

ARGONNE NATIONAL LABORATORY-WEST



Final Draft
Site-Specific Requirements in Support of LTS Transfer for
Argonne National Laboratory-West

Prepared for:

DOE-CH Long-Term Stewardship Pilot Project

**Planning Critical Elements of the Transition to Long-Term Stewardship
at Chicago Operations Facilities**

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1. PURPOSE

This document is the first in a series of documents being prepared as a pilot study regarding the preparation of Long-Term Stewardship Implementation Plans (LTS Plans) for three sites managed by the DOE-Chicago Headquarters (CH). These sites are Brookhaven National Laboratory (BNL); Argonne National Laboratory-East (ANL-E); and Argonne National Laboratory-West (ANL-W), the subject of this report. The following requirements are discussed in this document:

- Information needs,
- Issues to be resolved,
- Planning that must be completed, and
- Commitments that must be made

The above requirements should be completed prior to the transfer of the U.S. Department of Energy (DOE) Environmental Management Office (EM) sites at ANL-W to the responsible landlord. For ANL-W, the landlord is the Office of Nuclear Energy (NE). Identifying these requirements early in the transfer process will help ensure that the subsequent LTS Plan for ANL-W will accurately and completely describe the responsibilities and commitments involved in the transition from EM to NE.

2. BACKGROUND

In November 1989, the Idaho National Engineering and Environmental Laboratory (INEEL) was placed on the *National Priorities List*, which identifies sites containing hazardous substances that require investigation. Under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the risks posed by hazardous substances at National Priorities List sites must be evaluated, and if necessary, appropriate remediation methods must be implemented to reduce risks to acceptable levels. The investigation of hazardous substance sites at the INEEL is implemented under a Federal Facilities Agreement/ Consent Order (FFA/CO), which was negotiated by the agencies and signed in December 1991.

To better manage environmental investigations, the INEEL was divided into 10 Waste Area Groups. Each Waste Area Group was divided into *operable units* (OUs) to expedite the investigations associated with remedial activities. Under this management system, Waste Area Group 9 covers ANL-W. ANL-W evaluated 39 sites in the risk assessment and 34 sites were designated as No Further Action and are classed as unrestricted use sites. The 5 sites that were retained for remedial action are ANL-01, ANL-01A, ANL-04, ANL-09, and ANL-35. Table 2-1 provides a status of these sites and Table 2-2 lists the Institutional Controls required by the CERCLA Record of Decision (ROD).

Table 2-1: Waste Sites Requiring Remedial Actions

SWMU No.	Description	Remediation Activity⁽¹⁾	Status	Estimated or Actual completion of Remedial Activities
ANL-01	Industrial Waste Pond	P & D	Begin in FY 2003	FY 2010 (P); FY 2108 (D)
	Ditch A	P	Ongoing	FY 2002
	Open portion Ditch B	E	Ongoing	FY 1999 (E)
ANL-01A	Main Cooling Tower Blowdown Ditch	P	Ongoing	FY 2002
ANL-04	Sewage Lagoons	P	Begin in FY 2033	FY 2049
ANL-09	Interceptor Canal-Canal	D	Ongoing	FY 2087
	Interceptor Canal-Mound	P & D	Ongoing	FY 2002 (P); FY 2104 (D)
ANL-35	Industrial Waste Lift Station Discharge Ditch	P	Ongoing	FY 2002

