by DOE and DOE contractor personnel and/or the use of DOE facilities that is not directly funded by DOE appropriations. The Order requires that the proposed work ~~n~~ot create a detrimental future burden on DOE/NNSA resources." It limits and requires approvals for construction and other capital improvements at DOE sites in support of work for others. If such work requires implementation of additional institutional controls for its conduct or potential for long-term institutional controls following the conduct of the work, the cost of such controls and the feasibility of their implementation should be assessed before accepting the work and appropriate costs need to be included in resources plans for the work should it be approved.

6. Transfer of Property with Institutional Controls.

DOE sites must comply with statutory and regulatory requirements applicable to the transfer of property. Transfer of DOE property follows a well-defined process and must be conducted in accordance with the requirements of DOE O 430.1B, *Real Property Asset Management*. Information on the environmental requirements associated with the transfer of real property is contained in DOE/EH-413/9712, *Cross-Cut Guidance on Environmental Requirements for DOE Real Property Transfers (Update)*. Before a DOE site commits to transfer property all institutional control needs should be identified and there should be a reasonable expectation that these institutional control needs will be met. This applies to the new owner (may also be referred to as transferee, or receiver) when DOE transfers property from its control and to DOE when it accepts property from another entity.

When considering the transfer, sale, lease or change of management (e.g., management of the land by another Federal agency) of any property for which cleanup under CERCLA was conducted, the DOE site should assess whether the property is subject to institutional control requirements based on the corresponding Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) decision document. If such requirements exist, the DOE site should consider the following actions:

- Notify the Environmental Protection Agency (EPA) and the State before any action is taken, in accordance with any applicable requirements,

- Retain appropriate property interests,
- Attach institutional controls to the property, as appropriate, and
- Conduct other efforts in support of long-term stewardship of the property (e.g., information management).

When first considering transfer of property to which institutional controls apply (including transfer among DOE offices, from DOE to another Federal agency, or from DOE to a non-Federal party), DOE should ascertain that the new owner understands the institutional control needs and has the authority, willingness and actual capability to fulfill responsibilities imposed upon the property for the expected life of existing or planned institutional controls, including performing needed maintenance and other activities. DOE should examine the capability of the new owner to fund implementation and maintenance activities over the necessary period and ensure long-term effectiveness of the institutional controls. Provisions for ensuring the continued maintenance of institutional controls should be incorporated into written agreements or other legal documents, as appropriate. Contingencies to mitigate events such as abandonment of the property, bankruptcy of the owner, or failure to maintain institutional controls if property ownership changes in the future should be considered to the extent possible during the planning stages and should be commensurate with the risk of such events and their consequences. Entities receiving DOE property may maintain and monitor institutional controls put in place by DOE, or DOE could arrange to retain a right of access to the property to continue that responsibility.

In the planning phase, DOE should take necessary steps to ensure that the appropriate institutional controls associated with the property will be transferred to the new owner. DOE should inform the new owner of any institutional controls that will remain in place upon transfer of property and may use the appropriate mechanisms to attach the controls to the property at the time of transfer. Any additional measures that may be necessary would be determined on a case-by-case basis and would be delineated in the transfer documents. DOE should notify the new owner of any need to inform local governments about institutional control issues that could affect adjacent non-Federal property. The nature of the limits and restrictions on property need to be publicly available and documented. Beyond establishing appropriate institutional controls before transfer, DOE may have only limited authority over property that DOE no longer owns unless agreements indicating otherwise have been put in place.

For property transfers to other Federal agencies or within the DOE complex, the new owner should be responsible for maintenance, monitoring, and management of institutional controls. Proprietary controls may not be an effective option because a transfer among Federal agencies may not generate public records when a deed does not exist to record the transfer or when the agency lacks the authority to encumber the property. Therefore, certain institutional controls such as deed restrictions may not be used when DOE transfers property to another Federal agency. Property transfers among Federal agencies are usually documented in a memorandum of agreement

(MOA) or other appropriate instrument that should identify existing institutional controls and itemize land or water use restrictions. Such agreements should be maintained in the DOE records management system and appropriately archived with retention periods at least as long as the institutional controls are expected to be needed. DOE should work with the receiving agency to ensure that the institutional controls remain effective.

CHAPTER III. LAWS, REGULATIONS AND OTHER DIRECTIVES RELATED TO DOE USES OF INSTITUTIONAL CONTROLS

As part of a site-wide ISMS/EMS, DOE sites should establish and maintain procedures to identify and access legal and other requirements. Activities pertaining to planning, selection, and use of institutional controls must comply with all applicable statutory and regulatory requirements, permit or compliance agreement conditions, and DOE Order requirements and need to be integrated with other appropriate DOE directives (e.g., DOE policies, guides, and manuals).

Many major Federal laws, executive orders, regulations, and various other drivers influence the use of institutional controls at DOE sites. Some drivers directly authorize or require the use of institutional controls, while others do not. Also, DOE uses institutional controls when no specific statutory requirement exists to supplement active remediation, pollution control, public and resource protection, and physical security, or to bolster the integrity of engineered remedies. A listing of various drivers for the use of institutional controls at DOE sites is presented in Appendix A with the principal statutory drivers mentioned below.

The AEA, the Department of Energy Organization Act, and related statutes assign DOE the responsibility to protect the public, the environment, and property from hazards associated with its research, development, production or other activities. This responsibility includes protecting the public and the environment from radiation or radioactive material. DOE requirements mandate continued control of property until the radiological hazard associated with the property is reduced to levels at which regulation under the AEA is no longer needed to ensure protection of the public and the environment.[2] Similarly, CERCLA and the Resource Conservation and Recovery Act (RCRA) require that decisions related to environmental restoration and corrective action remain protective of human health and the environment. Requirements for institutional controls have also been established under the Uranium Mill Tailings Radiation Control Act (UMTRCA), the Waste Isolation Pilot Plant Land Withdrawal Act, and the Nuclear Waste Policy Act.

DOE and its predecessor agencies have conducted activities for over 50 years, using land ownership and access control, environmental monitoring and surveillance, and other tools to support protection efforts at operational and inactive facilities, including radioactive waste burial grounds. For example:

- DOE has used institutional controls successfully to restrict access at the Nevada Test Site for over 50 years.

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[2] Further discussion can be found in *The Long-Term Control of Property: Overview of Requirements in Orders DOE 5400.1 and DOE 5400.5*. U.S. Department of Energy Office of Environmental Policy and Assistance Information Brief, EH-412-0014/1099

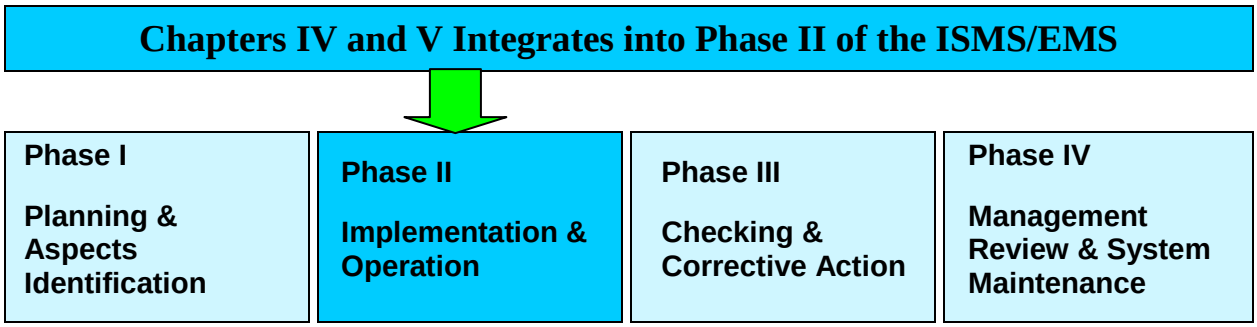
- DOE continues oversight and care of the Piqua nuclear reactor begun in 1968 by the Atomic Energy Commission (AEC) when this reactor was decommissioned and entombed.

