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Emergency Response
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September 2005

Long-Term Stewardship: Ensuring Environmental Site Cleanups Remain Protective Over Time

Challenges and Opportunities Facing EPA's Cleanup Programs

A Report by the
Long-Term Stewardship Task Force

September 2005

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

October 11, 2005

MEMORANDUM

SUBJECT: Long Term Stewardship Task Force Report and the Development of Implementation Options for the Task Force Recommendations

FROM: Thomas P. Dunne, Acting Assistant Administrator /s/
Barry N. Breen, Deputy Assistant Administrator /s/

TO: OSWER Office and Staff Directors
Superfund, RCRA, Tanks, and Brownfields Regional Directors
Regional Counsels
Susan Bromm, Office of Site Remediation and Enforcement
Scott Sherman, Office of General Counsel

The attached report, "Long-Term Stewardship: Ensuring Environmental Site Cleanups Remain Protective Over Time," is a result of a two-year effort by the Long-Term Stewardship (LTS) Task Force established under the One Cleanup Program. The Task Force was comprised of representatives from each of OSWER's program offices, OECA, OGC, Regions and the states of Arizona, Illinois, Missouri, New Jersey and Virginia. The Task Force was charged to identify and examine the wide spectrum of LTS issues, perspectives, and ongoing activities - and recommend potential activities for EPA to consider in its planning. We thank the Task Force members for their time and effort in producing this report. We believe that this document will be a good point of departure in developing an implementation strategy for LTS issues.

LTS encompasses a broad range of complex issues and many State, Federal and local programs are dealing with them. The Task Force suggests that EPA work with its regulatory partners to determine the strategic priority for activities to be implemented. Therefore, we have asked the Land Revitalization Office to work with your offices, Region 6 (as the sub-lead region for land revitalization), OECA, OGC, and the states to identify and analyze implementation options to address the LTS Task Force recommendations. We would like to have the implementation options available to share with ASTSWMO, ECOS and other Federal agencies by January 31, 2006. We have also directed the Land Revitalization Office to ensure that the implementation options address LTS issues at federal facilities, as agreed to in the Memorandum of Understanding (MOU) between EPA, ECOS, the Department of Defense, the Department of Interior, and the Department of Energy.

We look forward to your continuing involvement in LTS planning and future collaborative efforts. Please provide the name of your staff lead for this project to Ellen Manges (Land Revitalization Office staff lead) by October 18.

cc: ***Long-Term Stewardship Task Force:***

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Attachment

Acknowledgments

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This report would not have been possible without the contribution of the many individuals listed below who participated in EPA's Long-Term Stewardship Task Force. The Task Force was organized and chaired by EPA's Land Revitalization Office (Edward Chu, Acting Director) within the Office of Solid Waste and Emergency Response.

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Disclaimer

This report is a work product of the Long-Term Stewardship Task Force. The report is intended to provide information to EPA management, program staff, and other stakeholders for their consideration and to inform and encourage discussion on the topic. The statements in this document do not constitute official Agency policy, do not represent an Agency-wide position, and are not binding on EPA or any other party.

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Executive Summary

The cleanup remedies for contaminated sites and properties often require the management and oversight of on-site waste materials and contaminated environmental media for long periods of time. Long-Term Stewardship (LTS) generally refers to the activities and processes used to control and manage these material and media, and ensure protection of human health and the environment over time. Clear and effective LTS allows for beneficial and protective use of these properties. The EPA and its regulatory partners rely on LTS after construction of the remedy and for as long as wastes are controlled on site. LTS can last many years, decades, or in some cases, even longer. LTS involves ongoing coordination and communication among numerous stakeholders, each with different responsibilities, capabilities, and information needs. The importance of LTS is even clearer when you consider that thousands of contaminated sites throughout the U.S. may now or in the near future require post-cleanup monitoring and maintenance.

LTS is increasingly presenting challenges and issues to EPA and other regulatory agencies responsible for ensuring its implementation, oversight, and enforcement. In response, EPA identified and gathered State and EPA staff with a broad perspective of views to form the Long-Term Stewardship Task Force in spring 2004. The LTS Task Force consists of representatives from EPA and States in the Brownfields, Superfund, RCRA, Federal Facilities, and Underground Storage Tank (UST) cleanup and enforcement programs. The Task Force was asked to identify and examine the wide spectrum of LTS issues, perspectives, and ongoing activities - and recommend potential activities for EPA to consider in its planning. LTS encompasses a broad range of complex issues and many State, Federal and local programs are dealing with them. The Task Force recognized that not all of the report recommendations may be acted upon or appropriate for every program, and suggests that EPA work with its regulatory partners to determine the strategic priority for activities to be implemented.

The purpose of this report is to present the particular LTS challenges and opportunities for improvement identified by the Task Force, and to make recommendations for how EPA and its State, Tribal, and local partners should proceed in addressing them. This report also includes a definition of long-term stewardship, why long-term stewardship is important, and what EPA and others are currently doing to address LTS issues.

The Task Force addressed a variety of challenges facing EPA and its partners when they select, implement, monitor, and enforce LTS responsibilities. These challenges generally fall into the following six categories: roles and responsibilities, institutional controls (ICs), engineering controls (ECs), costing, funding and resources, and information management. Within these categories, the Task Force identified recommendations that EPA pursue to respond to the challenges most seriously impacting Federal, State, Tribal, and local government abilities at LTS sites. While these recommendations are focused on EPA activities, many of them may be beneficial to other Federal, State, Tribal, and local program activities. In addition, the Task Force recognizes that EPA's cleanup programs operate under different authorities, may approach the cleanup and stewardship of sites differently, or may already be addressing the challenges identified in this report. *For this reason, certain challenges or recommendations may not apply to every cleanup program.*

Task Force Recommendations Summary

Roles and Responsibilities (page 14)

1. *EPA should continue to review its decision documents, agreements, and other tools as appropriate, to ensure that site-specific LTS roles and responsibilities are clearly delineated. (page 16)*

2. *EPA should continue to develop guidance addressing LTS implementation and assurance across its cleanup programs, as appropriate. (page 17)*

3. *EPA, State, and Tribal cleanup programs and other Federal agencies should invest more time working with and building stronger relationships with local governments, and conduct more training and outreach, to help them better define and understand their potential specific LTS roles/responsibilities. (page 17)*

4. *EPA should partner with other Federal agencies and State, Tribal, and local government organizations to sponsor one or more "summits" in which representatives from Federal, State, Tribal and local agencies can share their perspectives and insights on LTS. (page 18)*

Information Management (page 19)

5. *EPA should continue to facilitate the maintenance and exchange of LTS information through existing grants and other resources, and by establishing and promoting data standards (e.g., data element registries and XML schema and tags). (page 20)*

6. *EPA should continue to support the development of mechanisms for sharing information to prevent breaches of institutional and engineering controls. (page 20)*

LTS Costs (page 22)

7. *EPA should evaluate current LTS costing guidance and, if appropriate, either revise it or develop new guidance to improve the Agency's ability to produce more consistent and reliable cost estimates. As appropriate, EPA should draw on existing governmental and non-governmental studies and information for estimating LTS costs. (page 22)*

Institutional Controls (ICs) (page 24)

8. *EPA should develop mechanisms and criteria across its cleanup programs for evaluating the effectiveness of ICs at sites. (page 25)*

9. *EPA should support the development of an analysis of institutional controls to determine the reliance on (and burden to) State, Tribal, and local governments. (page 25)*

10. *To enhance the availability and reliability of ICs, EPA should encourage States to review the Uniform Environmental Covenants Act or similar legal provisions for potential state applicability. (page 26)*

Engineering Controls (ECs) (page 27)

11. *EPA should adopt a flexible approach for re-evaluating the effectiveness of ECs and, if appropriate, modifying ECs to optimize remedial system performance and minimize LTS costs. (page 28)*

LTS Funding and Resources (page 29)

12. *EPA should work with outside organizations to explore adequate and sustainable funding sources and mechanisms at the Federal, State, and local level to monitor, oversee, and enforce LTS activities. (page 30)*

13. *EPA should continue to explore the role of the private sector in supporting the LTS of sites and foster their involvement, as appropriate. (page 30)*

Introduction

Long-term stewardship (LTS) of contaminated sites is taking on greater significance as an increasing number of these sites are cleaned up and put back into beneficial use. Many sites cleaned up under Federal and State programs involve restrictions or limits on their use to ensure long-term protection of human health and the environment. Long-term cleanup requirements and any subsequent restrictions at these sites should be monitored, maintained, and enforced to ensure that the integrity of the remedy is protected and the site remains protective of people and the environment. Federal, State, Tribal, and local governments, responsible parties, and other site stakeholders serve as long-term stewards for many cleaned up sites.

The U.S. Environmental Protection Agency (EPA) formed the Long-Term Stewardship Task Force to evaluate the current state of long-term stewardship across its cleanup programs and to make recommendations for where EPA should focus its efforts to address particular issues or opportunities for improvements. The Task Force includes representatives from each of EPA's cleanup programs, including the Superfund, Resource Conservation Recovery Act (RCRA), Underground Storage Tank (UST), Brownfields, Federal facilities, and enforcement programs, and several State cleanup programs. The Task Force examined a variety of aspects associated with LTS, with an emphasis on the following six elements:

- Roles and responsibilities—Who is or should be responsible for implementing and overseeing LTS activities, and are these responsibilities understood and clearly communicated?

- Information management—Is there adequate information on LTS activities, is it effectively communicated, and is there a need for improved information and training?

- Institutional Controls—Are there problems with implementation and effectiveness of ICs and are there opportunities for improving how they are selected, implemented, monitored, and enforced?

- Engineering controls/remedies – Are there problems with engineering controls and opportunities for re-evaluating them and the physical remedies to reflect changing science and technology, improve performance, and optimize operation and maintenance without minimizing human health and environmental protection.

- Life-cycle costs—Are there effective methods for determining the costs of LTS activities and are cleanup programs consistently applying them when making cleanup decisions?

- Resources and funding mechanisms—Are there adequate resources to effectively carry out LTS activities and are there mechanisms to ensure funding is sustained over time?

The purpose of this report is to present particular challenges and opportunities for improvement identified by the Task Force and to make recommendations that EPA and its State, Tribal, and local partners should consider in addressing them. This report represents the first effort by the Task Force to identify and address the challenges that EPA's cleanup programs are facing. As the state of LTS evolves across the different cleanup programs, new or different issues may emerge that may result in additional recommendations. Similarly, as the Task Force and EPA's cleanup programs continue to address the many issues inherent in LTS, lessons learned and new solutions may be identified and shared with other programs.

The remainder of the report provides the background or context of LTS (including a definition and explanation of its importance), what EPA and others are currently doing to address it, and the specific LTS challenges and recommendations of the Task Force.

What is Long-Term Stewardship?

The Task Force established the following definition of LTS:

> *Long-term stewardship applies to sites where long-term management of contaminated environmental media is necessary to protect human health and the environment. Long-term stewardship generally includes the establishment and maintenance of physical and legal controls, implementation entities, authorities, accountability mechanisms, information and data management systems, and resources that are necessary to ensure that these sites remain protective of human health and the environment.*[1]

Examples of Engineering Controls

- Landfill soil caps
- Impermeable liners
- Other containment covers
- Underground slurry walls
- Fences
- Bioremediation
- Groundwater pump-and-treat and monitoring systems

Examples of Institutional Controls

- Zoning
- Notices and warnings
- Easements
- Restrictive covenants
- Other land or resource use restrictions
- Permits/Governmental Controls
- Administrative Orders

LTS activities typically center on physical and legal controls to prevent inappropriate exposure to contamination left in place at a site. Physical or "engineered" controls are the engineered physical barriers or structures designed to monitor and prevent or limit exposure to the contamination. Certain engineered cleanups will involve ongoing O&M, monitoring, evaluation, periodic repairs, and sometimes replacement of remedy components. Legal or "institutional" controls are non-engineered instruments, such as administrative and/or legal controls intended to minimize the potential for human exposure to contamination by limiting land or resource use. Institutional controls may be used to supplement engineering controls and also must be operated, monitored, and evaluated for effectiveness as long as the risks at a site are present. Informational devices, such as signs, state registries and deed notices, are commonly used informational, non-enforceable tools.