(1) E= Excavation; P=Phytoremediation; D=Decay by natural attenuation

Table 2-2: Institutional Controls Required by the ROD

Waste Site	Waste Site Name	Timeframe of Land Use Restrictions (from 1999)	Review Period	Institutional Controls
ANL-01	Industrial Waste Pond	Max of 110 years is expected	5 year	Access restrictions (e.g. fences, posted signs, permanent markers) to prevent residential intrusion. Periodic inspection & maintenance to ensure integrity of institutional controls.
	Ditch B (open portion)	Excavated in FY99	5 year	Maintain existing fencing and access controls until remedy is complete.
	Ditch A	Expected to be 5-7 years	5 year	Maintain existing fencing and access controls until remedy is complete.
ANL-01A	Main Cooling Tower Blowdown West Ditch	Expected to be 5-7 years	5 year	Maintain existing fencing and access controls until remedy is complete.
ANL-01A	Main Cooling Tower Blowdown East Ditch	Excavated in FY99	5 year	Maintain existing fencing and access controls until remedy is complete.
ANL-04	Sewage Lagoons	Max of 50 years expected	5 year	Maintain existing fencing and access controls until remedy is complete. Maintain water in lagoons to prevent risk to ecological receptors (burrowing mammals) until remedy is complete.
ANL-09	Interceptor Canal- Mound	Max of 105 years is expected	5 year	Access restrictions (e.g. fences, posted signs, and permanent markers) to prevent residential intrusion. Periodic inspection & maintenance to ensure integrity of institutional controls.
ANL-09	Interceptor Canal-Canal	Max of 88 years is expected	5 year	Access restrictions (e.g. fences, posted signs, and permanent markers) to prevent residential intrusion. Periodic inspection & maintenance to ensure integrity of institutional controls.
ANL-35	Industrial Waste Lift Station Discharge Ditch	Expected to be 5-7 years	5 year	Maintain existing fencing and access controls until remedy is complete.

It is anticipated that by close of FY 2002 remediation activities will be completed or long term monitoring (i.e., natural attenuation) instituted at ANL-W for three of the five waste sites that are to undergo remediation. Currently this work is funded and managed by EM. In late FY 2002 or early FY 2003 verification sampling will be performed to validate that the phytoremediation remedy is functioning as designed.

In accordance with DOE policy (S-2 memorandum of December 15, 2000) the responsibilities for LTS of EM sites requiring long-term remedial actions are to be transferred to the site landlord. It is assumed that included in this transfer will be the remaining two waste sites that have not commenced phytoremediation. At ANL-W, the transfer of responsibility from EM to NE for completion of all remaining and ongoing environmental restoration activities under CERCLA is scheduled for FY 2003/2004.

The CERCLA regulatory requirements and documentation for the EM waste sites at ANL-W should address most of the LTS requirements presented in the LTS Plan Guidance. A review will be performed to ensure all of the LTS requirements will be performed.

LTS activities at ANL-W EM sites represent only one element of the ongoing environmental management efforts at ANL-W, most of which are already financed and managed by NE as the site landlord. The LTS program for EM sites cannot be properly understood unless its position within the larger context of ANL-W environmental management is understood. An example of overlapping environmental responsibilities is the relationship of the deactivation and closure of the Experimental Breeder Reactor-II primary and secondary sodium systems under the Resource Conservation and Recovery Act (RCRA) to the monitoring and reevaluation of potential releases from radioactively contaminated co-located facilities under CERCLA. The LTS program at ANL-W will be integrated into these existing environmental management efforts. This integration will provide the mechanism for meeting the CERCLA Record of Decision (ROD) conditions such as monitoring and evaluation of activities completed for removal of hazardous constituents (i.e., RCRA closure, decontamination and decommissioning (D&D)).

Elements of ANL-W environmental management that will likely be involved in the LTS program after the transfer include land use management, ground water monitoring, environmental compliance, surveillance and monitoring (S&M) program, waste management operations, Health Physics, and other elements at ANL-W. These programs and functions are located within various organizations of the ANL-W Facilities Division (FD), the Nuclear Technology Division (NTD), the Reactor Program Services Division (RPS) and the Environment, Safety and Health Oversight organization.

One organization at ANL-W currently manages the EM program. This organization is the Environmental Programs (EP), which manages the waste site cleanup and S&M for the EM sites that have obtained their remediation goals. For planning purposes, it is assumed that EP will continue to manage the waste site cleanup. However, other functions (i.e., S&M, document storage) should be integrated with other infrastructure programs, whenever possible.

3. INFORMATION NEEDS

The LTS Plan will contain or reference a large volume of information describing the nature of the LTS program; completed and ongoing restoration operations; ongoing inspection, maintenance, monitoring, and other requirements; and the nature of residual risk associated with closed sites. This information along with the EM baseline and the EM to NE transition schedules and will provide the technical basis for development of the LTS Plan.

In addition to defining the LTS work scope, information that describes, in general terms, other similar environmental management requirements should also be compiled and described briefly. Listing this information will help to define the magnitude and nature of the larger environmental management program into which the LTS program will fit.

