

Association of State and Territorial

ASTSWMO

Solid Waste Management Officials

CERCLA and Brownfields
Research Center

Long-Term Stewardship Focus Group

**A Long-Term Stewardship State Conceptual
Framework to Estimate Associated Cost**

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INTRODUCTION

Long-Term Stewardship (LTS), the activities and processes used to manage contaminated environmental media left in place after remedy implementation, is a critical component of the cleanup process. Used to ensure long-term protection of human health and the environment, clear and effective LTS allows for beneficial and protective reuse of contaminated properties.

The United States Environmental Protection Agency (EPA) and its State and Territory (State), tribal, local, private and federal partners rely on LTS after construction of the remedy for as long as contamination and/or wastes remain at a property and need to be controlled on site. States are, generally, responsible for LTS, either solely or in collaboration with other agencies.

Traditionally, the costs associated with LTS focused mainly on the implementation of institutional controls (ICs). While ICs are critical components of the remedy, States now recognize that the cost to maintain a LTS program, which manages the ICs, has not been factored into the cost equation. LTS costs are a missing piece in estimating the true cost of the remedy and in the State's budgeting process. If these costs are not recognized, are underestimated, or not adequately provided for, it may jeopardize the ability of the State to ensure protection of public health, especially during times of decreasing budgets.

Recognizing this gap in information, the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) Long-Term Stewardship Focus Group (LTS FG) conducted research into what a comprehensive LTS program would look like and created a tool that can help States estimate costs associated with those activities.

BACKGROUND

Clear and effective LTS allows for beneficial and protective reuse of contaminated properties. However, LTS may be required for many years, decades, or, in some cases, even longer. Even if the site is remediated to unrestricted use, future changes in cleanup standards may require States to re-evaluate the continued protectiveness of a remedy.

LTS requires ongoing coordination and communication among numerous stakeholders, each with different responsibilities, capabilities, and information needs. The importance of LTS is apparent when States consider that thousands of contaminated sites throughout the U.S. may now or in the near future require post-cleanup monitoring and maintenance.

LTS responsibilities should be evaluated and defined as early as possible in the remedy selection process. A comprehensive LTS program should include the establishment and maintenance of:

- 1) institutional controls (ICs) that place activity and use limitations on contaminated property and protect the effectiveness and integrity of any engineering controls constructed on the property,

- 2) monitoring and inspection procedures,
- 3) enforcement mechanisms,
- 4) information and data management systems,
- 5) community engagement activities, and
- 6) financial resources necessary to ensure contaminated sites remain protective of human health and the environment.

Typically, analysis of LTS costs focus on the ICs, while failing to account for institutional or associated costs that are not site-specific. For example, at fund-lead Superfund sites, the costs of operation and maintenance (O&M) are generally based on site-specific costs. As a result, a range of associated costs are not considered. These include the cost to the State to:

- maintain databases and websites,
- work with stakeholders,
- support local governments,
- attend meetings and training,
- track and report data,
- enforce compliance, and
- various other indirect expenses not included in the calculation.

A complete and accurate picture of the costs of LTS, rather than just, for example, the ICs, as early in the remediation process as possible would be valuable in informing the remedy decision. Early evaluation of the long-term obligations that come with implementing, monitoring and enforcing ICs may also demonstrate support for more aggressive remediation measures that could reduce future costs and the need for ICs.

During the ASTSWMO Long-Term Stewardship Symposium that was held in Boise, ID, in 2009, the ASTSWMO LTS FG recognized that States needed more information related to the costs associated with ICs. The Focus Group also recognized that ICs are used across the universe of sites and cleanup programs, whether they are Federal Superfund, State Response, Brownfields, Voluntary Cleanup, Toxic Substances Control Act (TSCA), Resource Conservation and Recovery Act (RCRA), underground storage tank (UST) or other sites. There are opportunities to share the costs of supporting long-term stewardship across programs and sites and a clear need to do so. Previously funded EPA research conducted by the Environmental Law Institute focused on developing a model to help local governments better identify and understand their costs associated with implementing and maintaining ICs. The Focus Group chose to build on this research and focus on the costs from a State perspective, especially for those States currently in the development or implementation stage of a State LTS program. Rather than focusing narrowly on site-specific ICs costs, the Focus Group conducted a broad evaluation of all of the costs associated with LTS. From this analysis, the Focus Group has developed a [spreadsheet tool](#) to assist States in establishing or enhancing an existing ICs or LTS program and determining the costs associated with those activities.

DEVELOPING A COST MODEL

One of the first questions a State will need to consider prior to developing a LTS program is the programmatic scope of the effort. Depending upon the State program's administrative structure, components of the LTS program may be better managed at the site-specific or regulatory program level. The spreadsheet costing tool was developed to identify all potential costs to the LTS program regardless of the management structure.