The functions of institutional controls, engineering controls, and other tools are to protect human health and the environment and to preserve the integrity of the selected remedy.

LTS helps ensure the ability of people to reuse those sites in a safe and protective manner. While reuse of a site is beneficial to the affected community, site reuse can also help ensure the protection of the remedy itself. For example, sites with active users can help ensure that LTS requirements or activities are occurring, as well as ensure that inappropriate uses of the site are not occurring (i.e., vacant sites that can be targets for trespass, vandalism, or inappropriate uses that may damage the remedies). In addition, because the use or condition of a site can change over time, it is important that LTS activities adapt to those changes and that adjustments to LTS activities are made.

LTS typically involves numerous public and private stakeholders who are responsible for implementing, monitoring, and enforcing the

[1] This definition should not in any way infringe upon or limit the authority of any party to carry out its responsibilities under various Federal and State laws.

engineering and institutional controls. These stakeholders may include government agencies at the Federal, State, Tribal, and local levels; private parties who either own the land or otherwise have an interest in the property; communities and local groups living near or affected by the site; as well as a potential range of other parties, such as land developers, financial institutions, insurance companies, and land or other third party trusts. Each stakeholder involved at a site plays a particular role and has certain responsibilities for carrying out stewardship activities.

Even though the various cleanup programs have different authorities and mechanisms for addressing LTS, there are common elements inherent to all LTS efforts. As part of its research, the Task Force has compiled a set of themes/ideas that may be of interest to other LTS programs (see Appendix A).

Because the authorities and responsibilities for carrying out these activities vary across the different cleanup programs, each program may approach LTS differently and face different types of issues. For example:

- Under the **Superfund** program, LTS activities are performed as part of the operation and maintenance (O&M) of a remedy. Responsibility for O&M is contingent upon whether the cleanup was conducted by a potentially responsible party (PRP), including Federal facilities, or whether EPA funded the cleanup. For PRP-lead remedies, the PRP continues to operate and maintain the remedy during O&M, and EPA provides oversight to ensure that it is being performed adequately. At federal facilities, LTS may be transferred to another entity, such as another Federal agency, State, or Tribe. For fund-financed remedies, States are required to pay for or assure that O&M is completed; EPA can only fund the oversight of O&M. EPA retains responsibility for determining when O&M is complete and for conducting a review and evaluation of the remedy at least every five years. For fund-lead, long-term response actions involving treatment or other measures to restore groundwater or surface-water quality, EPA funds the operation of those activities for a period up to ten years after the remedy becomes operational and functional. After ten years, responsibility for O&M is transferred to the State. EPA requires five-year review at sites that cannot support unlimited use and unrestricted exposure. In some cases, even sites deleted from Superfund's National Priorities List include an LTS component.

- Under the **RCRA** program, cleanups are conducted in connection with the closure of regulated units and in facility-wide corrective action either under a permit, imminent hazard, or other order or agreement. While not all facilities are subject to the post-closure requirements—only land disposal facilities and any facility that cannot "clean close" are subject to the post-closure care requirements—LTS is particularly important at those sites during post-closure. For instance, information submission requirements for post-closure permits specify a performance monitoring program to include, among others: information regarding protection of groundwater monitoring data, groundwater monitoring system design, etc. If the institutional control is being imposed through a RCRA corrective action permit, remedy performance monitoring (often long-term) is necessary to measure progress towards remedial goals and ensure that remedial objectives are met, especially when waste is left in place and institutional and engineering controls are employed to guarantee the integrity of the final remedy.

Responsibility for overseeing corrective action and post-closure activities belong to the authorized States. EPA maintains responsibility for monitoring and enforcing corrective action and post-closure activities in non-authorized States, on Tribal lands, and where corrective actions are carried out under Agency enforcement authority. In terms of monitoring, all RCRA permits allow authorized representatives to inspect the facility upon presentation of credentials. They also require the facility to report any non-compliance that may endanger health or the environment within 24 hours and to maintain and report all records and monitoring information necessary for compliance.

- Under the **Brownfields** program, EPA provides cleanup grants to State and local governments and non-profit organizations to carry out cleanup activities, including monitoring and enforcement of institutional controls. Specifically, a local government that receives a grant for site remediation can use up to ten percent of that grant to monitor and enforce any institutional control used to prevent human exposure to any hazardous substance from a brownfield site. States can use grant funds to establish or enhance their response program, including O&M or long-term monitoring activities. However, EPA does not have direct responsibility for LTS activities at brownfield sites and its authority to oversee cleanups and collect information is subject to the terms and operating period of the grant mechanism.

- Pursuant to the **Underground Storage Tanks (UST)** program, when a release has been detected or discovered at a UST, the UST owner/operator must perform a corrective action to clean up any contamination caused by the release from the UST. Under cooperative agreements between EPA and States, States are largely responsible for overseeing corrective actions in connection with these USTs. EPA is generally responsible for overseeing the corrective actions, including LTS activities on Tribal lands. Typically, UST owners/operators prepare a corrective action plan that the State reviews and modifies and/or approves. In some cases, the corrective action approved for a release at a UST may not achieve complete cleanup (i.e., a risk-based corrective action is undertaken). Depending on known or anticipated risks to human health and the environment, appropriate action may include site closure, monitoring and data collection, active or passive remediation, or institutional controls. In these cases, residual contamination may remain in the environment and must be monitored and/or contained to prevent further migration of the contamination.

- Under EPA's **Removal** program, it is estimated that over 7,000 removals have occurred. Because the overarching premise of the removal program is stabilization, it is likely that on-site contamination remains and that LTS is key to the proper management of these sites.

Why is Long-Term Stewardship Important?

LTS activities are critical at sites with contamination remaining and are used by EPA and its Federal and State partners to ensure:

- the ongoing protection of human health and the environment;
- the integrity of remedial or corrective actions so they continue to operate properly; and
- the ability of people to reuse sites in a safe and protective manner.

With several decades of experience, EPA and State cleanup programs have evolved and matured to a point where LTS is an ever increasing portion of their responsibilities. The nation's cleanup programs have cleaned up thousands of sites. Many of these sites have on-site contamination that requires implementation, monitoring, and enforcement of engineering and institutional controls.

LTS of contaminated sites also takes on greater importance with the increased demand for cleaned-up properties for beneficial reuse. The success of the Brownfields program in responding to—and even bolstering—market demand for properties with known or suspected contamination has led to increased demand for contaminated properties that are cleaned up under the other EPA programs (e.g., Superfund, Base Realignment and Closure). The demand and use of such sites includes those properties where some contamination is controlled on site and LTS activities are needed to ensure the continued protection of those land uses. In fact, the Superfund program estimates that approximately 80% of its sites entering the construction completion universe will require LTS. The BRAC program similarly anticipates requiring LTS at an increasing number of sites; while almost 400,000 acres have been transferred and put back into use by others, only 30% is estimated to be uncontaminated.

Site reuse and the implementation of appropriate and effective LTS activities (e.g., institutional controls) are complementary. When people look to reuse sites, it prompts a close look at the status of the site and its remedy, including LTS. This examination usually includes local governments, who may be one of the principal entities for tracking, maintaining, and enforcing institutional controls. The people responsible for these controls want to make sure they remain protective during future use and future users want to make sure that their activities are appropriate and do not cause future problems. Thus, all parties want to ensure continued implementation of appropriate and effective LTS.

The importance of LTS has never been greater with the maturation of EPA, other Federal agency, and State cleanup programs, the increasing number of sites requiring ongoing monitoring and maintenance, and the emphasis on reusing sites following cleanup.

What Are EPA and Others Doing about Long-Term Stewardship?

The Task Force recognizes that a significant amount of work has previously been undertaken within individual EPA programs, other Federal departments and agencies, States and State organizations, and non-governmental organizations. The following provides a few highlights of these efforts, and Appendix B provides a more detailed description of the studies that have been prepared and the initiatives underway.

Interagency Efforts

EPA has entered into a Memorandum of Understanding (MOU) on long-term stewardship of Federal facilities with the Department of Energy (DOE), Department of Defense (DoD), Department of Interior (DOI), and the Environmental Council of States (ECOS). The MOU provides a common understanding and agreement, and basis for discussion and coordination, among relevant Federal agencies and ECOS. The MOU provides a definition of LTS, a set of guiding principles, and the key elements or components of LTS.

The Environmental Financial Advisory Board, a Federal advisory committee composed of public and private entities that provides advice to EPA, is currently working with EPA and The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) to address the issue of the reliability of financial assurance for environmental stewardship of contaminated properties. The results of this effort will be documented in a report that should supplement and educate the work of the LTS Task Force.

EPA Activities

EPA's cleanup programs have been addressing LTS for many years and are increasingly addressing such matters through new strategies, initiatives, guidance, and pilot projects. Highlights of several key efforts include:

- The Superfund program has developed a "National Strategy to Manage Post-Construction Completion at Superfund Sites," which provides a framework of initiatives to provide greater assurance that Superfund remedies remain protective over the long-term. This strategy will help EPA focus efforts during the next five years on activities to ensure human health and the environment are protected at Superfund sites after construction is complete.

- The Superfund program has established a strategy for identifying, tracking, and evaluating institutional control effectiveness; developing an IC tracking system; engaging other government and non-government organizations on institutional control data collection standards and systems; issuing cross-program guidance on the full life-cycle of institutional controls; and piloting one-call systems and other public-private partnership efforts.

- In 2000, the Superfund program began an initiative to optimize Superfund-financed ground water pump & treat (P&T) systems, which continues today. Optimization is intended to encourage systematic review and modification to operating remedies in order to promote

continuous improvement and enhance overall remedy and cost effectiveness. Optimization also plays a key role in ensuring smooth transfer of P&T remedies to States. In addition, the Interstate Technology and Regulatory Council has a Remediation Process Optimization Team that is developing various fact sheets and training modules on optimization.

- The RCRA base program includes regulations that establish the post-closure permit and post-closure care requirements and has published guidance on completion of corrective actions, including provisions for corrective action complete with controls, when long-term stewardship is required. In addition, both OSW and OSRE are presently collaborating on a joint memorandum addressed to the RCRA Regional Divisional Directors and Enforcement Managers titled "Ensuring Effective and Reliable ICs at RCRA Facilities" that includes advice on LTS issues and presents key considerations on their implementation.

- The RCRA IC tracking component of RCRAInfo asks for information from the regulated community to allow the Agency to keep track of sites with institutional and engineering controls in place. It provides dates when institutional and engineering controls are either projected to be or are actually fully implemented.

- The UST program is currently developing a system for tracking institutional controls at sites for which they have oversight—those on tribal lands.

- The Brownfields Program is providing contractor support to ICMA to continue to enhance the LUCS.org web site to serve as a reference site for all information on institutional controls related issues, including State regulations, model laws, professional papers written on the issue, and other information related to the implementation and enforcement of institutional controls.

- The Brownfields Program collects institutional control information about certain brownfields sites in the Brownfields Property Profile Form, which are completed by cleanup and revolving loan fund grantees. The grantee indicates if an institutional control was required and if so the grantee must identify the type of institutional control. This information is available through Brownfields Envirofacts.

Other Federal Agency Activities

DoD and DOE have extensive experience addressing LTS issues at their cleaned-up sites. While they may face unique issues with respect to the cleanup of their sites, both DOE's and DoD's efforts have broad applicability to other contamination sites requiring post-cleanup care. Several noteworthy reports and initiatives are summarized below. Others are noted in the appendix at the back.

- DOE prepared a comprehensive study on LTS in 2001 to identify programmatic and cross-cutting issues and information that DOE should consider while implementing its LTS activities.

- DOE established policy to guide DOE decisions related to planning, maintenance, and implementation of ICs when such controls are used at DOE sites or utilized under a statutory program, and published a Long-Term Stewardship Planning Guidance for Closure Sites to provide a framework for planning LTS activities at DOE facilities.

- DOE/Idaho National Engineering and Environmental Laboratory (INEL) developed an LTS national science and technology roadmap program to provide the context for making LTS R&D investment decisions and guide national research priorities for LTS.