3.1. EM SITES LIST

All EM sites should be listed and briefly described. This list will define the environmental restoration sites for which LTS may be required. It should also include closed environmental restoration sites. The following are classifications of EM sites located at ANL-W that are expected to transfer to NE.

Remedial actions for all the sites under the CERCLA ROD are not expected to be in place prior to transferring LTS responsibility to NE. This is because some of the Solid Waste Management Units (SWMUs) are still active facilities in use by NE programs (see Table 2-1).

3.1.1. UNRESTRICTED USE WASTE SITES

- Waste sites that were closed (administratively) through Environmental Protection Agency (EPA) Region X and the State of Idaho Department of Environmental Quality [IDEQ] approval request by demonstrating that contamination does not exist above applicable action levels.
- Waste sites for which remedial actions were completed through removal (excavation) or intrusion barriers (i.e., concrete) resulting in an unrestricted use designation.

3.1.2. RESTRICTED USE WASTE SITES

- Waste sites for which active remedial actions (i.e., waste soil removal or phytoremediation removal actions) are complete but operation and maintenance (O&M) and monitoring are ongoing because of the presence of residual contamination. Institutional controls are or will be required.
- Waste sites where active remedial actions are ongoing. Remedial actions for all the EM sites are not expected to be in place prior to transferring responsibility to NE.

A list of summary level information about all the sites — including the exact location and size, nature of operations now and in the past, environmental restoration actions completed to date, regulatory status, the nature of known or suspected contamination, and other pertinent data — should be prepared. The management of information about these sites, particularly regarding the analytical results and standards used to declare these sites "clean," should be addressed by the LTS program and discussed in the LTS Plan. In the LTS Plan, reference should be made to plans, reports, or other documents that contain detailed information about each of the listed sites.

Requirements that are specified in the ROD that pertain to non-CERCLA sites (i.e., RCRA treatment and/or storage facilities, radioactively contaminated co-located facilities) should be included to provide a complete picture of responsibilities. Inclusion of this information may define a different starting point for LTS.

3.2. FUTURE REMEDIATION SITES AND FACILITIES

The future remediation of contaminated facilities (with the potential for unknown releases) will feed into future risk assessments and may result in interrelated LTS responsibilities after completion. Many of the issues raised in this document relate to how LTS principles can be integrated into current and future environmental management efforts at ANL-W.

A list of known future remediation sites currently not in the EM program should also be prepared. This list should be a part of the LTS Plan. It is needed to describe how LTS requirements fit into the overall environmental management obligations of NE. As programs and projects close, responsibilities for management of residual waste, environmental restoration, deactivation, decontamination and decommissioning and RCRA will transition to the LTS program for ongoing management. A preliminary list of these sites include:

- Active mixed waste treatment and storage facilities that will undergo RCRA closure and D&D simultaneously, in the future.
- Active mixed waste treatment and storage facilities that may require S&M and/ or D&D in the future when the facility has completed RCRA closure.
- Active radioactive waste management facilities that may require remediation in the future when the facility is no longer needed.
- Active radiological research and development facilities that will require D&D or environmental remediation in the future when the facility is closed.

3.3. ONGOING REMEDIAL ACTION REQUIREMENTS

To define the nature and magnitude of LTS program elements, a list of current O&M, environmental monitoring, and S&M requirements and commitments should be included in the LTS Plan. This list should encompass all current regulatory requirements related to EM sites (i.e., ROD). It would also include institutional controls that are needed to ensure the integrity of

the remedial actions (e.g., fences, signs, digging restrictions, deed restrictions, etc.). An estimate of the length of time these activities will be required should be included.

Any limitations to the future use of land containing closed waste sites or the reuse of soil or facilities should be identified. Limitations include restrictions on the types of activities that would not be permissible at a closed unit (e.g., digging in or around a closed unit) or restrictions that would apply to the waste materials generated by renovation or demolition of the structure.

3.4. CHARACTERIZATION OF RESIDUAL RISK

For the EM waste sites that will be included in the LTS program, the nature and magnitude of waste materials, contaminated media, or radiological contamination in soil or within structures should be described. A summary of the risk assessments conducted under the CERCLA process should be included in the LTS Plan to assist in prioritizing LTS efforts. Existing documents that contain risk assessments that resulted in the ROD should be referenced, wherever possible.