- DOE is implementing institutional controls for Uranium Mill Tailings Remedial Action (UMTRA) Project sites in accordance with statutory and regulatory requirements and site-specific long-term surveillance and maintenance plans.

- DOE is implementing institutional controls at sites in accordance with site-specific RCRA and CERCLA agreements (such as DOE Tri-Party Agreements) which tend to focus the use of institutional controls on the need to create a sustainable cleanup strategy.

DOE decision makers need to account for applicable statutes, regulations, and DOE directives when evaluating institutional control options for activities at DOE sites during the planning phase. Appendix A identifies general areas of activity where DOE uses institutional controls.

In addition to Federal drivers, individual State and local laws may affect the use of institutional controls for a specific site, for example, requirements to use State model language in drafting controls, State laws on recording deeds or local zoning ordinances. DOE's legal counsel and realty specialists need to be cognizant of applicable State and local property laws and environmental laws and should be consulted to ensure that such State and local requirements do not conflict with Federal law. Land use controls must comply with requirements in Federal property management regulations.



Effective use and successful implementation of institutional controls will depend on clear articulation of roles, responsibilities, and authorities across the various elements of the DOE site as part of the site's ISMS/EMS. Effective communication with representatives of other DOE programs and facilities, other Federal, State and local agencies, Tribal governments and the public will help to ensure that institutional controls are implemented and maintained for as long as they are needed. DOE sites should also take the needs of future generations into account as part of the implementation and operation phase to communicate information necessary to the long-term effectiveness of the institutional controls. Maintenance, inventory, document control and records management activities that support the implementation and operation of institutional controls would link to Phase II of the DOE site's ISMS/EMS.

CHAPTER IV. KEY PARTIES AND THEIR STRUCTURES, ROLES, RESPONSIBILITIES AND AUTHORITIES

1. Department of Energy.

DOE is responsible for establishing policy and guidance related to the use of institutional controls at its sites. DOE line management is responsible for ensuring that institutional control needs are addressed as part of an ISMS/EMS. DOE line management at a site has the primary responsibility for:

- the identification, use, implementation, oversight, integration, and maintenance of institutional controls at DOE sites,
- ensuring compliance with any applicable requirements,
- evaluating the effectiveness of the institutional controls, and
- communicating with other Federal, State, and local agencies and Tribal governments.

For example, DOE line management is responsible for

- ensuring adherence to any institutional control requirements specified in CERCLA decision documents and for the development of any necessary reports,
- assuring that institutional controls are implemented as planned, and
- periodically assessing the effectiveness of the institutional controls and for conducting assessments regarding the performance of the institutional controls under their purview.

For DOE sites that have transitioned into the legacy management program, the DOE Office of Legacy Management is responsible for the identification, implementation, evaluation, maintenance, and documentation of institutional controls, and communication of institutional controls failure and corrective action. The Office of Legacy Management has the responsibility to ensure that institutional controls remain in place as long as they are needed at legacy management sites. In addition, should there be a transfer of ownership of any part of a legacy management site, deed restrictions, if implemented, will be reviewed by the Office of Legacy Management to ensure that they remain in effect with the local authorities.

DOE offices need to coordinate decisions and integrate programs related to institutional controls with site-wide operations. Regular communication with program managers of facilities or activities that may have potential impacts on institutional controls is essential. For example, DOE site environmental staff should ensure that the DOE legal counsel and property experts understand the access restrictions necessary to protect public health and the environment; DOE offices responsible for water resource programs should be cognizant of institutional controls involving restrictions on ground water uses; DOE facility management and maintenance personnel should be notified of institutional controls that restrict soil use in particular areas; and grounds maintenance personnel should be made aware of the placement and purpose of institutional controls such as markers, fences and signs. Effective communication and coordination at DOE sites can be accomplished in a number of ways, such as through a site-wide ISMS/EMS team or committee.

DOE sites can use various management tools such as laws, regulations, DOE orders, internal procedures, agreements, consent orders, Federal Register notices, information announcements, and contracts to ensure that institutional controls needs are met.

In accordance with DOE P 454.1, DOE will maintain and oversee the institutional controls under its control as long as necessary for the controls to perform their intended protective purposes. In some case, because of remediation, natural processes or radioactive decay, DOE control of the property may be required for a limited amount of time, while in other cases, due to factors such as the nature of the hazards, statutory requirements or ongoing missions, Federal control may be required indefinitely.

DOE sites need to ensure that institutional controls are maintained properly and protected from damage so that they continue to function effectively and provide an adequate level of protection. Effectiveness of institutional controls can be enhanced by routine custodial maintenance (e.g., clearing vegetation to keep markers visible; removing deep-rooted vegetation on a disposal cell; road maintenance) and repair (e.g., fence repair around controlled areas; repairing damage to a disposal cell; fixing gates and locks). Custodial maintenance should be documented and incorporated into a site's permanent file.

Although DOE has ownership responsibility for institutional controls, DOE may execute the actions necessary for implementation and maintenance through the use of contractors. DOE contractors are required to comply with applicable environmental laws, DOE directives, and administrative orders through contract requirements. DOE site line management is responsible for assuring that the contractors adhere to all applicable requirements.

2. Other Federal, State, and Local Agencies.

Federal, state, and local government agencies may play a role in the success of institutional controls at DOE sites. For example, in CERCLA remediation and cleanup, EPA and the States generally are the primary external regulatory agencies that oversee cleanup activities at the DOE sites while the NRC is the primary regulatory agency overseeing DOE activities related to the UMTRCA Title I and Title II sites. NRC also will be the licensing authority for a DOE-developed high-level radioactive waste repository.

Early cooperation and involvement with other interested and affected governments including State and local governments, other appropriate State agencies, and affected Federal agencies should increase the successful implementation of institutional controls, especially when there is a need for institutional controls on property owned by non-DOE entities. Whether DOE sites intend to transfer property to non-Federal entities or retain property for DOE missions, institutional control alternatives, and their implications for future use need to be clearly understood by DOE, external regulators and the public. Entities such as economic development interests, local re-use authorities, local municipalities, DOE-certified realty specialists, DOE legal representatives, and appropriate site managers should be involved in identifying potential future uses for a site. Such entities should be consulted to obtain information on topics such as the following:

- community needs,
- anticipated future stresses on natural resource systems (e.g., greater demand for water or land by adjacent communities)
- potential land uses,
- local land use authorities and restrictions,

- anticipated property owners,
- legal status of the property and knowledge of the implications of that status, and
- expected economic, legal, and demographic conditions (e.g., changes in growth of adjacent communities).

DOE site representatives should work closely with individual land owners surrounding the site and appropriate local governments to ensure that legal ownership and planned land use are accurate and complete for both the surface and subsurface. This is particularly relevant where a hazard such as contaminated ground water or soil had or has the potential to migrate offsite.

3. Native American Tribes.

Tribal governments may also play a role in implementation of institutional controls at DOE sites. Principles set forth in the DOE *American Indian & Alaska Native Tribal Government Policy* should be followed to ensure effective implementation of a government-to-government relationship with tribal governments. DOE should encourage input from neighboring tribes on program management activities that could affect them. Communication and requests for tribal input should occur early in any DOE process that may affect tribes and consideration should be given to the policies, priorities and concerns of the affected tribes, and/or, where appropriate, affected tribal members. Existing methods of effective communication with the tribes can be used to convey information on institutional controls.

4. Public Participation and Outreach.

DOE P 141.2, *Public Participation and Community Relations*, recognizes that public participation is a fundamental component in program operations, planning activities and decision making within DOE. DOE sites should encourage meaningful public participation and community involvement early in the development and implementation of institutional controls to keep local communities and stakeholders informed and to provide a feedback mechanism. Security concerns and safety priorities will compel DOE sites to limit information released to the public domain about certain types of institutional controls, as discussed in Chapter V. However, local communities and stakeholders should be afforded access to publicly available information on institutional controls. Publicly available information on institutional controls should be included in a site's general public participation programs to facilitate input and to ensure that the public understands DOE's ongoing activities. Existing public outreach mechanisms (e.g., the National Environmental Policy Act (NEPA) process, site-specific advisory boards, scheduled meetings with local governments or community-based organizations, public meetings, mailings, information centers, web sites, etc.) can be used to engage the public.