- DoD developed policy and guidance on implementing, documenting, and managing land use controls associated with environmental restoration activities.

- U.S. Navy developed a "point in time" land use control information system known as LUCIS, which is a Geographic Information System (GIS)-based database that houses environmental baseline surveys, GIS displays, site maps, deeds, and LUC summaries.

States and State Organizations

Highlights of several key State efforts to address LTS issues include:

- ECOS established a Long-Term Stewardship Subcommittee and is promoting an interagency dialogue to improve consideration of LTS in the remediation process.

- National Association of Attorneys General (NAAG) is working on a State-by-State analysis of statutory and common law in each of the States, designed to evaluate whether existing mechanisms could be used to impose effective and enforceable institutional controls.

- The National Governors' Association's LTS Committee is conducting a study (drawing on NAAG research) on Federal and State statutory issues and LTS that will examine, among other issues, the adequacy of existing mechanisms for institutional controls, and the applicability of State IC laws to Federal agencies.

- ASTSWMO has published several key documents, including a white paper on the future direction of institutional controls and LTS and a survey of State institutional control mechanisms.

Non-governmental Organizations

Several noteworthy initiatives and studies by non-governmental organizations include:

- The National Conference of Commissioners on Uniform State Laws (NCCUSL) has prepared and is actively supporting the Uniform Environmental Covenants Act, model legislation for States to adopt to remove legal barriers to implementing institutional controls.

- Environmental Law Institute (ELI) and Energy Communities Alliance (ECA), prepared a joint study on the practical implementation of LTS.

- Resources for the Future has addressed LTS issues including, among other studies, preparing a paper on the mechanisms for financing and oversight of long-term stewardship, with an emphasis on trust funds.

Private Sector

The private sector is increasingly playing a role in several aspects of LTS. For example, insurance companies and others in the risk management field are developing products and services that provide the financial mechanisms and address the liability concerns for those with LTS responsibilities at sites. Private firms are also engaging landowners and regulatory agencies, through several pilot projects, to establish not-for-profit trust mechanisms that assume a direct property interest in remediated sites and take over

all LTS responsibilities for those sites, including inspections, operation and maintenance, monitoring, and tracking implementation of institutional controls. Companies are also developing new or improved methods of monitoring sites with residual contamination and detecting possible breaches of engineering or institutional controls.

Challenges and Recommendations

The following presents a summary of the LTS challenges, and recommendations for addressing those challenges that the Task Force identified and EPA's cleanup programs should consider. Where appropriate, potential recommendations for LTS implementation and issues/concerns were identified and called out in the report by the Task Force. In addition, the Task Force recognizes that EPA's cleanup programs operate under different authorities, may approach the cleanup and stewardship of sites differently, or may already be addressing the identified challenge. For this reason, certain challenges or recommendations may not apply to every cleanup program.

* * * * *

Challenge: Ensuring that Stakeholder Roles and Responsibilities Are Clearly Understood

Although EPA cleanup programs frequently select remedies that rely on LTS activities, including ICs, the responsibility for implementation, monitoring, and enforcement is often under the jurisdiction of other levels of government and private parties. As such, there are a variety of public and private stakeholders that may be involved in selecting, implementing, monitoring, and enforcing LTS activities at a site. Each stakeholder has specific responsibilities for carrying out those activities. To be effective, each stakeholder needs to have a clear understanding of its current and future responsibilities, as well as those of any other stakeholder. The roles and responsibilities need to be clearly articulated and accepted by all parties and well documented through legal and other means. Also, involved parties need to be able to adapt to changing site and site management conditions. Appropriate mechanisms are necessary to ensure continued performance of these responsibilities, especially with the potential for change of stakeholders and site conditions over time.

ROLES AND RESPONSIBILITIES

Problem: Cleanup programs do not always clearly convey the appropriate LTS roles and responsibilities.

Goal: Ensure stakeholder LTS roles and responsibilities are clearly communicated and understood.

Recommendations:

- EPA should continue to review its decision documents, agreements, and other tools as appropriate, to ensure site-specific LTS roles and responsibilities are clearly delineated.
- EPA should continue to develop guidance addressing LTS implementation and assurance across its cleanup programs, as appropriate.
- EPA , State, and Tribal cleanup programs and other Federal agencies should invest more time working with and building stronger relationships with local governments, and conduct more training and outreach to help them better define and understand their potential specific LTS roles and responsibilities.
- EPA should partner with other Federal agencies and State, Tribal, and local government organizations to sponsor one or more "summits" in which representatives from Federal, State, Tribal and local agencies can share their perspectives and insights on LTS.

The Task Force considered the following as potential LTS challenges and opportunities for improvement:

- *Federal, State, Tribal, and local governments are not always clear on, or do not often specify, the appropriate roles and responsibilities for implementing and overseeing LTS activities.*
  - States often claim that land use controls and other types of institutional controls—a key element of LTS—are typically the responsibility of local governments.

- Local government officials often maintain that either the State or EPA has responsibility for assuring the protection at sites.
- The transfer of sites between Federal agencies can also create questions of roles, responsibilities, resources, etc.
- Local governments are not clearly assigned a role or responsibility under several statutes and regulations governing waste cleanup and management.
- Local governments are typically not a party to the formal agreements that govern cleanup at waste sites.
- Local government activities to support the LTS of sites (e.g., zoning and permitting) are typically not designed with environmental protection as an objective.
- State or local governments may not always agree with the cleanup action selected for a site, yet may be responsible for either implementing or monitoring and enforcing LTS activities.
- Sites located on Tribal lands present unique issues in determining the roles and responsibilities of EPA, States, and Tribes.

- *At some sites, it may not always be clear who has the responsibility or the ability and resources to effectively implement, monitor, and enforce LTS activities.*
  - Decision documents and agreements do not always delineate responsibilities for specific LTS activities.
  - The LTS activities, such as institutional controls, may only be identified generally in a decision document and the responsibility for their implementation and oversight left vague or based on assumptions.
  - Mechanisms that ensure the transfer of information on roles and responsibilities to other stakeholders over time need to be evaluated and developed.
  - There is a need to ensure that legal or other agreements specify the responsibilities of parties beyond the expiration or performance dates of key documents as reasonable.
- *At many sites, the responsibility for LTS falls to PRPs; however, there are circumstances in which the roles and responsibilities of PRPs are ambiguous.*
  - PRPs are not always fulfilling their LTS responsibilities, particularly when planning and designing the remedy and its LTS needs.
  - It is not always clear what the responsibilities are for PRPs in the long-term, especially if the PRP goes out of business.
  - It is important to clarify the roles and responsibilities of PRPs that are small companies with limited resources.
  - It is unclear what the roles and responsibilities are of operators of facilities when they are not the facility owner (e.g., gas station operators). In RCRA corrective actions, owners and operators commonly share responsibility for cleanups.

- PRPs need to ensure that other stakeholders involved in the implementation of LTS (e.g., insurance companies or third party trusts established by the PRP) understand and fulfill their responsibilities.

- Almost all States are authorized for RCRA closure and corrective action cleanups, so States typically have a responsibility in the selection, implementation, monitoring, and enforcement of institutional and engineering controls.

- *Future users can play an important role in the LTS of sites, but in order to do so effectively, need to be involved early and often in discussions with key players.*

  - Future users may take over certain O&M requirements, such as mowing or fence repair.

  - Future users should know any limitation associated with the property to ensure there is no unintentional damage done to the remedy.

  - Future users can discourage illegal activities that may damage remedies, such as all terrain vehicle racing on a cap.

  - Future users can help enforce institutional controls, or alert the appropriate authorities if there has been a breach. This may be especially useful if the regulatory agency is not expected to visit the facility on a regular basis.

Recommendation #1*: EPA should continue to review its decision documents, agreements, and other tools as appropriate, to ensure that site-specific LTS roles and responsibilities are clearly delineated.*

Decision documents and legal agreements (e.g., consent orders, permits, grants, and contracts) are often the tools that are used to communicate LTS responsibilities at specific cleanup sites. In some cases, such as a RCRA permit, provisions specifying the LTS responsibilities may be clear and unambiguous. In other cases, a decision document may not provide specific LTS requirements or a clear delineation of who has responsibility for each LTS component.

To ensure that there is no ambiguity as to the site-specific roles and responsibilities of different stakeholders for implementing, monitoring, and enforcing LTS, the cleanup programs should consider reviewing existing decision documents, legal agreements, contract or grant provisions, or other tools used to specify LTS responsibilities. This review needs to identify specific documents used to establish LTS responsibilities and ensure that specific LTS responsibilities are clearly identified. At a minimum, such documents may require that information be included on who specifically or what private party or organization, or specific branch of government, is responsible for each LTS activity needed, where they are to carry out those responsibilities, and how often and for how long they must do so. Where third parties are expected to fulfill certain LTS responsibilities (e.g., a holder of an easement, a trust organization), or where implementation depends on the actions of those not a party to an agreement or settlement (e.g., a local government), provisions should be included that identify their responsibilities and those of the entity who will oversee and ensure that the LTS activities are being properly carried out. It is important to note that individual programs will need to develop strategies to address deficiencies in roles and responsibilities that are identified in the review of its documents.

To provide greater flexibility during the cleanup process by ensuring that up-to-date information is available on the operational aspects of a remedy, programs should consider providing greater detail on specific roles and responsibilities during the design phase of the cleanup. In an upcoming guidance on institutional controls, the Agency asks that an Institutional Controls Implementation Plan (ICIP) be developed prior to, or at the same time, as the design for the physical remedy. The use of an Implementation and Assurance (I&A) Plan for LTS initiatives, together with inclusion of an ICIP as part of the decision documents or agreements (*see* Recommendation #2) could be the tools used to document full site-specific LTS responsibilities, or establish a process for doing so during the design phase.

Recommendation #2*: EPA should continue to develop guidance addressing LTS implementation and assurance across its cleanup programs, as appropriate.*

To ensure that adequate guidance is available to EPA and State staff and other stakeholders with LTS responsibilities, the Agency should consider developing guidance on LTS implementation and assurance. Such guidance could establish the expectations and provide the guidelines for ensuring the specific responsibilities, mechanisms, and frequency for implementing, monitoring, and enforcing LTS activities are clearly identified and assigned at individual sites, across multiple sites, or program-wide. The guidance should be developed according to the programmatic context of each cleanup program and tailored to complement existing policies, processes, tools, and guidance. For example, cleanup programs may rely on a variety of documents and tools that serve the purpose of clarifying roles and responsibilities at sites, including cleanup decision documents, model agreements, O&M plans, and institutional control implementation plans. New guidance on implementation and assurance would recognize these existing tools and incorporate them into an overall strategy or approach for ensuring that responsibilities are clear and unambiguous, and that assurance and accountability mechanisms are integrated into their implementation.

As an initial effort, EPA could identify the core set of cross-program LTS-related information that needs to be included in LTS implementation and assurance guidance regardless of cleanup program. The guidance may also provide guidelines for developing LTS I&A plans or comparable tools, where appropriate. I&A Plans are tools that EPA's cleanup programs may wish to consider adopting either on a site-specific, multiple site, or program-wide basis.

For programs where EPA does not have direct responsibility for LTS implementation and assurance (e.g., a State VCP program, or a local government grant recipient), EPA guidance could encourage these other program implementers to consider adopting similar approaches and mechanisms for delineating specific roles and responsibilities at cleanup sites, ensuring their implementation, and holding accountable those responsible for LTS.

Recommendation #3: *EPA, State, and Tribal cleanup programs and other Federal agencies should invest more time working with and building stronger relationships with local governments, and conduct more training and outreach to help them better define and understand their potential specific LTS roles/responsibilities.*

Local governments can, and often do, play an important role in the implementation of

LTS activities at a site. However, the legal, administrative, and other tools of local governments that EPA and others call upon to protect people and the environment often were not intended to serve this purpose. Moreover, local governments often do not have the necessary knowledge and expertise, nor resources to gain such expertise, to carry out LTS responsibilities. As a result, local government resources (whether people or processes) may not be adequate to fulfill the growing LTS needs across the cleanup programs. EPA, States and other Federal agencies should work with local governments—either individually at sites or on a broader basis through such organizations as The International City/County Management Association (ICMA)—to communicate LTS responsibilities and needs, provide guidance and training, and otherwise offer assistance to enhance local government capabilities. Generally, EPA and States may consider working together to provide training to local governments on LTS and on how local legal and other tools are used at waste sites to protect remedies and minimize possible exposure. At the site-specific level, EPA needs to identify, if present and available, specific opportunities for involving local governments in LTS decisions, gauging their capabilities, and taking steps to enhance those capabilities through training and other educational activities. EPA's cleanup programs may consider tailoring their outreach to local governments according to their programmatic context (e.g., existing program authorities, or current Federal-State-local relationship).