The costing tool arranges the activities of State costs associated with the development and maintenance of a LTS program into categories. The remainder of this document as well as the costing tool is divided into three broad elements: 1) Program Development, 2) Implementation, and 3) Site-Specific. In the Program Development section, States would evaluate the costs associated with initial development of a LTS program. States planning to implement a LTS program would be able to use this information as a reference and planning outline when considering the scope and costs associated with creating a LTS program. The Implementation section of the costing tool evaluates the ongoing costs associated with maintaining an existing program. These general program costs would serve as the basis of estimating "infrastructure costs" that are not currently adequately accounted for when estimating O&M costs. A pro-rata of these costs would be added to the site-specific costs when decisions are made related to calculating the cost and selecting a remedy. The third section is designed to provide an outline for States to estimate site-specific costs as early as possible in the decision-making process, ideally during the study of alternatives.

Within the three broad sections of this document listed above, the Focus Group further divided activities and costs into five general categories: 1) Planning, 2) Community Engagement, 3) Information Management, 4) Monitoring and Inspection, and 5) Enforcement.

Each of the sections of the tool (Planning, Implementation, and Site-Specific) attempt to identify discrete costs. When using the costing tool, in order to ensure accuracy, care will be required to ensure that no costs are reflected more than once.

PROGRAM DEVELOPMENT

The first section in the costing tool identifies Program Development costs. This section is designed to identify costs related to the development of the LTS program. These are essentially the onetime costs that would be incurred to plan and make a LTS program operational. These costs represent various components of the capacity development process at the State level required to manage the State's LTS sites. The State's LTS efforts may range from a single remedial programmatic area, such as UST, RCRA, federal facilities, State Response Programs, Brownfields, and Voluntary Cleanup Programs, or it may involve multiple programmatic areas. The programmatic scope of the system and the costs associated with its development and implementation are related in that the broader the programmatic scope, the greater potential

efficiencies are possible. In other words, the cost per site should be lower the more comprehensive the system.

Planning

Comprehensive planning during LTS program development can result in efficient program integration across remedial programs and save overall program expenditures. One valuable first step should be an evaluation of the existing remedial program structures to identify the baseline conditions, including current gaps or limitations that will need to be considered in designing the LTS program. The planning may be completed using existing in-house staff, contracted to an outside entity, or may take the form of a “Kaizen” interactive analysis. Costs, therefore, may vary considerably depending on the approach taken. The range of activities that are included in this category should be captured on one or more of the detail lines listed below the planning heading.

Community Engagement

Public involvement, education and understanding are critical for a successful LTS program. Local stakeholders are essential to the planning and implementation of an effective LTS program. Local partners need to be engaged in the design and implementation of the remedy and to understand the importance of LTS. Communication is vital for effective community engagement. The costs associated with developing and supporting community participation in program development and participation through the process of identifying stakeholders and developing communication strategies should be itemized within the detail lines below the community engagement heading.

Information Management

The development of an effective information management system is critical to the effectiveness of a LTS program. The costs of designing the information management (IM) system can vary greatly, depending on the platform, functionality, and scope of the system. The costs will include staff time, equipment (software and hardware), and services, and may also include contractual costs. These are captured in the detail lines of the information management heading of the costing tool.

Because data collection efforts involve sharing information with multiple parties, planning for the collection, storage and exchange of data can make a significant difference in the quality of the information, the use of the information, the ease with which the data will be exchanged, and the reliability of the information. When information is to be exchanged between EPA and external parties, the data must be exchanged in a manner that conforms to data standards, which provide uniform definitions and exchange formats. Identifying the appropriate data for collection, any relevant data standards, and how the information will be exchanged can dramatically reduce costs and errors.

Monitoring and Inspection

An effective LTS program includes monitoring and inspections to ensure that ICs are operating properly. While the cost to construct a remedy, including any engineering controls, is not a cost that is considered under a LTS program, the LTS program must provide for the costs associated with inspecting and monitoring the long-term effectiveness and integrity of these controls. Both activities typically involve site visits and data collection. When considering the development of a LTS program, a number of fundamental policy decisions should first be established. Costs will depend upon whether monitoring and inspections will be conducted by 1) in-house staff, 2) subcontractors/local government, or 3) on-site responsible parties, and the frequency and inspection requirements mandated by State or local laws.

Once these fundamental decisions have been established, there will be a number of questions that should be considered when documenting these costs for the Program Development Phase in the detail lines of the monitoring and inspection heading.

Enforcement

The establishment of an enforcement program is necessary to ensure effectiveness of the LTS program. There are several critical elements in the planning process for a LTS enforcement program that can have significant impacts on overall program costs. These include:

- Overall structure of the enforcement process. Adequate time should be allocated to carefully plan all the steps envisioned for the enforcement process.
- Development of policies, procedures, and statutes. This would include review of any existing procedures, identification of gaps, and the time needed to develop new procedures. Associated costs include the time to develop supporting materials such as notes and manuals for these procedures and policies and, depending on program structure, the updating and amending of these items in the future. Also included in this section is the cost, dependent on the particular methods chosen, of communicating and disseminating these policies, procedures, and statutes to the public.
- Information technology integration. The degree to which information technology is incorporated into the steps of the enforcement process will affect costs in so far as time will be required to identify and plan the types of IT tools that will be needed and the costs for their development estimated.
- Staffing and Training needs. This element includes the cost of identifying the necessary skill levels, number, and organization of staff that will most effectively implement the enforcement process that is envisioned as well as the amount of resources this staff will need to operate effectively.