Early outreach can enhance public awareness of the institutional controls. Educating the local communities on institutional controls is an important aspect of outreach efforts. Education programs can be tailored to the needs of specific groups (e.g., property owners,

schools, developers, etc.). The public, particularly the local communities, need information in an understandable format that conveys why the institutional controls are necessary, what the existing hazards are, how DOE makes decisions related to the controls, what activities are restricted and which can be conducted safely, and how the institutional controls will be managed.

Coordination with local communities and other stakeholders is an important way to gain input on decisions related to future use of the property. Future use expectations of local communities may drive the type and extent of institutional controls used. Economic, social or legal (e.g., treaties or agreements) pressures for land use can affect the types of institutional controls under consideration. Stakeholders' needs, values, and expectations for site use may determine whether or not institutional controls are acceptable, or which specific institutional controls are considered for the site. For example, based on input from one local community a DOE site decided that future public access to an on-site disposal facility would be restricted and future uses of the site will be limited to environmental, educational, and passive controls, with a continued DOE presence at the site into the foreseeable future. In another situation, excess land was identified through the request for use by neighboring counties to a DOE site. DOE approved the request and the land was disposed of, with a future use identified as a municipal solid waste landfill.

The public needs to know the names and phone numbers of responsible DOE contacts to be notified if problems arise and where to direct questions related to institutional controls. There should be mechanisms in place at DOE sites to ensure that the public is notified in a timely manner of any incident related to failure of an institutional control.

5. Future Generations.

As part of its stewardship responsibilities DOE needs to recognize the importance of intergenerational equity considerations in the planning, usage and implementation of institutional controls, that is, how the interests of future generations are factored into decisions made by the current generation. The following principles[3] should be considered when making decisions related to institutional controls that could affect future generations:

- Trustee Principle—Every generation has obligations as trustee to protect the interests of future generations;

- Sustainability Principle—No generation should deprive future generations of the opportunity for a quality of life comparable to its own;

[3] These principles and guidance for their application were developed in a report entitled *Deciding for the Future: Balancing Risks, Costs, and Benefits Fairly Across Generations*. This 1997 report was prepared by a panel of the National Academy of Public Administration (NAPA) for DOE.

- Chain of Obligation Principle—Each generation's primary obligation is to provide for the needs of the living and succeeding generations. Near-term concrete hazards have priority over long-term hypothetical hazards;

- Precautionary Principle—Actions that pose a realistic threat of irreversible harm or catastrophic consequences should not be pursued unless there is some compelling countervailing need to benefit either current or future generations.

Although general in nature, these principles and the associated NAPA recommendations represent a reasonable framework to aid DOE line management in making institutional control decisions in a manner that fairly balances risk, costs and benefits across generations.

6. Training, Awareness, and Competence.

In addition to communication, training is another essential element of an ISMS/EMS. DOE sites should evaluate the need for general awareness training related to the need for, and use of, institutional controls at DOE sites for personnel whose work may create a significant impact on the effectiveness of institutional controls so that they have the necessary knowledge to carry out the responsibilities of their positions. The sites should establish and maintain procedures to make personnel at each relevant function and level aware of the following:

- the importance of conformance with the institutional controls policy and procedures and with the requirements of the EMS;

- the significant environmental impacts, actual or potential, of their work activities and the environmental benefits of improved personal performance;

- their roles and responsibilities in achieving conformance with the institutional controls policy and procedures; and

- the potential consequences if procedures are not followed.

CHAPTER V. INVENTORY AND DOCUMENTATION OF INSTITUTIONAL CONTROLS

1. Inventory of Institutional Controls.

DOE sites should have a reliable inventory of all institutional controls in use. DOE O 430.1B states that Facilities Information Management System (FIMS) data must be maintained as complete and current throughout the life cycle of real property assets, including real property related institutional controls. A tracking mechanism that identifies all land areas under restrictions or controls would be useful to develop or to expand. Some DOE sites use existing documents such as land use plans to track the institutional controlled areas.

2. Documentation and Records Management.

Documentation and recordkeeping are essential to ensuring effective and lasting institutional controls. Although it may not be possible to guarantee that the controls will be effective 100% of the time, good records management should greatly minimize chances of lengthy failure. DOE P 454.1 calls for the purpose and need for the institutional controls to be documented, and made publicly available, as appropriate and allowed by law. The site's ISMS/EMS, Annual Site Environmental Reports (ASERs) and NEPA documents are examples of documentation that can support this objective. Real property asset management at DOE sites needs to be conducted in accordance with DOE O 430.1B, Executive Order 13327, *Federal Real Property Asset Management,* and land use planning provisions of DOE P 430.1 *Land and Facility Use Planning*, to ensure that pertinent real estate and records management activities are conducted in accordance with applicable DOE directives and that access constraints imposed upon DOE's comprehensive land and facility use planning process by current and future needs for institutional controls are recognized and clearly understood.

DOE sites need close coordination with their Records Management and Classification offices because documentation released to the public must not contain sensitive or classified information. In this regard, this Guide does not suggest, nor should it be interpreted to suggest that any information regarding security measures be released to the public. Security concerns and safety priorities will compel DOE sites to limit information released to the public domain about certain types of institutional controls (see for example, DOE O 471.3, *Identifying and Protecting Official Use Only Information* and the associated DOE M 471.3-1 and DOE G 471.3-1; DOE O 471.1A, *Identification and Protection of Unclassified Controlled Nuclear* Information; DOE M 475.1-1A, *Identifying Classified Information*; and current classification guides). DOE sites also must comply with other applicable restrictions on the release of information. For example, the Archeological Resources Protection Act of 1979 (ARPA), as amended, precludes public access to maps or other information concerning the nature and location of cultural resources under Subchapter II of Chapter 5 of Title 5 of the

United States Code (Freedom of Information Act) or under any other provision of law unless certain conditions specified in ARPA are met. However, such requirements do not preclude documentation in appropriately-controlled records.

Whenever possible and appropriate, documentation on the institutional controls that a DOE site makes publicly available should allow interested parties to understand—

- the need for the controls (e.g., physical security, worker protection, preservation of cultural resources, etc);
- the objectives of the institutional controls (e.g., limit unauthorized access to a site, protect cultural resources from vandalism, block a particular receptor pathway, restrict the use of ground water for a specified period of time, etc.);
- the types of institutional controls that are planned at the site, and their associated limitations;
- site-specific factors that could affect the type and extent of controls;
- a description of any authorized uses and the nature of constraints and restrictions on the use of property by present and future owners;
- the magnitude of any hazard or risk that may be present,
- a timeframe during which the institutional controls will apply and the duration of DOE control over the property;
- life cycle cost estimates for institutional controls to the extent practicable;
- the manner in which the institutional controls will operate and be maintained;
- a description of tools and procedures that will be applied to implement the controls and to evaluate the effectiveness of institutional controls;
- identification of conditions that could result in termination of the institutional controls;
- identification of the organization responsible for implementation and maintenance of institutional controls;
- the name and phone number of the appropriate organization to be notified in the event that a violation or failure of the institutional controls is discovered (e.g., security telephone numbers may be posted on the site perimeter, access points and other key locations on the sites);
- a description of the mitigative actions that may be undertaken if institutional controls are violated or fail;

- any reporting procedures for compliance with environmental laws and DOE directives; and

- a description of the records management system for the institutional controls, how and where records will be maintained, and how the public will have appropriate access to publicly available records.

Site office or program office management is responsible for maintaining institutional control information. For sites that have transitioned to the Office of Legacy Management, information that is needed for institutional control purposes will be managed by the Office of Legacy Management. Any centralized system to provide stakeholders with access to publicly available information on legacy management sites will be managed by the Office of Legacy Management.