***Recommendation #4 (Cross-Cutting)**: EPA should partner with other Federal agencies and State, Tribal, and local government organizations to sponsor one or more "summits" in which representatives from Federal, State, Tribal and local agencies can share their perspectives and insights on LTS.*

The Task Force recognizes that various public and private sector organizations have undertaken a significant amount of work to research and address LTS challenges and opportunities. EPA sees a distinct opportunity for LTS stakeholders to convene one or a series of meetings to open a dialogue on the LTS challenges facing regulatory agencies. As LTS challenges affect all levels of government, a "summit" of officials representing Federal, State, Tribal, and local governments would allow stakeholders to share their insights and perspectives, resulting in a holistic view that is needed to better understand and address the issues involving LTS. Such a summit could address the challenges posed in this report —either individually or in a cross-cutting manner—as well as other challenges that may be considered a priority by other stakeholders. Participants in the summit could address whether and how best to involve non-governmental and private stakeholders to share their perspectives and approaches that may help government agencies improve their LTS responsibilities.

Potential partner organizations identified by the Task Force include ECOS, ASTSWMO, ICMA, and the Energy Communities Alliance (ECA).

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Challenge: Ensuring that LTS Information Is Managed and Shared Effectively

Without effective information management, it is difficult for stakeholders to understand and implement their LTS responsibilities effectively. Information is best managed and coordinated across different levels of government, and should be widely distributed and accessible to all stakeholders, including the public, to communicate risks and safeguards, support accountability mechanisms, and augment institutional memory. The Task Force identified the following as potential areas for concern:

- *There may be a need to improve data sharing among stakeholders at sites requiring LTS.*
  - For many cleanup programs, LTS information may not be collected and managed systematically and provided to stakeholders in a timely or meaningful way.
  - EPA and States have expressed difficulty in obtaining local information about the implementation of LTS activities.
  - Local governments and communities have difficulty obtaining information from State and Federal regulators on the status and effectiveness of LTS activities.
  - The need to communicate information to potential developers is increasingly critical to ensure the integrity of remedies and the protection of workers and nearby residents. EPA's Superfund and RCRA programs are in the process of making site information available to the public through the Internet's "Cleanups In My Community" (CIMC) Web site.
  - It is difficult for regulatory agencies to evaluate the effectiveness of LTS programs.
- *Current data management systems to support the maintenance, monitoring, and enforcement of LTS responsibilities are limited.*
  - While information management systems to track and communicate information on LTS activities have been established, data are not stored and communicated in a common way.
  - It is unclear if and how a central information management system for LTS should be developed, and who should be responsible for maintaining it.
  - A central and coordinated information management system would require extensive resources to develop and maintain.

INFORMATION MANAGEMENT

Problem: LTS information is not always easily and fully shared among relevant stakeholders.

Goal: Ensure that LTS information is managed and shared effectively.

Recommendations:

- EPA should continue to facilitate the maintenance and exchange of LTS information through existing grants and other resources, and by establishing and promoting data standards (e.g., data element registries and XML schema and tags).
- EPA should continue to support the development of mechanisms for sharing information to prevent breaches of institutional and engineering controls.

- Electronically stored records will need to remain accessible over time even as information management technologies change.

- Some Federal, State, Tribal, and local governments may not have adequate resources to develop, maintain, or support a system, especially now when their operating budgets are being reduced.

- Local government involvement is critical to ensure data is current and accurate—yet their resources to exchange data may be limited.

- To be most effective, information management systems (and those who develop and maintain them) need to use a universal set of terms and definitions.

- *Certain private sector organizations are developing systems that support the tracking of information on institutional and other LTS activities.*

  - Market-based monitoring and information tracking services are being developed independently by the private sector. For example, Terradex Corporation's information tracking system allows it to offer proactive notification services when a potentially inappropriate land use is identified, because it may violate an IC or an EC.

- *Other Federal agencies are developing innovative methods to preserve information. For example, DOE is building monuments and museums at some sites helping to maintain or create a "community memory" that will continue across generations.*

***Recommendation #5**: EPA should continue to facilitate the maintenance and exchange of LTS information through existing grants and other resources, and by establishing and promoting data standards (e.g., data element registries and XML schema and tags).*

Information management is central to properly communicating the responsibilities and environmental issues that exist when a site enters the world of LTS. EPA could consider continuing to fund the development of State and local information systems that track LTS data through such funding vehicles as the Brownfields program section 128(a) and OEI's grants. In addition, while there may be difficulties in creating a central database of LTS information, the sharing of LTS data must continue to grow beyond its current partners and scope. EPA plans to continue its work on the development of a common LTS "language." Using a common set of LTS terms and data names allows regulators, developers, prospective purchasers and the general public to exchange necessary site information. Data registries can be used to align and store this IC/EC/LTS terminology and thereby facilitate the exchange and communication of data.

It is worth noting that although it makes sense to have a common data standard, the States may already be comfortable with their own data standards, and may not want to change to an EPA-designed set of data standards, especially if it costs them to implement.

***Recommendation #6**: EPA should continue to support the development of mechanisms for sharing information to prevent breaches of institutional and engineering controls.*

EPA for example is currently supporting one-call pilots in Pennsylvania, Wisconsin, California, and New York. These pilots are based on the "Miss Utility" model of a free "one call" information exchange center for

excavators, contractors and property owners planning any kind of excavation or digging. Several questions concerning the pilots still need to be answered including scope of activities to be carried out by the one-call systems, required timing of calls (proactive site planning vs. day of the dig), and resource needs to modify the one-call system to include LTS data.

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Challenge: Understanding and Considering the Full, Life-cycle Costs of Long-Term Stewardship When Making Cleanup Decisions

The cost of LTS activities should be a key factor when making cleanup decisions. Risk-based approaches relying on LTS activities may appear as less expensive alternatives. However, leaving waste onsite may require long-term management for years, decades, or possibly even longer. Costs associated with the LTS at these sites include implementing and maintaining institutional and engineering controls, oversight and enforcement by governmental or other entities, and other monitoring and administrative activities. These costs should be calculated and fully considered when making remedial decisions at a site. It is also important to note the LTS costs to non-governmental entities such as PRPs and future users.

The Task Force identified the following as potential areas for concern:

- *A consistent and reliable method for defining and estimating full life-cycle costs for LTS is needed to inform remedial or corrective action decision making.*
  - There does not appear to be a systematic method for, or guidance to support, calculating the costs of institutional controls and other implementation, monitoring, and maintenance activities.
  - Site managers across the cleanup programs may be using different approaches to calculate estimated costs—some may employ standard engineering cost analysis while others may factor in discounting, opportunity costs, and costs of remedy failure.

LTS Costs

Problem: Accurate estimates of LTS costs may not always be developed or available.
Goal: To ensure that the full, life-cycle costs of LTS are understood and considered when making cleanup decisions and planning LTS implementation.
Recommendation:

- EPA should evaluate current LTS costing guidance and, if appropriate, either revise it or develop new guidance to improve the Agency's ability to produce more consistent and reliable cost estimates. As appropriate, EPA should draw on existing governmental and non-governmental studies and information for estimating LTS costs.

- *Accurate estimates of LTS may not always be developed and considered when evaluating the options for remedial or corrective actions.*
  - At some sites, estimates of LTS costs rely on standard assumptions about ICs and other long-term management approaches.
  - LTS cost estimates are not always developed consistently across sites.
  - *Accurate cost estimates are important to LTS implementers as they try to fully understand resource responsibilities.*

***Recommendation #7**: EPA should evaluate current LTS costing guidance and, if appropriate, either revise it or develop new guidance to improve the Agency's ability to produce more consistent and reliable cost estimates. As appropriate, EPA should draw on existing governmental and non-governmental studies and information for estimating LTS costs.*

While the Task Force is aware that costing guidance exists, this guidance is often not effective for developing accurate or reliable estimates of LTS. Because costing guidance has been developed across multiple program areas, EPA should undertake an evaluation of current costing guidance to better tie together the elements of costing and to identify possible gaps and inconsistencies. Specifically, EPA needs to gain a better understanding of such issues as the role of discounting in developing cost estimates, as well as the use of net present value—both areas have proved problematic in the past and make development of accurate long-term costs difficult to calculate. EPA may also explore working with other stakeholders to improve the guidance in these and other areas. Task Force members suggested several possible sources of information that may help in understanding LTS costs, including: the State RCRA programs' annual corrective-action LTS costs, if available; the work done by Resources for the Future regarding discounting; and ICMA's expertise on costing ICs at the local level.

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Challenge: Ensuring the Effective Implementation of Institutional Controls

Effective implementation of LTS activities should:

- Ensure that the institutional controls at a site remain in effect for as long as the contamination remaining poses a risk to human health and the environment.
- Ensure that the restrictions on the land or resources are effectively communicated to anyone who may come into contact with the site.
- Allow for re-evaluation of LTS needs to determine effectiveness and need for changes.
- Enhance the overall protectiveness of institutional controls by using them in layers and/or in series.

The Task Force considered the following as potential LTS challenges and opportunities for improvement:

- *EPA's cleanup programs increasingly rely on State and local governments to implement, monitor, and/or enforce ICs.*
- *Current property law is often inadequate to ensure the continuity and enforcement of institutional controls.*
  - Institutional controls are effective tools for land use restrictions and requirements only if their legal status under State property law and their enforceability are assured.
  - Archaic common law doctrine and other State property laws (such as tax lien foreclosure, adverse termination, and marketable title statutes) often work against long-term institutional controls, undermining their effectiveness and compromising the ability of government agencies to maintain and enforce them.
  - Current common property law can limit the long-term effectiveness of certain institutional controls because they attach those institutional controls to property ownership rather than to the property itself. Thus, while property is transferred from one party to another, the control may fail to transfer with it.
  - Current State property laws often result in inconsistent application of institutional controls across sites and present regulatory agencies with a significant burden for

Institutional Controls

Problem: Cleanup programs increasingly rely on ICs and current property law is often inadequate to ensure continuity and enforcement.

Goal: To ensure that ICs are effectively implemented and evaluated to protect remedies and avoid inappropriate exposure.

Recommendations:

- EPA should develop mechanisms and criteria across its cleanup programs for evaluating the effectiveness of ICs at sites.
- EPA should support the development of an analysis of ICs to determine the reliance on (and burden to) State, Tribal, and local governments.
- To enhance the availability and reliability of ICs, EPA should encourage States to review the Uniform Environmental Covenants Act or similar legal provisions for potential State applicability.

frequent and ongoing monitoring and enforcement.

- *Cleanup programs generally do not have specific processes or performance standards in place to evaluate the effectiveness of institutional controls.*
  - There are existing processes for evaluating whether ICs have been implemented (e.g., Superfund has five-year reviews, RCRA uses its tracking system), however, they generally do not address whether they are effective or implemented correctly.
  - There may be opportunities to reduce the time and resources needed to implement institutional controls through an effective institutional controls evaluation process (i.e., institutional control optimization).

***Recommendation #8**: EPA should develop mechanisms and criteria across its cleanup programs for evaluating the effectiveness of ICs at sites.*

EPA and State programs need to ensure that the effectiveness of LTS, and institutional controls in particular, are periodically evaluated. Such an evaluation needs to go beyond simply determining whether an institutional control has been implemented, but rather whether the institutional controls are being implemented effectively and accomplish what they were intended to do. In other words, the evaluation should focus on determining whether the right information is being communicated to the right people at the right time.