For sites deemed to be "clean," a risk characterization is unnecessary since there should be no residual contamination above the approved risk-based action levels. However, the criteria for determining that a site is "clean" (no further actions for waste sites or free release status for radioactively contaminated facilities) must be described. Any assumptions used to select these criteria (e.g., industrial-commercial land use or containment of radiological contamination behind a barrier of some type), or any assumed restrictions on future usage, should be stated.

3.5. COST AND SCHEDULE FOR LONG TERM STEWARDSHIP

A critical component of the LTS planning effort will be estimating future costs for LTS activities. The EM baseline costs should be used as a starting point for LTS activities. A review should be conducted to ensure all activities have been identified along with a cost estimate, prior to transferring responsibilities to NE.

A realistic schedule for LTS activities is needed. Major events and milestones should be scheduled to the extent such events are understood. Key scheduled events include LTS starting dates, periodic performance reviews, anticipated completion dates for LTS activities at specific sites, and dates for final site closure or facility demolition. Any assumptions used to develop the cost estimate and schedule need to be documented.

4. ISSUES REQUIRING RESOLUTION

Numerous unresolved issues related to the transfer of EM sites have been identified. To the extent possible, the resolution of these issues will be captured within the LTS Plan in the form of definitions of terms, statements of responsibility, description of work scope or other elements of the plan. The following is a list of issues known at this point in time.

4.1. TECHNICAL ISSUES AFFECTING LTS WORK SCOPE

4.1.1. SCOPE OF THE LTS PROGRAM

The sites and activities that would come within the responsibility of the LTS program need to be defined. Current draft DOE guidance describes LTS scope as activities such as routine monitoring; operation, inspection, and maintenance of remedial actions; institutional controls; and information management that will be conducted at closed or long-term remedial action waste sites with residual contamination.

Similar, though less extensive, responsibilities exist even with "clean-closed" sites. For example, project records that document that a site was cleaned up must be retained and made available to future land users. This is especially true of sites with some contamination still present, even if it is below the risk-based remediation goals. A critical part of the planning process will be to identify all environmental restoration elements that NE will be responsible for after the transfer. For example: periodic performance assessments of operating remedial systems and final closure of CERCLA sites. A clear designation of responsibility for planning, scheduling and executing these future actions must be identified.

Other related tasks that may or may not be considered LTS work scope may include S&M of radiological facilities and routine environmental compliance reporting. These ongoing activities are currently the responsibility of NE. Whether the LTS program is fully integrated into existing infrastructure programs or is provided direct funding the designation of what constitutes LTS work scope for planning, scheduling and costing will be very important.

4.1.2. APPROACH TO LTS FOR THE D&D PROGRAM

Currently, no D&D work is being conducted at ANL-W. The EBR-II primary and secondary sodium systems have been placed in an industrially and radiologically safe condition. These sodium systems will have ongoing S&M until Decontamination and Decommissioning are performed. However, IDEQ is requiring that treatment (either by physical removal or chemical reaction) of these systems be performed. It needs to be determined how RCRA requirements, that fall in between S&M and D&D activities are to be incorporated into the LTS program.

4.1.3. FUTURE ENVIRONMENTAL RESTORATION WORK FOR NON-EM SITES

Environmental restoration work will be necessary as operating facilities (waste processing or nuclear research facilities) are shut down, previously unknown historic waste or contamination is discovered, or new contaminated sites are created through leaks or spills of hazardous or radioactive materials. Such actions are not the focus of current LTS planning; however, they represent significant future potential cost that should be acknowledged as part of the overall environmental management program at ANL-W of which the LTS will be a part. Identifying the options for the roles of NE and EM regarding these future actions would assist in the planning of LTS actions.

4.1.4. LTS PLANNING WINDOW

The length of time that LTS requirements will remain in effect is unknown but is likely to be very long, on the order of decades. The LTS program is likely to undergo many changes within its lifetime. The nature and timing of these changes are impossible to anticipate at this time. The LTS Plan should be prepared with a reasonable "planning window" in view. Detailed planning for events beyond the planning window should not be attempted. The plan should be written such that as the end of the planning window approaches, the plan will be updated. The length of this planning window has not yet been determined

4.1.5. KEY PLANNING ASSUMPTIONS

To complete the LTS Plan, a number of assumptions about the nature of the future remedial actions will need to be made, including the following.