Information management is necessary to ensure that records pertaining to institutional controls are preserved and remain accessible to DOE and other appropriate officials and whenever permitted by law and security requirements to the public. DOE sites may establish a central database of properties, sites, or areas affected by institutional controls, or use existing databases. For example, DOE O 430.1B requires that complete and current information on institutional controls for real property be maintained in the DOE FIMS. DOE sites should maintain and update site maps and information on properties affected by institutional controls and may track these institutional controls in FIMS, as appropriate and allowed by law and consistent with DOE security needs. DOE sites may need to establish supplemental systems or procedures if they need to retain pertinent site historical records on leased properties. Additionally, since FIMS does not archive all seismic information, DOE sites that need to retain pertinent seismic information should do so separately from FIMS. When available, detailed maps or Graphic Information Systems (GIS) computerized maps can depict the areas affected by the institutional controls. Pertinent information on the institutional controls also can be contained, or incorporated by reference in other documents prepared by the sites for other purposes (e.g., facility plans, regulatory supporting and decision documents, land transfer agreements, etc.), as appropriate. The information media used should be evaluated periodically and updated to ensure data remain accessible for future reference.

Accessible publicly available documentation on a DOE site's institutional controls will be of value to both current and future generations. Institutional controls provide protection, but also ensure that there is adequate information publicly available for current and future generations to make informed decisions regarding the controls. To account for intergenerational equity and to avoid foreclosing options for future generations, documentation should also communicate to future generations: the rationale, an understanding of the underlying environmental concerns, and limitations and uncertainty of data and analyses related to present-day decisions on institutional controls.

Chapters VI and VII Integrate into Phase III of the ISMS/EMS

Phase I	Phase II	Phase III	Phase IV
Planning & Aspects Identification	Implementation & Operation	Checking & Corrective Action	Management Review & System Maintenance

The assessment step is the third part of the ***plan-do-check-act*** *ISMS/EMS cycle. Performance assessment provides the necessary feedback to determine the effectiveness of the* ***plan*** *and* ***do*** *phases and to* ***act*** *on any necessary changes. Periodic assessments should be made to ensure compliance with, and implementation of, applicable legal requirements, including DOE Orders.*

DOE O 450.1 requires DOE Operations, Field, and Site Office Managers to conduct environmental monitoring, as appropriate to support a site's ISMS. To achieve a fully integrated monitoring program, the design network should consider site-wide needs. To ensure that the adequacy and utility of the site-wide monitoring networks are maintained over time as part of the ISMS/EMS, each site's monitoring program should include a process for periodic review and evaluation.

DOE P 226.1, Department of Energy Oversight Policy, requires DOE organizations to implement an assurance system that ensures compliance with applicable requirements, pursues excellence through continuous improvement, provides for timely identification and correction of deficient conditions, and verifies the effectiveness of completed corrective actions. DOE Headquarters and field element line management oversight processes put responsibility and accountability on line management to determine the effectiveness, on an ongoing and regular basis, of site operations and to ensure timely corrective actions if performance does not meet expectations. DOE P 226.1 requires Headquarters, field element and contractor line management to perform self assessments of its activities, including its oversight activities and activities necessary to support site assurance and mission activities. DOE O 226.1, Implementation of Department of Energy Oversight Policy, provides direction for implementing DOE P 226.1.

DOE G 430.1-2, Implementation Guide for Surveillance and Maintenance During Facility Transition and Disposition, notes that surveillance and maintenance (S&M) activities are conducted throughout the facility life cycle and that S&M is adjusted as transition, deactivation and decommissioning activities are completed.

Monitoring and periodic assessments of institutional controls should link to activities in support of Phase III of the site-wide ISMS/EMS.

CHAPTER VI. MONITORING, PERIODIC ADDESSMENT AND CORRECTIVE ACTION FOR INSTITUTIONAL CONTROLS

An integrated program to monitor and periodically assess institutional controls can be planned and conducted as part of a site's ISMS/EMS assessment or as part of existing site inspections. These existing mechanisms can be used to satisfy the DOE O 450.1 requirement that a site's ISMS/EMS include policies and procedures to assess performance and implement corrective action. Procedures for monitoring, periodic assessment, and when necessary, corrective actions, related to institutional controls should be documented as part of the site's ISMS/EMS.

A graded approach can be applied to determine the frequency of, and need for, monitoring and assessment of institutional controls, based upon site-specific circumstances and the degree to which the institutional controls provide protectiveness. Once the assessment process is well-established and the DOE site has demonstrated the effectiveness of the institutional controls, the frequency of future assessments may be modified. In some circumstances, this modification may be subject to approval by EPA or the State. Conversely, if it is deemed necessary or appropriate, the DOE site can schedule more frequent assessments (e.g., discovery of unauthorized activities or uses, or if the site is in an area of rapid development) to ensure that site restrictions are being maintained.

Monitoring and periodic assessment provide DOE sites with valuable opportunities to evaluate whether the assumptions made at the time the institutional controls were selected are still valid and protective of public health and to re-evaluate whether the physical (e.g., materials used for fences or signs) and the organizational (e.g., local zoning boards, deed recording systems) components of the institutional controls will remain intact for the necessary period of time. Through monitoring and periodic assessments, DOE line management can be kept apprised of the conditions of the institutional controls; detect conditions that, if left unattended, could promote failure; and respond to problems that may develop over time.

Monitoring and periodic assessment within an ISMS/EMS also provide opportunities to analyze the impacts of any changes to laws, regulations and directives; re-evaluate stakeholders understanding of the situation; determine the impacts of any changes in resources; and recommend cost-effective improvements.

Periodic assessments also can identify the need to implement changes, adjustments, or corrective actions to the institutional controls based on performance findings. Periodic assessments should be consistent with DOE O 226.1.

Periodic assessments of institutional controls by DOE sites can include, but are not limited to, the following activities:

- site visits and visual inspections to evaluate the condition of controls (e.g., fences, signs and postings) and ensure that controls are in place and functioning as intended;

- taking and analyzing site photographs (including aerial photographs if available) to track changes in land and resource uses;

- observations of adjacent properties for evidence of land use changes;
- interviews with neighboring property owners;
- evaluation of the integrity of runoff controls and natural drainage courses in the immediate vicinity;
- inspection of the general area for signs of erosion, excess sediment, seepage and signs of human or animal intrusion;
- review of environmental surveillance data;
- review of documentation to determine whether inappropriate land or resource use is occurring (e.g., property title examination to determine whether original controls imposed on real property are still in place or have been modified over time); and
- review of legal and administrative documentation (e.g., deed restrictions, siting restrictions and zoning ordinances) to determine whether proprietary controls are being obeyed.

Periodic assessments should address the following types of questions:

- Are the institutional controls performing as intended and do they continue to provide the necessary level of protection?
- Are the institutional controls still the most cost-effective way to provide the necessary protection or physical security?
- Have any unacceptable conditions developed (e.g., unauthorized access to the site by off-road vehicles, attempts to use soil or water in an inappropriate manner, damage to fencing, gates or postings, extensive vandalism, structural instability caused by subsidence or creep, plant intrusion, existence of burrowing animals, etc.)?
- Is the current land use still appropriate?
- Do the institutional controls need to be modified, replaced, or terminated? If yes, what is the rationale for such actions?
- Have any significant changes occurred to alter the original decision to use institutional controls? (e.g., changes in DOE missions, changes in applicable requirements, changes in onsite conditions such as contaminant migration, changes in offsite conditions, such as land use or resource activities or land use designations, particularly if such activities are not consistent with the objectives of the original institutional controls, or changes in assessment of risk, etc.).
- Is the public still aware of the institutional controls?

In the context of an ISMS/EMS, DOE sites should consider establishing performance indicators to facilitate assessments and to delineate under what conditions institutional controls—

- should remain in place, can continue to provide protectiveness and still work as planned;
- are no longer working effectively and need to be modified or replaced;
- are no longer needed and can be discontinued; or
- are no longer needed for their original purpose, but other purposes for the controls have been identified and the continuation of the institutional controls is deemed appropriate.