Each cleanup program is encouraged to explore mechanisms for integrating the evaluation of institutional control effectiveness into their existing program operations. Likewise, to evaluate the effectiveness of institutional controls, it is necessary to know what to evaluate and what questions to ask; for example, not just that an easement or covenant was recorded, but whether it was recorded properly given the local laws and processes. Thus, a set of criteria or similar device would assist programs in evaluating the effectiveness of institutional controls at both the site-specific level, as well as for an entire program. The Superfund program is developing a standard set of questions for evaluating the performance of institutional controls. The Superfund program is encouraged to continue its development of institutional control evaluation questions, and to share them with other EPA, State, and Tribal cleanup programs. The objective is to ensure that cleanup programs have the proper mechanisms and tools available to determine whether or not institutional control implementation is effective or whether additional steps are needed to ensure their effectiveness. Such evaluations should occur more frequently than every five years, as many things can change with respect to whether and how institutional controls are being implemented at a site.

***Recommendation #9**: EPA should support the development an analysis of ICs to determine the reliance on (and burden to) State, Tribal, and local governments.*

Because many cleanups involve managing wastes on site, restrictions on the use of the site are necessary. Often, EPA must rely on State, Tribal and local government laws and processes to provide the necessary restrictions, and on those government agencies to monitor restrictions to ensure that they are being implemented properly. This reliance on State, Tribal and local governments appears to be resulting in a significant burden that is only increasing as more sites enter the post-cleanup stage. EPA should analyze the extent to which its cleanup

programs rely on State and local governments to implement, monitor, and enforce institutional controls and the extent to which these stakeholders are incurring a burden that may affect their ability to ensure the effectiveness of institutional controls. Such an evaluation should be conducted in concert with, and inform decisions related to, the recommendations provided under the funding and resource challenge below.

***Recommendation #10**: To enhance the availability and reliability of ICs, EPA should encourage States to review and consider the Uniform Environmental Covenants Act or similar legal provisions for potential State applicability.*

To address some of the shortcomings of State and local property laws with respect to institutional control implementation and enforcement, the National Conference of Commissioners on Uniform State Law (NCCUSL) promulgated in 2003 the Uniform Environmental Covenants Act (UECA). NCCUSL is made up of lawyers chosen by the States and oversees the preparation of proposed uniform laws, which the States are encouraged to adopt. UECA is intended to provide a uniform set of provisions that States could adopt to overcome the inadequate common law rules affecting land use controls. It provides clear rules for a perpetual real estate interest—an environmental covenant—to regulate the use of contaminated properties when real estate is transferred from one owner to another. By ensuring that institutional controls are maintained and enforced, UECA would help to fulfill the dual purposes of such restrictions—the protection of human health and the economically viable reuse of the property in question.

It is advisable that EPA should support the concepts or tenants of UECA or similar laws that address the problems associated with various archaic property law that govern in numerous States. In supporting such provisions that establish a legal basis for environmental covenants or their equivalent, EPA and States may be able to better select, implement, monitor, and enforce land use restrictions, resulting in more protective and cost effective remedies. Support of legal provisions comparable to UECA should come in the form of senior management statements of support (written or during presentations), dialogue with organizations representing States (e.g., ASTSWMO), Regional-State dialogue, and other general support through programmatic communications and documents.

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Challenge: Ensuring the Effective Implementation and Evaluation of Engineering Controls

Engineering controls used to clean up a site may require LTS activities to ensure that the remedy functions properly and remains protective. To maintain the effectiveness and operational integrity of the engineering component of a remedy, LTS activities typically involve ongoing O&M, including performance monitoring, and periodic reviews and inspections. In addition, LTS activities may include periodic reviews of the engineering controls to improve their performance and/or reduce the annual operating cost of remedies without compromising protectiveness. Remedies involving engineering controls, and using monitoring networks, are designed and constructed based on the best knowledge of site conditions and technologies available at the time of construction.

The Task Force considered the following as potential LTS challenges and opportunities for improvement:

- *There does not appear to be a specific process or mechanism for evaluating the effectiveness of ECs and for determining whether changes are necessary.*
  - Some remedies where contamination has been left in place are not reviewed periodically to ensure that the remedies are still protective
  - Additionally, current Superfund EC evaluation guidance only covers a small subset of sites- e.g., there is a universe of sites that do not fit into the 5-year review cycle and that are not being reviewed.
  - O&M plans do not always account for changes in science and technology, and how such changes could be factored into a remedy evaluation process.
  - Changes in site conditions or new science may alter the exposure assumptions and cleanup standards. This could make existing ECs (and ICs) overly protective or inadequate.
  - Changes in cleanup or LTS technologies may result in the identification of a more cost-effective remedy, or alternatives to the existing engineering controls, particularly as the life expectancy of those controls approaches.
- *Private sector firms may be developing new technologies (e.g., materials engineering, remote sensors, computing technology, and geochemistry) and methodologies to support the monitoring of ECs and other oversight responsibilities at sites.*

Engineering Controls

Problem: There does not appear to be a specific process or mechanism for evaluating the effectiveness of ECs and for determining whether changes are necessary if the ECs are not protective of human health and the environment.

Goal: To ensure that ECs are effectively implemented and evaluated to improve their reliability and effectiveness over time.

Recommendation:

• *EPA should adopt a flexible approach for re-evaluating the effectiveness of ECs and, if appropriate, modifying ECs to optimize remedial system performance and minimize LTS costs.*

***Recommendation #11**: EPA should adopt a flexible approach for re-evaluating the effectiveness of ECs and, if appropriate, modifying ECs to optimize remedial system performance and minimize LTS costs.*

A significant element in reducing LTS costs may come from advancements in the fields of science and technology. In some cases, a new treatment technology may make retrieval and treatment more cost effective than ongoing long-term care and thus alleviate the need for a site to remain under long-term stewardship care. EPA, State, and Tribal cleanup programs may consider adopting a flexible approach and continually work to identify where new developments could be applied to LTS activities, or where advancements are desired. EPA and States may identify opportunities to enhance LTS operations by reducing risk, improving the reliability of monitoring methods used or employing new treatment technologies, or by reducing cost. This recommendation is not intended to create any new obligation for remedy review by EPA or the States. However, it is recommended that existing programmatic remedy reviews and optimization efforts consider new technologies and activities which would improve the effectiveness and or reduce the cost of LTS activities.

In order to provide new technologies for monitoring sites and optimizing remedies, the Federal Agencies and Departments should continue their investment in technology development.

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Challenge: Ensuring that Funding and Other Resource Needs Are Adequate and Sustainable

A reliable funding source or mechanism is needed to ensure that the LTS responsibilities are fulfilled. For responsible parties, operating facilities, and new landowners, this may involve securing funding or other financial mechanisms. For government agencies with oversight and enforcement responsibilities, this may involve obtaining adequate funding through an annual appropriations process. With a true understanding of the life cycle LTS costs and a reliable source and mechanism for funding, sound decision-making will lead to cleanup actions that are both effective and fiscally responsible.

- *Given the fiscal constraints that Federal agencies, States, Tribes, and local governments are facing, funding to support LTS is uncertain and may impact their ability to effectively monitor and enforce such activities.*
  - As more sites reach the post-cleanup stage, State governments are shouldering an increasingly large burden to carry out their LTS responsibilities.
  - State, Tribal, and local governments currently face significant funding constraints as they are subject to shrinking appropriations from their respective legislatures.
  - Local governments may also face similar funding constraints as States turn to them for monitoring and enforcement needs.

LTS Funding and Resources

Problem: It is not clear that reliable funding is available to ensure that LTS responsibilities are fulfilled over the long term

Goal: To ensure that LTS funding and other resource needs are adequate and sustained so that LTS activities are effectively carried out for as long as necessary

Recommendations:

- EPA should work with outside organizations to explore adequate and sustainable funding sources and mechanisms at the Federal, State, and local level to monitor, oversee, and enforce LTS activities.
- EPA should continue to explore the role of the private sector in supporting the LTS of sites and foster their involvement, as appropriate.

  - Other Federal agencies, such as DOI, do not have adequate funding for LTS activities.

- *State, Tribal, and local governments may have additional resource needs to meet their LTS responsibilities.*
  - State, Tribal, and local governments need resources to develop and/or enhance their institutional and personnel capabilities (e.g., to educate and train their staff).
  - States and Tribes need additional resources to develop information systems to monitor sites, track activities, and share information among the stakeholders.

- *State and local government funds earmarked for LTS activities may be re-programmed to other activities based on changing priorities.*
  - Funds intended for LTS activities do not sit in escrow or other protected accounts and, therefore, may be directed for use by other

environmental, or non-environmental, programs if priorities change.

- *New or alternative mechanisms for conducting and funding long-term stewardship activities (e.g., insurance, trust funds) are increasingly becoming available.*
  - States, such as Wisconsin and Massachusetts, have developed their own programs where insurance companies take over the LTS management for a portfolio of sites.
  - Private sector firms have demonstrated (through pilot projects with EPA and States) the viability of third-party trust mechanisms to assume a direct property interest in remediated sites and take over all LTS responsibilities for those sites, including inspections, operation and maintenance, monitoring, and tracking implementation of institutional controls.

***Recommendation #12**: EPA should work with outside organizations to explore adequate and sustainable funding sources and mechanisms at the Federal, State, and local levels to monitor, oversee, and enforce LTS activities.*

Based on the current fiscal environment, funding to support LTS is uncertain and may be inadequate to implement necessary LTS activities. EPA may work with State and local organizations to conduct an analysis of funding issues, needs, and sources to determine whether adequate funding is available to fully implement LTS responsibilities across all sectors of government. In addition, as environmental budgets tighten at all levels of government, the governmental units responsible for LTS are going to have to be more creative in finding sources of funding for these activities. Insurance programs in States like Wisconsin, as well as activities such as New Jersey's annual LTS management fee program, and Federal tax incentives need to be evaluated to determine their potential for more widespread use in the LTS arena.

***Recommendation #13**: EPA should continue to explore the role of the private sector in supporting the LTS of sites and foster their involvement, as appropriate.*

Where there is a viable owner/operator or other responsible party, such as at many RCRA, Brownfields, and UST sites, the success of LTS depends on their involvement and commitment.
It is the responsibility of the viable owner/operator to implement the selected remedy and also to conduct LTS activities at the cleaned-up site with engineering or institutional controls in place. Performance monitoring also belongs to the owner/operator or other responsible party, and is a critical aspect of remedial alternatives that leave waste in place and rely on engineering controls (e.g., caps and barrier walls).

Private entities developing innovative approaches are another potential source of LTS funding, and EPA should continue to examine these alternatives. For example, EPA should explore the viability of third party trust organizations like the Guardian Trust to determine the viability of its program and the potential benefits of its use to manage LTS sites. EPA might also want to explore the viability of alternative approaches that depend on the greater involvement of non-governmental entities, such as community or church groups to provide certain oversight or watchdog activities at LTS sites. These entities, while not in the traditional chain of government, might serve as a low-cost extra set of site monitors or historians.

Appendix A: Key Long-Term Stewardship Themes Gathered from Other Agencies and Groups

The following themes were compiled from various reports and studies conducted on long-term stewardship and represent a collective set of goals or objectives from numerous public and private organizations. Therefore, these themes reflect an ideal set of goals that may not be applicable for every situation under each of EPA's cleanup programs.

The full set of source information for the themes below can be found in Appendix B: Long-Term Stewardship Studies and Initiatives.