Regular training for all staff involved in enforcement will be vital to obtain optimum results.

IMPLEMENTATION

The Implementation section identifies the components of a functional LTS program, the staffing required to operate and maintain the program, and the expenses that are incurred in

the management of the program. As in the Program Development section, the LTS program can encompass all types of remedial programs or individual sites.

Planning

Planning costs associated with the implementation of the LTS program largely include development, evaluation, coordination, and revision tasks in order to ensure that the structure, process, and efficiencies identified earlier during program development are maintained or enhanced. These tasks will primarily consist of staff time.

Community Engagement

Implementation of community engagement includes many tasks and costs. Costs will include staff time to prepare, review and distribute materials to stakeholders and the general public, as well as costs associated with the publication and distribution (postage or website) of the materials.

Information Management

The maintenance of an effective information management (IM) system is likewise critical to the continued effectiveness of a LTS program. The costs of maintaining the IM system can vary greatly, depending on the platform and functionality of the system. The costs will include staff time, equipment, and services, and may also include contractual costs. Costs also include tasks the system will perform that are more general in nature than the associated site-specific costs and usually pertain to the overall management of data within the system. Examples include quality assurance/quality control checks of the data, querying system information, and generating and distributing reports regarding the number and types of ICs for departmental purposes and/or public information. States will need to ensure that maintenance costs for hardware and software are provided. The IM system will need to serve timely and accurate data to all users in a format flexible enough to be used in a range of platforms. Ongoing programming support will be required to ensure the system continues to run.

Monitoring and Inspection

Implementation of the LTS Program involves on-going (annual) costs. Ideally, during the Program Development Phase, policies, procedures and standardized checklists have been established to maximize the effectiveness of this piece of the LTS Program. As with all components of the LTS Program, one important decision is whether the activities are performed using a centralized process (i.e., using staff to focus strictly on monitoring and inspections) or in a decentralized site-specific manner where monitoring and inspections of a specific site are conducted by one individual responsible for that site. There are potential economies of scale using a centralized program, particularly as the number of sites increase over time. Site-specific monitoring and inspection costs are typically a staff level or subcontractor responsibility and will be discussed further in the next section.

Enforcement

Implementation of LTS enforcement focuses on authority, assigning responsibility and coordination. Administrative structures will need to be created to carry out the planned activities including hiring additional staff (if necessary), setting up data collection protocols, and setting policies and procedures for the staff. LTS data will need to be collected and analyzed on a timely basis. Ongoing review and project modification will require follow-up. The lead agency or agencies that will handle the administrative aspects of the project, including drafting enforcement-related documents, should be identified.

SITE-SPECIFIC

The Site-Specific section identifies the level of effort required to provide LTS for individual sites. It is intended to identify only those costs that are specific to the site. Infrastructure costs, such as information system development, information management and general planning activities that are shared across the entire roster of sites in the LTS program are meant to be reported in the other two tabs of the costing tool. Costs should only be reported in the site-specific tab that can be allocated specifically and exclusively to a project. Each site should have its own Site-Specific section spreadsheet.

Planning

The general structure, process, and tools needed to implement the LTS program have been identified in the Program Development and Implementation sections. Planning costs for LTS at specific sites will be associated with identifying, at the earliest stage possible, which site issues related to LTS will require the greatest investment of staff time for resolution, which LTS documents will require the most lead time for development and implementation, and the level of coordination that will be necessary between various entities (programs, agencies, and private parties). Subsequently, there will be costs of planning to resolve these issues in a timely and effective manner.

Community Engagement

In addition to the LTS Community Engagement Program, there should be an individual approach tailored to the specific circumstances and community of each individual site. Many of the activities associated with Program Development and Implementation are repeated for specific sites; however, the focus is now each individual site.

Information Management

The costs reported in this section are limited to those associated with IM systems that are not included in the programmatic infrastructure costs (see Implementation). This would include the time and expense to input site-specific ICs information into the system, generating site-specific reports for compliance tracking, updating the system regarding the status of a particular site following monitoring and inspection activities, and potential enforcement actions.

Monitoring and Inspection

For most States, site-specific monitoring and inspection costs are predictable and, therefore, the easiest to estimate. While a “one size fits all” approach may be appropriate during the Program Development and Implementation phases, this approach may not always be optimal for development and implementation of site-specific plans. In fact, time and resources to deal with site-specific factors are often found to be grossly underestimated during the implementation phase.

Enforcement

While the costs for establishment of the overall Enforcement Program have been previously captured under the Program Development and Implementation sections, it will become necessary to factor in additional costs on a site-specific basis. Some of these site-specific enforcement costs may include issuing compliance orders on a site-specific basis to compel the facility to perform the work necessary to protect human health or the environment. A mediator may prove successful in shortening the time frame for meeting compliance order goals.