Information obtained from periodic assessment can build a knowledge base of the actual performance of the institutional controls and improve effectiveness. The assessment process can be directed through the use of a checklist or evaluation form to focus the scope of the assessments on primary outcomes, to provide an objective review of the controls and to provide a continuous record for tracking changes over time. This assessment can be documented in a report that summarizes the assessment activities, identifies deficiencies, and makes recommendations regarding repairs and improvements to the implementation of the institutional controls. A lessons-learned program can record information on effectiveness, maintenance requirements, costs, and other factors to foster greater understanding of institutional controls and improved implementation.

DOE sites should establish and document procedures for defining responsibility and authority for handling and investigating non-conformance, taking action to mitigate any impacts that were caused, and initiating and completing corrective and preventive action. For example, if a failure or violation of an institutional control is detected through a periodic assessment or discovered at any other time, personnel identifying the failed or violated institutional control should notify the appropriate DOE official. This DOE official should notify external parties as necessary (e.g., a CERCLA Record of Decision (ROD) may require notification of EPA and/or the State if an institutional control failure is detected; and at Title I and Title II sites 10 CFR 40 requires DOE to submit a preliminary report to NRC within 60 days if unusual disruption or damage is detected). The DOE site should identify the root cause of the institutional control process failure, evaluate how to correct the process to avoid future problems, implement these changes, and ensure that the integrity of the control is restored.

CHAPTER VII. MODIFICATION OR TERMINATION OF INSTITUTIONAL CONTROLS

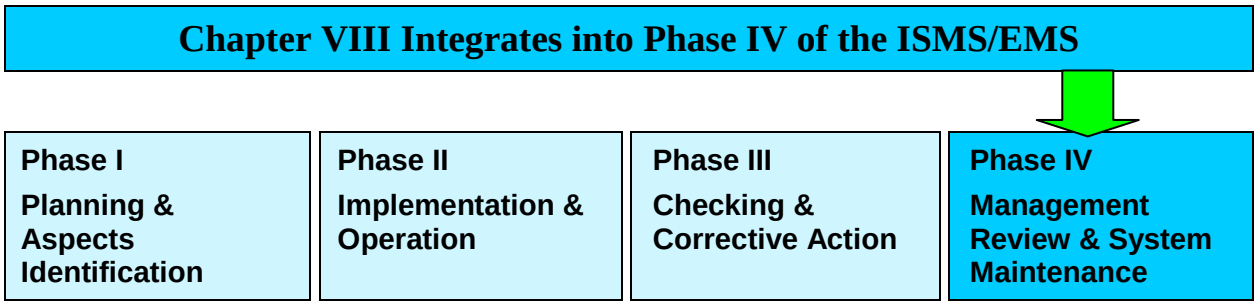
It may be necessary to replace, modify, or terminate the controls due to changes in conditions existing at a site over time, or changes in the institutional controls themselves. DOE sites should establish procedures to modify or terminate institutional controls when warranted. These procedures should clearly delineate criteria to assist DOE sites in determining whether it is appropriate to modify or terminate institutional controls, and should be documented.

The procedures should establish a process for site personnel to follow when modifying or terminating institutional controls, including:

- DOE legal offices need to be consulted to determine the specific requirements for modifying or terminating the institutional controls.
- DOE site managers need to approve all modifications or terminations of institutional controls in writing before these actions are implemented.
- When appropriate, DOE should notify EPA and appropriate State government offices, as well as local jurisdictions, before any anticipated change in restrictions, land uses or activity for any legally required institutional control.
- Appropriate documents and agreements should be developed, amended, or modified, as necessary, to reflect changing conditions and ensure compliance with applicable public participation, administrative record and legal requirements.
- A schedule of activities needs to be established.

DOE sites should document decisions to modify, enhance or terminate existing institutional controls. This documentation should address the following, as appropriate to the specific situation:

- Provide the basis for the decision that existing institutional controls need to be modified or enhanced (e.g., the hazard has increased), or that the institutional controls are no longer needed and can be terminated (e.g., the hazard has decreased).
- Identify what modifications or enhancements will be made and how these modifications or enhancements will serve to protect public health and the environment.
- List the names and phone numbers of the organization responsible for implementing the decision to modify or terminate the institutional controls.



CHAPTER VIII. MANAGEMENT REVIEW AND SYSTEM MAINTENANCE

Management review is the periodic review of the need for, and use of, institutional controls in the context of an ISMS/EMS by senior management (i.e., managers who have the authority to make decisions for the site or facility). The primary goal of a management review should be to ensure that the institutional controls continue to be suitable, adequate, and effective for their intended purpose. The management review process allows senior managers of the site to assess the existing institutional controls within the context of the overall ISMS/EMS, evaluate the possible need for changes, provide direction and/or resources for any actions necessary to make the changes, and to promote continual improvement through their leadership. This review should be documented. Guidance pertaining to management review can be found in DOE G 450.1-1.

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APPENDIX A. STATUTORY, REGULATORY AND OTHER DIRECTIVES AS DRIVERS FOR USES OF INSTITUTIONAL CONTROLS AT DOE SITES

A. USE OF INSTITUTIONAL CONTROLS IN RADIATION PROTECTION OF WORKERS, THE PUBLIC AND THE ENVIRONMENT		
Law, Regulation or Directive	**Relationship to Institutional Controls**	**Types of Controls**
Atomic Energy Act of 1954, as amended (AEA)	The AEA grants DOE the authority and responsibility to protect property, workers, the public, and the environment from the activities conducted under its control. DOE cannot delegate its AEA responsibilities to non-DOE parties. DOE has developed radiation protection standards for protection of workers, the public and the environment that are institutionalized through DOE rules, orders and policies that establish limits on allowable radiation doses and impose controls to ensure that those limits are not exceeded.	
Order DOE 5400.5, *Radiation Protection of the Public and the Environment* (Chg.2, 1-7-93).	DOE 5400.5 establishes dose limits to control releases of radioactivity from DOE facilities, requires implementation of a process to assure that releases are as low as reasonably achievable (ALARA), and requires monitoring and record keeping associated with property releases, including releases of personal property. DOE 5400.5 includes requirements that institutional controls be incorporated into remediation plans. Institutional controls are an important part of DOE activities to comply with dose limits. DOE maintains restrictions on access to areas of a site based on the potential for radiation exposure. DOE 5400.5 establishes a process for determining whether restrictions need to be maintained based on levels of residual radioactivity. DOE may be restricted from moving personal property within a site or between sites or only able to transfer the property to external parties (whether for use or disposal) that maintain appropriate licenses. When levels of residual radioactivity are sufficiently low, unrestricted release may be an option.	Access is controlled through fencing and sometimes other barriers, as well as through non-structural means such as work permits. Several types of institutional controls can be employed to maintain these restrictions, such as radiation monitoring programs, record keeping, and restrictions on the disposition of surplus property. For example, if property is cleared for release to a sanitary landfill for disposal, but not approved for release to be recycled, institutional controls should be used to ensure that the surplus property is disposed as required, whether on-site or at an off-site location.
10 CFR 835, *Occupational Radiation Protection*.	10 CFR 835 establishes DOE's primary standards for occupational radiation protection. The regulation contains provisions relating to a ~~"~~Controlled Area," defined as any area to which access is managed by or for DOE to protect individuals from exposure to radiation and/or radioactive material" and to a ~~"~~Radiological Area," which is any area within a controlled area defined as a ~~"~~radiation area," ~~"~~high radiation area," ~~"~~very high radiation area," ~~"~~contamination area" or ~~"~~airborne radioactivity area." The degree of control established under the 10 CFR 835 entry control program must be commensurate with existing and potential radiological hazards in the area.	Limits for members of the public entering a controlled area, posting and labeling requirements, and radioactive contamination control provisions are contained in the final rule.
10 CFR 830, *Nuclear Safety Management*.	This DOE regulation governs the conduct of DOE personnel, contractors and other persons conducting activities that affect, or may affect, the safety of DOE nuclear facilities. 10 CFR 830 establishes provisions related to ~~"~~hazard controls" defined as measures to eliminate, limit or mitigate hazards to workers, the public or the environment.	Hazard controls include: 1) physical design, structural and engineered features; 2) safety structures, systems and components; 3) safety management programs; 4) technical safety requirements; and 5) other controls necessary to provide adequate protection from hazards.