Roles and Responsibilities

Theme: Long-term stewardship must be a part of the remedial decision making, planning, design, and implementation processes. (Memorandum of Understanding on Long-Term Stewardship; April 9, 2003)

Theme: A mechanism for re-evaluating prior long-term stewardship decisions should be incorporated into cleanup programs. (Memorandum of Understanding on Long-Term Stewardship; April 9, 2003)

Theme: Roles and responsibilities of those funding, implementing, monitoring, and enforcing LTS responsibilities must be clearly articulated, understood, accepted, and documented at the outset. Consideration should be given for succession of replacements should original stewards no longer function. (ASTSWMO White Paper; "Institutional Controls and Long-Term Stewardship: Where Are We Going?"; May 20, 2004)

Theme: State, Tribal, and local governments should be involved in decisions affecting their roles and responsibilities in carrying out LTS activities, and evaluating the capabilities of those who are expected to carry out LTS activities. (Memorandum of Understanding on Long-Term Stewardship; April 9, 2003)

Theme: Members of the public and other affected stakeholders should be meaningfully involved in the planning and implementation of long-term stewardship activities. (Memorandum of Understanding on Long-Term Stewardship; April 9, 2003)

Information Management

Theme: Comprehensive information management systems are needed to effectively manage long-term stewardship responsibilities. (U.S. DOE Long-Term Stewardship Study, Volume 1 Report; October 2001)

Theme: Information on long-term stewardship needs to be managed and coordinated across different levels of government. (U.S. DOE Long-Term Stewardship Study, Volume 1 Report; October 2001)

Theme: Information maintained on long-term stewardship responsibilities should be widely distributed and accessible to all stakeholders, including the public, to communicate risks and safeguards, support accountability mechanisms, and instill institutional memory. (State and Tribal Government Working Group Interim Report on Information Management for Long-Term Stewardship; October 2001)

Institutional/Engineering Controls

Theme: Institutional and engineering controls must assure the ongoing protection of human health and the environment for sites with residual contamination for as long as residual contamination remains hazardous or until a reliable substitute can be implemented. (Memorandum of Understanding on Long-Term Stewardship; April 9, 2003)

Theme: Institutional controls should be clearly defined and unambiguous. (ASTSWMO White Paper; "Institutional Controls and Long-Term Stewardship: Where Are We Going?"; May 20, 2004)

Theme: Multiple levels of control and layers are desirable for any institutional control program. (U.S. Army Corps of Engineers Guidance; "Recurring Reviews on Ordnance and Explosives Response Actions"; October 2003)

Theme: Institutional controls should have a firm legal basis that makes them enforceable by persons responsible for and capable of enforcement. (ASTSWMO White Paper; "Institutional Controls and Long-Term Stewardship: Where Are We Going?"; May 20, 2004)

Theme: Institutional controls should run with the land and be free from archaic common law defenses. (ASTSWMO White Paper; "Institutional Controls and Long-Term Stewardship: Where Are We Going?"; May 20, 2004)

Theme: Institutional controls should be designed to allow maximum reuse of the land consistent with protection of human health and the environment. (ASTSWMO White Paper; "Institutional Controls and Long-Term Stewardship: Where Are We Going?"; May 20, 2004)

Theme: Systems should be in place that provide for regular monitoring and inspection to ensure LTS mechanisms and activities work as designed. (ASTSWMO White Paper; "Institutional Controls and Long-Term Stewardship: Where Are We Going?"; May 20, 2004)

Theme: Long-term stewardship oversight functions should extend over the lifetime of the contamination hazard and be able to span generations. (ASTSWMO White Paper; "Institutional Controls and Long-Term Stewardship: Where Are We Going?"; May 20, 2004)

Theme: Long-term stewardship programs should be dynamic and continually evaluate and adjust based on new information on site conditions or new technologies for cleanup and effectiveness of existing LTS activities. (U.S. DOE; "Long-Term Stewardship Planning Guidance for Closure Sites")

Theme: Assurance strategies and/or contingency plans should be considered and developed in the event of long-term stewardship failure. (Environmental Law Reporter, "Institutional Controls or Emperor's Clothes? Long-Term Stewardship of the Nuclear Weapons Complex"; November 1998)

Costs and Funding

Theme: Comprehensive life-cycle costs for long-term stewardship should be identified, understood, and incorporated into the remedy decision-making process. (Memorandum of Understanding on Long-Term Stewardship; April 9, 2003)

Theme: The amount, source, and mechanism for securing the necessary funding to manage long-term stewardship activities must be identified and found acceptable before selecting a remedy. (Memorandum of Understanding on Long-Term Stewardship; April 9, 2003)

Theme: The funding source for long-term stewardship responsibilities must be secure and sustainable. (Environmental Law Reporter, "Institutional Controls or Emperor's Clothes? Long-Term Stewardship of the Nuclear Weapons Complex"; November 1998)

Theme: Those entities with the financial capabilities and incentive to maintain, monitor, and enforce ICs should fund them. (U.S. Army Corps of Engineers Guidance; "Recurring Reviews on Ordnance and Explosives Response Actions"; October 2003)

Appendix B:

Long-Term Stewardship Studies and Initiatives

One Cleanup Program Long-Term Stewardship Task Force: Summary of *Long-Term Stewardship* Activities and Key Documents

The following is a compilation of studies, reports, and initiatives that were identified by the LTS Task Force during its discussions on long-term stewardship challenges. The Task Force recognizes that this list reflects only a portion of the entire body of work that government and non-government organizations have developed to address the various aspects of LTS. Although this list may not be complete, the intent is to identify some of the key players and their efforts to date, which may lead to an increased understanding of, and greater collaboration to address, the challenges associated with LTS.

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
General/Cross-Cutting		
1. U.S. EPA, DoD, DOE, DOI, and Environmental Council of States (ECOS) Memorandum of Understanding on Long-Term Stewardship	The purpose of this MOU is to provide a common understanding and basis for discussion and coordination between ECOS and relevant Federal agencies regarding LTS. Given that there are multiple Federal agencies conducting both cleanup and stewardship activities, a coordinated effort is needed to address LTS at these sites. Such a forum provides an opportunity for the parties to discuss LTS issues, policies, procedures, coordination mechanisms, and generally applicable tools for LTS sites. The MOU provides a definition of LTS, guiding principles, and key elements or components of LTS.	MOU signed by ECOS, EPA, DoD, DOE, and DOI on April 9, 2003 Contact: TBD
2. *U.S. EPA/OSWER* Post-Construction Completion Strategy for Superfund Sites	This document outlines EPA Superfund's strategy for post-construction completion (PCC) at NPL sites. The PCC Strategy is a management framework to aid the Agency in resource and work planning. It provides information to Agency staff, the public, and the regulated community on how the Agency intends to manage the PCC stage of the Superfund program. The PCC Strategy established five overarching goals under which specific products are planned or underway, based on need, potential impact, resources, and other program priorities.	Under development Contact: Tracy Hopkins, (703) 603-8788, hopkins.tracy@epa.gov

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
3. U.S. Department of Energy "Long-Term Stewardship Planning Guidance for Closure Sites"	Guidance provides the rationale and framework for planning LTS activities. The stated goals of the LTS planning guidance are to: focus management on post-closure requirements before cleanup is complete; facilitate development of a baseline scope, schedule, and cost for LTS; facilitate transition of sites and LTS responsibilities; and provide a mechanism to ensure continued protectiveness of remedies.	Report completed Contact: TBD
4. U.S. Department of Energy "Long-Term Stewardship Study Volume 1 – Report"	The study describes and analyzes issues and a variety of information associated with long-term stewardship, including physical controls, institutions, information, and other mechanisms needed to ensure protection of people and environment. The purpose of the study is to identify programmatic and cross-cutting issues and information that DOE should consider while implementing its LTS activities. Specific areas addressed in the study include: managing residual site hazards; managing land and real property; maintaining sustainability of LTS over multiple generations; information management; funding and financial management; and public involvement.	Final Study published October 2001 Contact: TBD
5. U.S. Department of Energy Report: "From Cleanup to Stewardship"	This background report provides a national summary of the nature and extent of DOE's current and anticipated LTS needs. It also examines some of the issues, challenges, and barriers associated with the transition from cleanup to long-term stewardship.	Final report published October 1999 Contact: TBD

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
6. Rocky Flats Stewardship Working Group The Rocky Flats Stewardship Toolbox: Tools for Long-Term Planning	Report provides an analytical matrix designed to help decisionmakers ensure that long-term stewardship requirements are thoroughly considered during the remedy selection process. The toolbox is divided into six components of LTS analysis: physical controls; institutional or administrative controls; operational and performance monitoring and maintenance; information management; periodic assessment; and maintenance by a responsible controlling authority. Toolbox only marginally addresses issue of cost, and recommends that Federal agencies revisit and improve upon how life-cycle costs are calculated.	Final Report issued June 2002 Contact: TBD
7. ECOS Long-Term Stewardship Subcommittee Interagency Dialogue: Improve Consideration of LTS in the Remediation Process	The ECOS LTS Subcommittee has been charged with addressing LTS issues for ECOS across all relevant Federal agencies and programs. The Subcommittee is coordinating its internal efforts among relevant ECOS Forums and Committees, and is also coordinating with other State executive business organizations. ECOS is interested in assuring that LTS issues are identified early and considered throughout the remedial planning, design, and implementation process. ECOS has proposed that a dialogue be held among interested governmental partners to mutually define how the current processes for considering LTS can be accelerated and improved.	ECOS' LTS Subcommittee has been inactive due to funding constraints (currently waiting for EPA funding). If funding from EPA comes through, it will work on a project to develop a case study of sites to formulate LTS standards. The Subcommittee will primarily focus on Federal Facility sites, but will also address non-Fed Facility sites. (Sites have not been selected yet). Contact: Carolyn Hanson, LTS Subcommittee, 202-624-3660; or R. Steven Brown, Executive Director, sbrown@sso.org

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
8. Resources for the Future Report: "Long-Term Stewardship and the Nuclear Weapons Complex: The Challenge Ahead"	The purpose of the report is to stimulate discussion about the need for long-term stewardship at the sites in the nuclear weapons complex. Included are the key functions of a long-term stewardship program and important institutional issues that must be addressed to develop a successful LTS program, including a pros and cons discussion of several institutional alternatives for carrying out stewardship activities. The report also presents recommendations to address the challenge of LTS at nuclear weapons sites.	Final Report published ____ Contact: Kate Probst
9. National Environmental Policy Institute Report: "Rolling Stewardship: Beyond Institutional Controls: Preparing Future Generations for Long-Term Environmental Cleanups"	Report addresses issues affecting the long-term stewardship of contaminated waste sites by posing point-counterpoint discussion of issues, and suggests next steps for policy makers to consider as they formulate solutions at the national, State, and local level. Key issues include national infrastructure to manage post-cleanup care; tailoring the Federal role; balancing Federal mandates with local/private land use controls; compiling stewardship sites and tools; funding; and identifying the universe of sites and matching solutions.	Final Report issued December 1999 Contact: TBD

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
10. Environmental Law Institute (ELI) and Energy Communities Alliance (ECA) Study on Practical Implementation of LTS	ELI and ECA have initiated a project to analyze the practical implementation of the legal authorities available to the local governments, States, DOE, EPA, and citizens to implement long-term stewardship activities at DOE facilities. ELI and ECA will focus on the following issues: Federal Statutes and Regulations; Zoning Law and Procedures; State Constitutions; Title Insurance; State Statutes and Regulations; Title Searches and Reporting Procedures; Local Ordinances and Permits; DOE, EPA, NRC Guidance; and Local Real Estate Practices. ELI and ECA will review these specific issues and the legal tools available to implement LTS at two DOE facilities. Further, ELI and ECA will interview key real estate professionals and State and local government officials to develop a "how-to" guide for each site. These two case studies and the process utilized to identify the tools available to implement LTS will be instructive for local, State, and Federal governments and citizens and ensure that each party understands the authority, practical implementation, and limits of the legal tools when selecting remedies at sites.	Under development. Contact: Seth Kirshenberg, Executive Director, sethk@energyca.org
11. Guardian Trust Pilot Study	The Guardian Trust is an outgrowth of a pilot study funded by the U.S. EPA and the Pennsylvania Department of Environmental Protection. Also participating in the study were the United States Navy, the Maryland Department of the Environment, and the California Environmental Protection Agency. The pilot study looked at innovative approaches to solving problems associated with land use and engineering controls at sites where contamination remains behind after the initial clean up. The vast majority of all environmental clean ups use risk-based methods.	Guardian Trust Pilot Study issued February 2002 Contact: TBD