- Land use - Identifying the necessary stewardship requirements depends on the anticipated future use of the site. The anticipated usage is likely to remain much as it is now; however, the assumed usage should be verified by DOE management and clearly spelled out in the LTS Plan.
- Site ownership and management - The assumed owner and manager of the ANL-W site throughout the planning window should be identified.
- Technical assumptions - Assumptions regarding the likely progression of the remedial actions in place during the planning window should be spelled out. These assumptions should be based on an assessment of actual performance of the remedial actions to date.
- Regulatory agency actions - Changes in laws, regulations, cleanup standards, regulatory personnel, or relationships with regulatory agencies could profoundly change the nature and magnitude of LTS requirements. Assumptions describing the expected regulatory environment during the planning window should be described. Input from the applicable regulatory agencies in developing these assumptions should be sought.
- Duration of LTS activities - The actual duration of LTS activities is impossible to predict precisely. Therefore, assumptions regarding the length of such activities should be developed and used to prepare the LTS Plan.

4.1.6. FINAL SITE DISPOSITION

The ultimate fate of the ANL-W site has not yet been determined. As a result, future LTS requirements are not completely known. To the extent possible, the likely final disposition of these sites should be identified. For example: release of land to the public for agricultural use. Subsequent LTS requirements should be based on these assumptions.

4.2. ADMINISTRATIVE ISSUES RELATED TO IMPLEMENTING THE LTS PROGRAM

4.2.1. CRITERIA FOR TRANSFER FROM EM TO NE

The criteria for determining when EM environmental restoration waste sites are ready for transfer to NE should be defined. These criteria must be developed for the following:

- Waste sites that have met part of their remediation goals but the remainder of the remedial tasks will require long term surveillance and monitoring (i.e., monitoring radioactivity decay and/or potential releases to groundwater).
- Waste sites that have a proven remediation technique, however, implementation of this technique is in the future because of ongoing facility operations.

A primary issue to be resolved is the transfer of sites where remedial activities have not been implemented until validation of the process (i.e., phytoremediation) has occurred. This may require a few to several more years of operational experience before the effectiveness of these actions and the possible need for future modifications would be known. From a practical perspective, information regarding the effectiveness and likely completion of the sites now undergoing phytoremediation is expected in late FY 2002 or early FY 2003. If there is agreement with the regulators that remediation is complete at these sites (except for ongoing monitoring, institutional controls, and periodic CERCLA reviews), then the issue essentially is resolved. The transfer of sites that have no further action status should present few problems.

4.2.2. IDENTIFYING THE POINT IN TIME WHEN THE TRANSFER WILL OCCUR

The transfer of ANL-W EM sites is expected to occur in FY 2003 or FY 2004. The anticipated date for the transfer needs to be identified to ensure adequate time is allotted to all parties concerned to complete their up-front work.

4.2.3. RENEGOTIATION TRIGGERS

Criteria for triggering the renegotiation of the transfer agreement need to be established. Such a set of criteria would provide an agreed-upon threshold for renegotiating the agreement in response to major problems with completed remedial actions, changes in land usage, changing cleanup standards, or other scope changes that are beyond the agreed-upon LTS scope transferred to NE.

4.2.4. MANAGEMENT APPROACH

The organizational approach for implementing the LTS program at ANL-W needs to be defined for inclusion in the LTS Plan. It is assumed that ANL-W will adopt an integrated approach to LTS. However, integrating LTS requirements into the various environmental management organizational functions will not be a trivial undertaking. In considering integration, many issues arise including the following:

- Ensuring adequate incremental funding to cover the additional requirements,
- Ensuring efficient information flow and decision making among the various entities,
- Providing adequate management oversight to ensure that LTS requirements are being met (includes integrating applicable INEEL LTS requirements),
- Ensuring adequate technical management to ensure the effectiveness of the remedial actions, and
- Ensuring adequate DOE-Idaho and stakeholder participation in LTS issues.

4.2.5. FUNDING OF LTS ACTIVITIES

The mechanism for allocating funds to support LTS activities needs to be determined. Ensuring adequate funds is critical to the success of the program.