B. USE OF INSTITUTIONAL CONTROLS IN RADIOACTIVE WASTE MANAGEMENT AND DISPOSAL.		
Law, Regulation or Directive	**Relationship to Institutional Controls**	**Types of Controls**
The Nuclear Waste Policy Act The Energy Policy Act of 1992 40 CFR 191, *Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes* 10 CFR 63*, Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada*	Institutional controls used in high-level radioactive waste disposal generally need to enhance protection and to contain radioactive wastes for extended periods of time. The Energy Policy Act of 1992 gave DOE responsibility for permanent Federal control of the Yucca Mountain site. The Act also directed EPA to promulgate public health and safety standards related to releases from radioactive materials that would be stored at the proposed Yucca Mountain repository. It also required a study of reasonable standards for protection of public health and safety which included findings and recommendations of whether a system for post-closure oversight of the repository could be developed, based upon the use of active institutional controls, that would prevent the risk of a breach of the engineered or geologic barriers or exposure of individuals to radiation above allowable limits. The Nuclear Regulatory Commission's (NRC's) regulation, 10 CFR 63, requires that DOE will have a system of active and passive controls at any potential geologic repository at Yucca Mountain. Following NRC license termination, Yucca Mountain will be under permanent Federal control.	40 CFR 191 addresses active institutional controls such as security guards. Passive institutional controls include permanent markers, records and other passive controls practicable to indicate the dangers of the wastes and their location. In 10 CFR 63 the term ―passive institutional controls" means: 1) markers, as permanent as practicable, placed on the Earth's surface; 2) public records and archives; 3) Government ownership and regulations regarding land or resource use; and 4) other reasonable methods of preserving knowledge about the location, design, and contents of the Yucca Mountain disposal system.
Waste Isolation Pilot Plant Land Withdrawal Act 40 CFR 194, *Criteria for the Certification and Recertification of the Waste Isolation Pilot Plant's Compliance With the Disposal Regulations: Certification Decision*.	Congress enacted the WIPP Land Withdrawal Act (LWA) to withdraw the land on which the WIPP is situated from public use and to reserve the land for WIPP-related activities. Jurisdiction over the lands was transferred from the Secretary of the Interior to the Secretary of Energy. The LWA also contained provisions that require maintenance of wildlife habitat, authorize the Secretary of Energy to permit appropriate non-WIPP-related uses such as domestic livestock grazing, hunting and trapping and allow closure to the public of any road, trail or portion of the Withdrawal if required for the health and safety of the public, or the common defense and security. 40 CFR 194 contains provisions for active and passive institutional controls (Sections 194.41 and 194.43 respectively). The 40 CFR 194 provisions for active institutional controls are consistent with 40 CFR 191. However, assumptions pertaining to active institutional controls shall be supported by a description, including location and period of time the controls are proposed to remain active. 40 CFR 194 also requires a plan for pre-closure and post-closure monitoring. The provisions for passive institutional controls are the same as 40 CFR 191.	DOE plans to use active institutional controls fences and guards to prevent intrusion into the repository for 100 years after the disposal phase ends. DOE will develop and construct passive institutional controls to inform people in the future of the nature of the repository.
DOE O 435.1, *Radioactive Waste Management* (Change 1, 8-28-01).	DOE O 435.1 implements DOE's authority and responsibility under the AEA to ensure that radioactive waste is managed in a manner that is protective of worker and public health and safety, and the environment. For the purposes of establishing low-level radioactive waste disposal facility concentration limits, DOE O 435.1 requires assessment of doses to an inadvertent intruder assuming that institutional controls are effective for at least 100 years, or for longer periods if justified (such as by passive institutional controls). It also requires that institutional control measures be integrated into land use and stewardship plans (long-term surveillance and maintenance plans) and continue	Inventory control, monitoring contents of waste containers, maintaining a paper trail on the transfer of wastes, and related functions. These comprise a system of controls to assure that the facility's performance is maintained within an appropriate margin of safety. Institutional control measures must be incorporated into the site's land use and long-term surveillance and maintenance plans and programs to ensure control of

B. USE OF INSTITUTIONAL CONTROLS IN RADIOACTIVE WASTE MANAGEMENT AND DISPOSAL.		
Law, Regulation or Directive	**Relationship to Institutional Controls**	**Types of Controls**
	until the facility can be released under DOE 5400.5. The objective of this requirement is to ensure that institutional control will continue until the low-level waste disposal facility can be released for unrestricted use. DOE M 435.1-1 (Change 1, 6-19-01), and related guidance identify several opportunities for the use of institutional controls in the management of radioactive waste.	the site is not compromised.
The Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) 10 CFR 40, *Domestic Licensing of Source Material* 40 CFR 192, *Groundwater Standards for Remedial Actions at Inactive Uranium Processing Sites*.	The UMTRCA directed DOE to provide for the stabilization and control of inactive uranium mill tailings in a safe and environmentally sound manner to minimize or eliminate radiation health hazards to the public. DOE's long-term control and maintenance of the mill tailing sites are subject to NRC general licensing requirements (with no license termination) for custody and long-term care in 10 CFR 40 which requires Federal (DOE) ownership, monitoring and maintenance, in perpetuity, and to EPA's generally applicable standards in 40 CFR 192 that govern the stabilization and cleanup of inactive uranium and thorium mill tailings sites. Title I and Title II disposal cells are designed to be effective for 1,000 years, or at least 200 years, with no more than custodial maintenance (40 CFR 192.02 (a)(d); 10 CFR 40 Appendix A, criterion 6).	The cover system (i.e., rock or vegetative) drainage controls and other features that contribute to cell performance; boundary monuments, site markers, entrance and perimeter signs, and fences; and ground water monitoring, if required, are all examples of institutional controls that are used in DOE's long term control and maintenance of the mill tailing sites.

C. USE OF INSTITUTIONAL CONTROLS IN ENVIRONMENTAL PROTECTION		
Law, Regulation or Directive	**Relationship to Institutional Controls**	**Types of Controls**
DOE O 450.1, *Environmental Protection Program*	DOE O 450.1 establishes a general framework for DOE's environmental protection program. This order requires that each DOE site implement an EMS as part of the site's ISMS. The site-wide EMS must provide for the systematic planning, integrated execution, and evaluation of programs that ensure public health and environmental protection, pollution prevention, and compliance with DOE directives and applicable laws. Institutional controls are tools to be integrated into the EMS implementation framework to help protect the public and the environment. The ISMS/EMS can support site-wide and programmatic decisions on DOE's planning, maintenance and implementation of institutional controls.	
National Environmental Policy Act (NEPA)	Under NEPA and the Council on Environmental Quality implementing regulations, Federal agencies, including DOE, need to consider the potential environmental impacts that could arise from a proposed action. For proposed actions that cannot be categorically excluded from analysis, agencies prepare either an environmental impact statement (EIS) or environmental assessment (EA) to consider the impacts of the proposed action and alternatives. Agencies are to consider mitigation measures for adverse impacts. In all cases where institutional controls are proposed and their environmental impacts analyzed in an EIS or EA, DOE provides an analysis in the EIS or EA of environmental impacts after 100 years, without the institutional controls. DOE sites should evaluate institutional controls as one aspect of implementation of a proposed action and alternatives within NEPA documents, as appropriate. Institutional controls may be identified as an aspect of proposed mitigation discussed in a NEPA document. DOE sites should give institutional controls broad consideration in NEPA documents, especially in site-wide EISs. NEPA analysis provides an opportunity to examine the effectiveness of different combinations of institutional controls to address the potential impacts of a proposed action, including cumulative impacts. This could provide information useful to decisions about how to integrate institutional controls needed to achieve different purposes at closely located facilities. A site-wide EIS should examine options for using institutional controls across an entire site to best meet a variety of program objectives, including operational continuity, providing for new facilities, maintaining security, and protecting natural and cultural resources.	Institutional controls could be a major element of DOE's plans to protect a resource as mitigation for an unavoidable loss of a comparable resource located elsewhere.
10 CFR 1022, *Floodplain and Wetland Environmental Review Requirements*	Much like NEPA, the primary mechanism for implementing 10 CFR 1022 is through the evaluation of alternatives and the early consideration of potential impacts. In addition, when proposing an action in a floodplain or wetland, DOE must consider mitigation. Compliance often is integrated with the NEPA process, or alternatively with the CERCLA process for	