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
12. Environmental Financial Advisory Board (EFAB) Report: "Protecting America's Land Legacy: Stewardship Policies, Tools, and Incentives to Protect and Restore America's Land Legacy"	This report discusses general land stewardship practices and ethics in terms of protecting "America's Land Legacy." In this report, EFAB defines stewardship, lays out guiding principles and a framework for planning a nationwide approach to stewardship. EFAB examines the tools and policies currently affecting stewardship practices and ethics, as well as the economic incentives involved. The report concludes with a series of recommendations for the Administrator of EPA. The report focuses primarily on pollution prevention and only marginally addresses long-term stewardship issues.	Final Report published February 2003 http://www.epa.gov/efinpage/efab/stewardship_2003.pdf
13. Environmental Law Reporter Article: "Institutional Controls or Emperor's Clothes? Long-Term Stewardship of the Nuclear Weapons Complex"	The article discusses the challenges that DOE faces in developing an effective LTS program, and presents findings on legal limitations and other barriers to effective LTS, including the failure to establish the types of institutions needed to manage long-lived wastes. Article concludes that existing ICs are not likely to be effective over time, and advocates the development of new legal instruments, procedures for current decisionmaking, and stewardship institutions.	Article published November 1998 Document reference: 28 ELR 10631
14. U.S. Department of Energy "Legacy Management Strategic Plan"	This strategic plan explains the responsibilities of the DOE Office of Legacy Management and outlines a comprehensive management plan for all environmental and human legacy issues.	Strategic plan completed July 2004 Contact: TBD NOTE: Submitted by Arizona DEQ

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
Roles and Responsibilities		
15. U.S. EPA/OSWER Guidance for Community Involvement in Institutional Controls	EPA is developing guidance on the role of communities in monitoring and enforcing institutional controls implemented at sites. EPA has held several workshops on IC issues, including the topic of community involvement in the IC process. Workshop participants provided recommendations, which are captured in the meeting summaries.	Under development Contact: Mike Bellot, (703) 603-8905, bellot.michael@epa.gov
16. State and Tribal Government Working Group (STGWG) Study on Land Transfers in the DOE	STGWG's Long-Term Stewardship Committee tracks DOE and other efforts to address long-term stewardship issues and contributes to the dialogue and information associated with these issues on behalf of STGWG and its members. The STGWG LTS Committee conducted surveys and investigations of selected land transfers, developed findings on such issues as *responsibility for long-term controls*, and developed recommendations for DOE improvements in area of land transfer and long-term stewardship.	Study completed October 2001 Contact: TBD
17. ELI and ECA The Role of Local Governments in Long-Term Stewardship at DOE Facilities	In this report, ELI and ECA examine how local governments are only beginning to develop the capacity to apply their experience to the highly specialized types of environmental hazards that DOE leaves behind. The report presents the results of in-depth studies of the existing and planned roles and capabilities of local governments with respect to LTS at three DOE facilities. The report provides recommendations for how DOE and local governments should work together to address LTS issues.	Final report issued 2001 Contact: TBD

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
18. International City/County Management Association (ICMA) Report: "Striking a Balance: Local Government Implementation of Land Use Controls"	This report highlights the best practices, strategies, and lessons learned from a peer exchange between local government officials from Louisville- Jefferson County, Kentucky, and Chautauqua County, New York, in which they shared information about the challenges they face and the strategies they employ to address land use controls in their communities. The report takes an in-depth look at land use controls and the challenges and opportunities that local governments and other public and private stakeholders face in maintaining them. It also addresses such issues as design and implementation of land use controls, stakeholder coordination, information management, enforcement, and funding.	Final. November, 2003. Contact: Danielle Miller Wagner Director, Brownfields Program ICMA 777 North Capitol Street, NE Suite 500 Washington, D.C. 20002-4201 http://www2.icma.org/main/ld.asp?from=search&ldid=16738&hsid=1

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
19. Energy Communities Alliance (ECA) Interagency policy meetings	ECA members conduct peer meetings to discuss the potential role of local governments in long-term stewardship at DOE facilities. ECA held its first meeting in Grand Junction, Colorado and plans to hold at least two additional meetings to scope out the specific roles at specific sites. This study should educate local governments on long-term stewardship issues, educate State and Federal government officials on the potential role of local governments when selecting remedies, and ensure that local, State and Federal government officials communicate on these important issues that impact local communities. ECA also believes that one of these meetings would be a joint State and local government meeting.	ECA held a peer meeting in Santa Fe to bring together local government and DOE officials to voice concerns about LM and LTS. A summary and next steps are currently being developed. ECA is also holding an intergovernmental meeting with DOE officials in DC in early November. The meeting will focus on LM and LTS, although the product of meeting is uncertain considering possible administration change. ECA's policy statement on Environmental Remediation and Long-Term Stewardship can be found at http://www.energyca.org/PDF/ECA2004policystatements.pdf Contact: Sara Szynwelski, Assistant Program Manager, saras@energyca.org
Information Management		
20. U.S. EPA/OSWER Institutional Controls Tracking System (ICTS)	EPA is currently developing and populating ICTS, a web-based system with a mapping component that tracks the life-cycle of ICs and allows for data sharing with stakeholders. The system is being developed in two phases, with the first focusing on collecting and maintaining basic IC information and the second expanding to include more detailed information and data exchange capabilities.	Under development Contact: Mike Bellot, (703) 603-8905 bellot.michael@epa.gov

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
21. U.S. EPA/OSWER IC Data Element Registry (DER)	EPA has drafted the IC DER as a tool to facilitate the exchange of information among existing tracking systems using common language. EPA requested input from 300 organizations within various levels of government, and organized and facilitated a series of focus groups with each stakeholder group to identify the data categories that are most important to each. To develop a common language for sharing IC information, a data element registry was developed from the resulting 35 data categories.	Draft, under development; circulating for comment before finalizing Contact: Mike Bellot, (703) 603-8905, bellot.michael@epa.gov
22. U.S. EPA/OSWER IC Data Sharing Pilot	EPA Headquarters, in collaboration with EPA Region 9, Terradex, and California local land use agencies, is conducting an IC data sharing pilot project. Through the pilot, IC information will be shared among the partners to provide increased public protection and to promote site redevelopment through the monitoring of ICs and informed land use decisions.	Ongoing Contact: Mike Bellot, (703) 603-8905, bellot.michael@epa.gov
23. Interagency Partnership Institutional Controls Tracking Network Initiative	EPA is partnering with ICMA, ASTM, ECOS, and ASTSWMO to facilitate the exchange of information within the IC Tracking Network, a voluntary network of IC tracking systems consisting of local land use tracking and permitting systems, local inventories, county recording systems, state inventories and tracking systems, Federal databases and tracking systems, and industry tracking systems.	Under development Contact: Mike Bellot, (703) 603-8905, bellot.michael@epa.gov
24. U.S. Navy Land Use Controls information System (LUCIS)	U.S. Navy has developed a land use control information system known as LUCIS, which is a Geographic Information System (GIS)-based database that houses environmental baseline surveys, GIS displays, site maps, deeds, and LUC summaries.	Ongoing Contact: TBD

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
25. U.S. Department of Energy Report: "Managing Data for Long-Term Stewardship"	Report presents a preliminary assessment of how successfully information about the hazards that remain at DOE sites will be preserved and made accessible for the duration of LTS. Report addresses such issues as defining LTS data; how data will be used for future LTS activities; how data is managed and preserved for future generations; consequences of information loss; organization and references for stewardship data; and requirements for developing a system to manage stewardship data.	Working draft report issued in 1998; final report unknown Contact: TBD
26. State and Tribal Government Working Group Interim Report on Information Management for Long-Term Stewardship	STGWG's Long-Term Stewardship Committee tracks DOE and other efforts to address long-term stewardship issues and contributes to the dialogue and information associated with these issues on behalf of STGWG and its members. The STGWG LTS Committee conducted a survey of state and tribal governments to determine the scope of potential long-term stewardship information needs, including identifying and ranking the importance of the types of information needed, potential users of information, and purposes for which information would be needed.	Survey completed and interim report prepared October 2001. Follow-up study discussed to address data gaps. Contact: TBD
27. International City/County Management Association Land Use Controls e-Library Web Site	ICMA has launched a Web site dedicated to the collection and distribution of information related to land-use controls (LUCs) at brownfields, Superfund sites, military bases, or other contaminated properties. As a clearinghouse of information related to LUCs, the electronic library (e-Library) represents a tool and resource for communities and local government professionals. The e-Library contains a wide variety of information, including public and private LUCs, model LUCs, zoning codes, restrictive covenants and easements, and site reuse plans.	Ongoing; see www.LUCS.org Contact: Joe Schilling

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
28. American Society of Testing and Materials (ASTM) Workgroup for Identifying IC Tracking Data Elements	ASTM has formed a workgroup to consider options for developing an industry standard of minimal IC data elements to ensure long-term stewardship at sites. Preliminary discussions have identified the following six general categories of information: site identification/IC location; IC instruments; IC objectives; IC restrictions/obligations; location of other IC information; and IC contact information.	Ongoing Contact: TBD
Institutional and Engineering Controls		
29. U.S. EPA/OSWER Report "Institutional Controls: A Site Manager's Guide to Identifying, Evaluating, and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups"	Provides Superfund and RCRA site managers and other decision makers with an overview of the types of ICs that are commonly available, including their relative strengths and weaknesses, and to provide a discussion of the key factors to consider when evaluating and selecting ICs in Superfund and RCRA Corrective Action cleanups.	Final Guidance, September 2000 Contact: Mike Bellot, (703) 603-8905, bellot.michael@epa.gov
30. U.S. EPA/OSWER Report "Institutional Controls: A Guide to Implementing, Monitoring, and Enforcing Institutional Controls at Superfund, Brownfields, Federal Facility, UST, and RCRA Corrective Action Cleanups"	Provides site managers and site attorneys with an overview of responsibilities for the implementation, monitoring, and enforcement of ICs at their sites, and discusses common issues they may encounter when carrying out these responsibilities.	Draft Guidance, February 2003 Contact: Mike Bellot, (703) 603-8905 bellot.michael@epa.gov
31. U.S. EPA/OSWER IC Tracking/Monitoring Pilot Projects	EPA Superfund is sponsoring several pilot projects in conjunction with State and local governments, industry, and other NGOs to monitor sites and alert stakeholders of possible activities affecting established ICs. Several pilots are exploring the inclusion of information about waste sites in existing one–call systems designed to prevent damages to utilities from excavation and other development.	Ongoing. Contact: Mike Bellot, (703) 603-8905 bellot.michael@epa.gov

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
32. U.S. EPA/OSWER The Comprehensive Five-Year Review Guidance	Document provides guidance for complying with requirements to conduct a review of the remedy every five years to ensure protection of human health and the environment for remedial actions that result in hazardous substances, pollutants, or contaminants remaining at the site. Guidance is intended to provide an approach for conducting five-year reviews, clarify current policy, provide consistency, and discuss roles and responsibilities, including community involvement.	Final issued June 2001 Contact: Rafael Gonzalez, EPA gonzalez.rafael@epa.gov
33. U.S. EPA/OSWER Guidance "Operation and Maintenance in the Superfund Program"	Document provides guidance to site managers for conducting O&M activities at sites, including O&M considerations throughout the life cycle of site cleanup and post-cleanup care. Guidance also provides information on the roles and responsibilities of EPA, States, and PRPs throughout O&M process, including EPA oversight as O&M responsibilities are transferred to States or PRPs.	Final issued May 2001
34. U.S. EPA/OSWER Guidance "Transfer of Long Term Response Action (LTRA) Projects to States"	Guidance provides key elements of the LTRA transfer process and provides guidance to site managers concerning the transfer of responsibilities from EPA to States for O&M.	Final issued July 2003

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
35. U.S. Department of Energy Policy: Use of Institutional Controls	Policy delineates how DOE will use ICs in the management of resources, facilities, and properties under its control. The policy also explains how DOE will use ICs to implement its responsibilities pursuant to various statutes, such as the Nuclear Waste Policy Act, the Atomic Energy Act, and the Resource Conservation and Recovery Act. This policy is intended to guide DOE decisions related to planning, maintenance, and implementation of ICs when such controls are used at DOE sites or utilized under a statutory program. The policy is also intended to address DOE's responsibilities related to its role as a steward of Federal lands and properties and identify activities that DOE needs to accomplish to ensure that ICs are properly used and maintained.	Final April 2003 Contact: TBD
36. DOE Idaho National Engineering and Environmental Laboratory (INEEL) Technology Innovations	In support of DOE's perspective on long-term solutions, the INEEL is concentrating considerable resources on its Environmental Stewardship Initiative. The INEEL will integrate the best science and engineering talent into its stewardship activities. The major thrust is to coordinate investments in science and technology that result in significant reductions of risk and cost, and increased protection of human health and the environment after cleanup activities have ended. Various *technological innovations* are identified to reduce costs of long-term stewardship.	Kevin Kostelnik 208-526-9642 Kvk@inel.gov