4.2.6. STAKEHOLDER INVOLVEMENT

DOE policy (Geiser memo, Oct. 26, 2001) states that site stakeholders should be consulted regarding LTS issues. The degrees of involvement of the ANL-W stakeholder community and the mechanisms to ensure such involvement have not been determined. This will have to be coordinated with DOE-Idaho, since ANL-W is part of the Idaho National Engineering and Environmental Laboratory (INEEL) and the INEEL Community Relations Plan.

4.2.7. TRANSITION DOCUMENTATION

The nature of any formal transfer agreements, transition plans, Memoranda of Understanding, or other vehicles needed to facilitate the transition need to be identified.

4.2.8. TRANSITION SCHEDULE

To facilitate the transfer, a timeline of important events and required completion dates needs to be established. The transition to NE is assumed to be the end of FY 2003. Because of the federal budget cycle, a number of activities may need to be initiated very soon to ensure that the necessary funding will be in place. The point in time the transition will occur will influence the schedule for transition. Establishing a schedule for these events is a critical first step.

5. REQUIRED PLANNING EFFORTS

To complete the LTS Plan, detailed information regarding how the various aspects of the LTS program (discussed in Section 2 and elsewhere in this document) will be implemented needs to be available. The planning effort needed to generate this information will ensure that adequate forethought has been given to these issues and that realistic estimates of cost will be generated.

In some cases, the necessary planning has already occurred and has been captured in existing documents. In other cases, no detailed planning has yet been undertaken. Where adequate, up-to-date plans exist, the LTS Plan should reference them. Where adequate plans do not exist, the planning efforts may be documented either in new stand-alone plans, modifications to existing plans, or by including the necessary details in the LTS Plan itself. The following areas require detailed planning and documentation of that planning effort:

- Operation and maintenance – Description of all work required for operating and maintaining existing remedial systems, including maintenance of facilities in the S&M mode.
- Environmental monitoring – Description of all sampling, analysis, data management, reporting, and other actions related to performance monitoring and release detection from environmental restoration sites, and S&M of contaminated facilities or newly identified sites.
- Periodic performance assessments - The approach and schedule for periodic reviews of remedial system performance and assessment of opportunities to optimize the remedial action by introducing new technologies or approaches.
- Remediation site final closeout - The approach for performing final closeout of no further action or S&M sites, including final verification sampling, removal of completed environmental restoration equipment (e.g., wells, pumps, control systems, phytoremediation trees, fences, radiation monitors, deed restrictions, etc.), facility demolition, and preparation of final closeout reports.
- Information management - Procedures for collecting, reviewing and publishing data on the status of closed or ongoing remedial actions. Location of the data, for easy stakeholder access now and several generations in the future, will be in an established repository (i.e., INEEL Technical Library).
- Failure detection and recovery (Contingency Plan) - Procedures to be used to ensure a timely and adequate response to process failures, equipment malfunction, unauthorized entry, and unexpected releases.

6. STATEMENTS OF ROLES, RESPONSIBILITIES, AND COMMITMENTS

The roles, responsibilities, and commitments needed to implement the LTS program after the transfer, as well as during the transition process, need to be clearly spelled out in the LTS Plan. Examples of some of the responsibilities and commitments needed include the following:

- Information transfer - Commitment by EM to provide all historical information to NE for all waste sites being transferred.

- Completion of ongoing remedial actions - Commitment by NE to complete ongoing remedial actions effectively and within the budget and schedule contained in the current EM Baseline.
- Effective Management of the LTS Program - Commitment by NE management to perform all required management functions, including the following:
 - Budget programming and allocation.
 - Organizational responsibility for implementing the LTS Program.
 - Compliance with all applicable regulatory requirements contained in the RCRA Part B Permit, DOE Orders, and other regulations.
 - Operations, maintenance, monitoring, surveillance, and reporting as specified in regulatory agencies-approved plans and other documents.
 - Land use controls to prevent inadvertent disturbance of closed sites.
 - Information management.
 - Emergency response and corrective action for performance deficiencies.
 - Periodic performance reviews and optimization studies.
 - Final site closeout documentation.
 - Interaction with stakeholders.