C. USE OF INSTITUTIONAL CONTROLS IN ENVIRONMENTAL PROTECTION		
Law, Regulation or Directive	**Relationship to Institutional Controls**	**Types of Controls**
	certain proposed remedial actions. 10 CFR 1022 imposes additional provisions. For proposed actions to which the rule applies, DOE sites need to look for locations outside the floodplain or wetland and only proceed with a proposal within a floodplain or wetland when there is no practicable alternative. 10 CFR 1022 also contains relevant provisions separate from the review requirements. Section 1022.21, *Property Management*, requires that for any property in a floodplain or wetland that DOE proposes ―for license, easement, lease, transfer or disposal to non-Federal public or private parties," DOE shall identify uses that are restricted by floodplain or wetland regulations and attach other appropriate restrictions on the uses of the property, or withhold the property from being conveyed. Also, DOE must inform the parties before the completion of any transaction guaranteed, approved, regulated or insured by DOE related to an area located in a floodplain, of the hazards of locating facilities or structures in the floodplain.	
Endangered Species Act	The Endangered Species Act (ESA) makes it illegal to kill, collect, remove, harass, import or export an endangered or threatened species (animals and plants) without a permit from the Secretary of the Interior. The ESA mandates each Federal agency assure its actions are not likely to jeopardize any endangered or threatened species or critical habitat. In implementing any institutional control, DOE sites should consider the impact upon species in the vicinity of the property at issue. Any action that could potentially affect an endangered or threatened species or its critical habitat requires that the DOE site take appropriate steps, depending on the nature of the proposed action and the species or habitat potentially impacted, to comply with the ESA.	Institutional controls (e.g., Federal ownership) used at DOE sites for other purposes such as the tracts of land used as security and safety buffer zones around DOE facilities and the associated limited human access often protect endangered and threatened species and critical habitat on the DOE property and allowed local ecosystems to flourish virtually undisturbed for over a half century. Additionally, some DOE sites have established conservation easements to protect habitat on the property. Care should be taken to assure that implementation of institutional controls, however, does not adversely affect a habitat or species. For example: 1) a fence to provide security or cordon off a contaminated area could interfere with the routine activities of local endangered or threatened species, 2) construction of a guard house could lead to erosion that adversely impacts a critical stream or 3) reducing a site's perimeter in response to changed security or waste management needs might open human access to previously restricted areas in which endangered or threatened species thrived.

D. USE OF INSTITUTIONAL CONTROLS IN ENVIRONMENTAL REMEDIATION		
Law, Regulation or Directive	**Relationship to Institutional Controls**	**Types of Controls**
CERCLA RCRA 40 CFR 300, *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP)	The primary regulations governing environmental remediation are those implementing CERCLA and RCRA. The principal implementing regulation for CERCLA is the NCP (40 CFR 300). Also relevant to CERCLA implementation at Federal facilities is the 1986 Superfund Amendments and Reauthorization Act (SARA), which clarifies that Federal facilities are subject to CERCLA requirements. In addition, Executive Order 12580, Superfund Implementation (1-23-87), as amended by Executive Order 13016 (8-28-96) also clarifies that Federal agencies are responsible for implementing CERCLA at sites that fall within their jurisdiction. The NCP (40 CFR 300.430(a)(iii)(D) allows institutional controls to be used to supplement engineering controls during the conduct of the RI/FS and implementation of the remedial action and, where necessary, as a component in the completed remedy. The NCP lists nine criteria to be used in evaluating remedial alternatives (40 CFR 300.430(e)(9)(iii)). EPA uses these criteria to evaluate the appropriateness of institutional controls, noting that institutional controls should be evaluated to the same level of detail as other remedy components. CERCLA cleanup actions, including the requirements for institutional controls, can be specified and documented in CERCLA decision documents (Record of Decision (ROD), ROD Amendment, Explanation of Significant Differences (ESD), and Action Memorandum). Under CERCLA, EPA can enforce the implementation of institutional controls. It may not be able to enforce their long-term maintenance, however, if the controls rely on action by local government (e.g., zoning) or other measures outside EPA's jurisdiction. The consideration and implementation of institutional controls under RCRA generally is consistent with implementation under CERCLA. The most notable difference is that CERCLA is implemented by EPA whereas RCRA often is delegated to a state government. A state authorized by EPA to implement RCRA may apply its own set of requirements as long as they are at least as protective as those enforced by EPA are. State-specific approaches to the implementation of institutional controls vary, and DOE facilities need to be familiar with local requirements and guidance. Under the 1992 Federal Facility Compliance Act, Federal facilities are subject to fines imposed by the EPA or authorized states for non-compliance with RCRA. Institutional controls are used during active remediation, for example, to document characterization data and to prevent inadvertent use of contaminated media. If a permanent remedy is not feasible, institutional controls may be used for many years, even decades, to maintain records of residual contamination and otherwise help ensure that human health and environmental protection goals are met. The institutional controls required following cleanup would be specified in final CERCLA decision documents for the respective operating units. The scope and duration of institutional controls will be based on an evaluation of residual contamination, the location of the material (e.g., at the surface or at depth), reasonably anticipated future human land uses, and environmental impacts. In some cases, interim CERCLA	Under CERCLA and RCRA institutional controls most frequently considered are administrative or legal instruments, such as zoning controls or land use restrictions, that limit access to, or disturbance of, real property at which hazards to the public exist. In the context of environmental remediation, EPA views institutional controls as supplementary to active remediation, engineering controls, and other elements of the remedy to serve primarily to prevent inadvertent exposures to hazardous substances or to preserve the integrity of containment and monitoring systems.

D. USE OF INSTITUTIONAL CONTROLS IN ENVIRONMENTAL REMEDIATION		
Law, Regulation or Directive	**Relationship to Institutional Controls**	**Types of Controls**
	decision documents already specify institutional control requirements that will be applied after cleanup is complete. In general, if the end state of the selected remedy cannot support unrestricted human use and unlimited human exposure, institutional controls will be required to maintain human health and protection.	
DOE P 455.1, *Risk-Based End States*	Generally, if the end state of the selected remedy cannot support unrestricted human use and unlimited human exposure, institutional controls will be required to maintain human health and protection. When the selected remedy results in the need for long-term surveillance and maintenance on site, risk control concepts should include layered and redundant institutional controls, commensurate with the risks to maintain protectiveness.	Long-term surveillance and maintenance methods.

E. USE OF INSTITUTIONAL CONTROLS IN CULTURAL RESOURCES MANAGEMENT AND HISTORIC PRESERVATION		
Law, Regulation or Directive	**Relationship to Institutional Controls**	**Types of Controls**
DOE P 141.1, *Management of Cultural Resources* DOE G 450.1-3, *Environmental Guidelines for Development of Cultural Resource Management Plans – Update*	DOE P 141.1 and DOE G 450.1-3 govern DOE management and protection of cultural resources and associated sensitive information (e.g., location of artifacts), which should be integrated into planning for, and implementing, institutional controls. Institutional controls can help DOE protect cultural resources and appropriately limit access to cultural resources. Cultural resource management actions could necessitate the development, and affect implementation, of institutional control measures in circumstances such as: 1) development of strategies and plans for the management of cultural resources, access to cultural resources, and documentation, stabilization, preservation, conservation, and restoration of cultural resources, as appropriate; 2) transfer of lands or land management responsibilities from DOE to another entity, if it could result in significant changes in the regulatory environment or management practices applicable to cultural resources on those lands; 3) removal, modification, or transfer of historic structures and/or their component parts to maintain their physical safety and/or to limit their potential exposure to contaminants; 4) decisions on placement of fencing and other measures that may disturb the ground and diminish the integrity of archaeological sites; 5) potential for security measures, such as security guards or fencing, to alter the setting of an historic structure or place of traditional cultural or religious significance, if those security measures introduce incompatible elements and diminish the qualities of setting that contribute to the significance of that place; and 6) efforts to minimize loss of cultural resources through disuse or neglect, including the deterioration of historic structures and the erosion of archaeological sites due to natural processes. Institutional controls measures should be components of the site-specific cultural resources management plans outlined in DOE G 450.1-3.	Personal property (e.g., an historic artifact) and real property (e.g., the site of a culturally or historically significant resource) can be protected from damage or removal through inventories, access restrictions, fencing, and other measures. Permits are used pursuant to the Archeological Resources Protection Act (ARPA) to regulate the excavation and removal of archeological resources. In some instances, ARPA requires restrictions on the release of information about the presence of archeological resources and sacred sites. DOE may provide for access by native peoples to resources of cultural or religious significance; researchers and scientists to archeological sites for investigation designed to contribute to the understanding of history or prehistory; and local historical organizations and tourists to certain historic sites that are preserved for the inspiration and benefit of the public.