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
37. U.S. Department of Defense "Policy on Land Use Controls Associated with Environmental Restoration Activities"	Provides DoD components with environmental restoration and land use management responsibilities an overall DoD framework for implementing, documenting, and managing land use controls for real property being transferred out of Federal control and for active installations. The intent of the policy is to ensure land use activities in the future remain compatible with the land use restrictions imposed on the property during the environmental restoration process.	Final issued Contact: TBD
38. U.S. Department of Defense "Guidance on Land Use Controls Associated with Environmental Restoration Activities for Property Planned for Transfer Out of Federal Control"	This document provides DoD Components with environmental restoration and land use management responsibilities guidance on developing, implementing, recording, and managing land use controls (LUCs) for property planned for transfer from Department of Defense (DoD) to non-Federal entities. This guidance is based on DoD *Policy on Land Use Controls Associated with Environmental Restoration Activities*. This guidance provides a range of options that may be used separately or collectively for incorporating land use controls into existing land use management processes.	Final issued March 2001 Contact: TBD
39. U.S. Army Corps of Engineers Guidance "Recurring Reviews on Ordnance and Explosives (OE) Response Actions"	Guidance presents procedures for developing and implementing recurring review requirements for OE response actions. The purpose of recurring reviews is to determine if a response action continues to minimize explosive safety risks and continues to be protective of human health, safety, and the environment. Recurring reviews are conducted under the long-term management phase once a Formerly used Defense Site achieves response complete. Recurring reviews satisfies CERCLA five-year review requirements.	Final published October 2003 Contact: TBD

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
40. U.S. Army Corps of Engineers Guidance "Establishing and Maintaining Institutional Controls for Ordnance and Explosives (OE) Projects"	Document provides an overview of ICs and guidance and tools for establishing, implementing, and maintaining an IC program. The guidance also provides key principles of an IC program.	Final issued December 2000 Contact: TBD
41. National Governors Association Long-Term Stewardship Committee Report on Federal & State Statutory Framework for Effective LTS	An NGA Task Force, composed of State regulators and Governors' policy advisors, established a Long-Term Stewardship Committee. The NGA LTS Committee is conducting a study (drawing on NAAG research) on Federal and State statutory issues & long-term stewardship that will examine, among other issues, the adequacy of existing mechanisms for institutional controls, and the applicability of state IC laws to federal agencies.	NGA operates an LTS Subcommittee under its Federal Facilities Task Force. NGA holds regular meetings and conference calls primarily between State and DOE representatives, and is focusing on ICs and post-closure agreements. NGA anticipates it will produce a paper on post-closure agreements and the role of the States by the end of the year. NGA's policy statement on Environmental Compliance at Federal Facilities (NR-8) can be found on its website at www.nga.org Contact: Kara Colton kcolton@nga.org 202-624-5300

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
42. National Association of Attorneys General (NAAG) Legal Handbook of Institutional Controls	NAAG is working on a state-by-state analysis of statutory and common law in each of the states, designed to evaluate whether existing mechanisms could be used to impose effective and enforceable institutional controls. The handbook will include a general discussion of the common law in this area, the state-by-state breakdown– charts and textual material– and probably a discussion of the legal issues surrounding transfer of federal properties.	Under development Contact: TBD
43. National Association of Attorneys General In-Depth Analysis of State Authorities for Institutional Controls	In conjunction with ELI, NAAG is working on a detailed review of legal authorities and processes that govern institutional controls at three sites. The ELI analysis will be a detailed investigation of the State laws that affect land-use restrictions at the sites. For instance, the analysis will look at zoning laws, State laws related to building codes, groundwater laws, public health laws, and mining laws that might be used to restrict certain types of uses. NAAG expects to contribute State law research and analysis, descriptions of environmental regulation by the State and general review of other facets of the in-depth analysis.	Under development Contact: TBD
44. National Association of Attorneys General Review of Barriers to Federal Transfer of Land-Use Rights	NAAG expects to produce legal research related to the legal and policy issues on the barriers to Federal transfer of land-use rights, but has not decided what format to use for making the research available to the larger community. There may be a published colloquium, a law review style paper, or possibly a conference among the various knowledgeable parties.	Under development Contact: TBD

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
45. National Conference of Commissioners on Uniform State Laws (NCCUSL) Uniform Environmental Covenants Act – Model Language	Developed at the request of EPA and DoD, NCCUSL has developed standard statutory language for consideration and adoption by State legislatures to facilitate the implementation and enforcement of institutional controls at sites where residual contamination exists.	http://www.law.upenn.edu/bll/ulc/ueca/2003final.htm
46. Association of State & Territorial Solid Waste Management Officials White Paper "Institutional Controls and Long Term Stewardship: Where Are We Going?"	Paper identifies the present and future hurdles associated with the use of ICs, and what State and Federal programs should consider in developing policy to address these hurdles. The paper also provides guidance on principles that are important for an effective IC program, and should be included in any institutional control or long-term stewardship policy or strategy.	Final issued May 20, 2004 Contact: Gary King (IL), Chair, CERCLA Research Center Subcommittee
47. Association of State & Territorial Solid Waste Management Officials "Survey of State Institutional Control Mechanisms"	ASTSWMO conducted a survey of State cleanup programs to determine to what extent ICs are used nationally, and to determine the successes and issues surrounding their use. Specific elements addressed in the survey results include the frequency of use in State programs and community and local government involvement in ICs.	Survey results published in December 1997 Contact: TBD

Organization & Initiative/Study/Report	Scope & Summary	Status/Contact Information
48. American Society of Testing and Materials (ASTM) "Standard Guide for Use of Activity and Use Limitations, Including Institutional and Engineering Controls" (E 2091-00)	This guide covers information for incorporating activity and use limitations that are protective of human health and the environment into Federal, State, Tribal or local remediation programs using a risk-based approach to corrective action. Specifically, it identifies screening and balancing criteria that should be applied in determining whether any particular activity and use limitation may be appropriate. This guide identifies the need to develop long-term monitoring and stewardship plans to ensure the long-term reliability and enforceability of activity and use limitations. This guide explains the purpose of activity and use limitations in the remedial action process and the types of activity and use limitations that are most commonly available.	Guide published http://www.astm.org/cgi-bin/SoftCart.exe/DATABASE.CART/REDLINE_PAGES/E2091.htm?L+mystore+lfwd2355+1088146015
49. Environmental Law Institute Report: "Institutional Controls in Use"	This report anticipates amendments to Superfund and describes in concrete terms how institutional controls have been used at Superfund sites and in similar situations in the past. Experience with past use of institutional controls provides Superfund policymakers with valuable examples and knowledge about how best to use these tools to protect humans for as long as risk remains at a site.	Final report published 1995 Contact: TBD
50. Resources for the Future Report: "Linking Land Use and Superfund Cleanups: Uncharted Territory"	This report describes the intersection between land use and remedy selection and explores how these two processes become interconnected when pressures for site reuse and restricted cleanups converge. A key chapter of the report addresses ICs and the critical role they play in linking land use and remedy selection, including a detailed analysis of the reliability of local land use regulatory systems to maintain the viability of ICs.	Final report issued June 1997 Contact: Kate Probst

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Cost and Funding		
51. U.S. EPA/OSWER Guidance for Estimating Costs for Implementing Institutional Controls	EPA is planning to develop guidance for estimating the costs of implementing ICs. An October 2001 workshop addressed the issues associated with estimating the costs of establishing and maintaining institutional controls. The discussion and feedback was centered on five issue areas: (1) What costs should be included in IC cost estimates? (2) When is the right time to estimate/define the costs? (3) Who should develop the cost estimates and what tools can be provided to assist them? (4) How should the out-year cost evaluation be performed? and (5) Who pays for these costs in the future and what are the options for financing ICs?	Under development Contact: Mike Bellot, (703) 603-8905, bellot.michael@epa.gov
52. U.S. DOE, National Energy Technology Laboratory LTS Cost Estimating Techniques	DOE/NETL is currently leading efforts to develop separate cost estimating techniques for long-term stewardship and incorporate these modules into the Environmental Cost Element Structure, a cross-agency framework for estimating and managing environmental management costs.	Status: unknown Contact: TBD
53. U.S. DOE, Rocky Flats Environmental Technology Site Cost Estimation Methodology	DOE/RFETS developed an activity-based methodology to estimate its annual stewardship costs based on the type, cost, and duration of anticipated long-term stewardship activities.	Completed 1999 Contact: TBD

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54. State and Tribal Government Working Group Paper: "Long-Term Cost Estimation in the DOE"	STGWG conducted research on the economics and cost estimating literature and interviewed experts in these fields to identify potential alternative methodologies to DOE cost estimation methods using present worth analysis. The paper makes several recommendations for continuing to explore alternative methods for developing cost estimates of LTS commitments.	Paper issued in October 2001; efforts are ongoing Contact: TBD
55. National Governors Association Long-Term Stewardship Committee Report on Federal & State Statutory Framework for Effective LTS	An NGA Task Force, composed of State regulators and Governors' policy advisors, established a Long-Term Stewardship Committee. The NGA LTS Committee is conducting a study on Federal and State statutory issues & long-term stewardship that will examine LTS funding mechanisms and related issues.	NGA operates an LTS Subcommittee under its Federal Facilities Task Force. NGA holds regular meetings and conference calls primarily between State and DOE representatives, and is focusing on ICs and post-closure agreements. NGA anticipates it will produce a paper on post-closure agreements and the role of the States by the end of the year. NGA's policy statement on Environmental Compliance at Federal Facilities (NR-8) can be found on its website at www.nga.org Contact: Kara Colton kcolton@nga.org 202-624-5300

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56. National Governors Association Center for Best Practices Issue Brief: Funding Long-Term Stewardship of DOE Weapons Sites: Tennessee's Perpetual Care Trust Fund	Based on a 1999 agreement between DOE and Tennessee Department of Environmental Conservation, DOE is funding a trust fund to finance long-term stewardship (e.g., annual O&M) costs following the closure of an Oak Ridge disposal cell for hazardous, radioactive, and mixed wastes. This issue brief provides an overview of the trust fund approach, the challenges it may face in the future, and possible solutions to those challenges. It also provides next steps for State officials to follow to pursue the establishment of similar LTS trust funds.	Status: Unknown Contact: TBD
57. Environmental Financial Advisory Board (EFAB) Guidebook: "A Guidebook of Financial Tools"	*A Guidebook of Financial Tools* is a reference work intended to provide an overview of a wide range of ways and means that are useful in paying for sustainable environmental systems. The document presents comprehensive financing tools that include traditional means of raising revenue, borrowing capital, enhancing credit, creating public- private partnerships, and ways of providing technical assistance. The document also presents financing tools that are, will, or might soon be, available to address significant environmental priorities, including ways of lowering the costs of compliance, encouraging pollution prevention, paying for community-based environmental protection, financing brownfields redevelopment, and improving access to capital for small businesses and the environmental goods and services industry. Each tool is described along with its actual and potential uses, advantages and limitations, and references for further information.	Latest Edition: April 1999 http://www.epa.gov/efinpage/guidbkpdf.htm

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58. Resources for the Future Discussion Paper: "Long-Term Stewardship of Contaminated Sites: Trust Funds as Mechanisms for Financing and Oversight"	RFF explores different mechanisms for financing and oversight of LTS activities at both private and Federal contaminated sites, focusing primarily on trust funds. The paper evaluates two components of the issue: (1) the financial aspect, so that funds are available now and in the future; and (2) the legal and institutional aspect, to ensure that LTS activities will in fact be implemented in the future and that those commitments can be enforced over time.	Discussion paper issued December 2000 Contact: Kate Probst