F. USE OF INSTITUTIONAL CONTROLS IN OPERATIONAL CONTINUITY AND SECURITY		
Law, Regulation or Directive	**Relationship to Institutional Controls**	**Types of Controls**
Atomic Energy Act of 1954, as amended DOE O 470.1, *Safeguards and Security Program;* 10 CFR 862.4, *Restrictions on Aircraft Landing and Air Delivery at Department of Energy Nuclear Sites*	Institutional controls are used in many routine activities at DOE sites. For example, on a daily basis DOE sites use institutional controls to implement site safety and physical security requirements under the Atomic Energy Act. Coordination with applicable DOE security directives such as DOE O 470.1 will assure that security needs are integrated into the institutional controls and should also ensure that information released to the public does not compromise DOE's primary missions or safety priorities. Airspace restrictions are derived from 10 CFR 862.4 and are maintained at several DOE sites primarily for security purposes, along with restrictions on the use of on-site landing facilities. This form of institutional control can be implemented in cooperation with external agencies, such as the Federal Aviation Administration. Institutional controls are also used routinely to maintain the continuity of operations. This is achieved through a number of familiar mechanisms such as restricting digging without first confirming the absence of buried cables and restrictions on access to the property for utility maintenance activities. DOE P 454.1 sets a framework for integrating these types of operational and security institutional controls with institutional controls that might serve more tailored purposes such as those described in other sections of this guide. DOE O 450.1 Section 4.a.(2) requires the ISMS/EMS to include procedures to manage, control, and mitigate the potential impacts of site activities with significant environmental impacts. Implementation of this requirement can support the institutional controls framework. DOE P 454.1 encourages a holistic approach to the relationship among these various controls to maximize efficiency, protectiveness and cost-effectiveness.	DOE ownership of a site and restrictions on access to the site as a whole are two types of institutional controls that are integral to a site's basic operation. These site-wide institutional controls provide a layer of protection that may be reinforced at specific areas by more focused institutional controls (e.g., even more restrictive access provisions). Airspace restrictions placed upon persons or aircraft entering or otherwise within or above areas within the boundaries of lands or waters subject to the jurisdiction, administration, or in the custody of the DOE at sites designated by DOE

G. USE OF INSTITUTIONAL CONTROLS IN LAND MANAGEMENT, LEGACY MANAGEMENT AND STEWARDSHIP		
Law, Regulation or Directive	**Relationship to Institutional Controls**	**Types of Controls**
Department of Energy Organization Act Atomic Energy Act of 1954, as amended DOE O 430.1B, *Real Property Asset Management* DOE P 430.1, *Land and facility Use Planning* DOE P 580.1, *Management Policy for Planning, Programming, Budgeting, Operation, Maintenance and Disposal of Real Property*	Although external regulators play an important role in assisting DOE identify institutional control needs, they do not share DOE's responsibilities as the Federal land manager for DOE sites. DOE managers need to implement the Department's land management responsibilities, which may include responsibilities derived from CERCLA and RCRA in addition to those derived from other laws and regulations. Although institutional controls may impose site access and land use restrictions, DOE, as the Federal land manager administering the institutional controls program, has the flexibility to allow productive uses of the land provided that the integrity and long-term performance of the site are not affected adversely. For example, DOE could permit cultural resource management studies or ecological research, or other educational or scientific purposes. DOE P 454.1 establishes the framework under which DOE should manage property under its control in a way that addresses **all** institutional control needs. Early in the planning stages for institutional controls at a site, an ISMS/EMS approach should help DOE sites address limitations imposed on institutional controls in an integrated manner. For example, institutional controls could be used to limit access to, and development of, a parcel of land with residual contamination. If regulated under CERCLA, the provisions for use of institutional controls within the context of environmental remediation would apply. With respect to aspects of DOE's operations other than environmental remediation, the parcel in this example could be located within or adjacent to a security buffer zone at a DOE site. Waste disposal operations or storage facilities might be located on or nearby the parcel. Important cultural, historic or ecological resources that must be protected or preserved could be located in the area. Consideration of these and other factors could lead to application of a different set of institutional controls than if protecting the public from residual contamination were the sole objective of the controls. DOE O 430.1B, establishes DOE's corporate approach to real property life-cycle asset management and contains several provisions related to institutional controls. DOE O 430.1B has additional provisions regarding the transfer of real property, including requirements to update FIMS. DOE G 430.1, *Transition Implementation Guide* (4-24-01) provides additional related information.	For the purposes of DOE O 430.1B institutional controls are those Governmental controls such as deed notifications, easements, use restrictions, leases and other property interests that are inventoried as records and notes in records in the Facilities Information Management System (FIMS).

APPENDIX B. EXAMPLES OF SITE-WIDE INSTITUTIONAL CONTROLS

Categories of Institutional Control	Types of Institutional Controls	Objective	Protects
Warning Notices	Signs, monuments	• 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.	• DOE employees • DOE contractors • Site visitors • Inadvertent intruders • Future generations
Entry and Access Restrictions	Procedural and Security Requirements for Access	• 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.	• DOE employees • DOE contractors • Site visitors • Inadvertent intruders
	Fencing	• Restrict or prevent unauthorized access to hazardous or sensitive areas. • Provide protective barriers to standard industrial hazards. • Provide visual warnings.	• DOE employees • DOE contractors • Site visitors • Inadvertent intruders
	Physical Barriers	• Restrict or prevent unauthorized access to hazardous or sensitive areas.	• DOE employees • DOE contractors • Site visitors • Inadvertent intruders
Resource-and Land-Use Management	Land-Use and Real Property Controls, Notifications and Restrictions	• Ensure that use of the land is compatible with any hazards that exist. • Ensure that any changes in use of the land are adequately assessed before being allowed. • Ensure that the record of the property documents restrictions that will apply beyond change in ownership or management of the property. • Assure that any changes in property ownership or control, or oversight will be communicated to the appropriate parties and required notifications will be provided.	• DOE employees • DOE contractors • Site visitors • Future generations • Non-DOE entities using DOE land • Environmental receptors
	Excavation Permits	• Avoid unplanned disturbance or infiltration. • Inform and protect workers regarding potential exposure to hazardous waste. • Avoid the creation of potential pathways for the migration of hazardous waste.	• DOE employees • DOE contractors • Non-DOE entities using DOE land
	Ground Water Controls	• Ensure proper use of ground water • Ensure early detection of contaminant movement • Detect leaks	• DOE employees • DOE contractors • Site visitors • Future generations • Non-DOE entities using DOE land
	Government Ownership	• Limit or restrict access to the site, or portions of the site. • Restrict or prevent unauthorized access to hazardous or sensitive areas.	• DOE employees • DOE contractors • Site visitors • Future generations • Environmental receptors
Site Information Management	Administrative Support, Archives and Libraries	• Maintain and provide access to information on the location and nature of contamination	• DOE employees • DOE contractors • Site visitors • Future generations