

EFCOG Best Practice #125

Best Practice Title: 50-Year Environmental Stewardship Plan

Facility: Los Alamos National Laboratory (LANL)

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Brief Description of Best Practice: Los Alamos National Laboratory (LANL) has developed a 50 Year Environmental Stewardship Plan (Plan) to integrate environmental planning with DOE/NNSA and institutional long-range planning. The Plan utilizes LANLs ISO 14001 certified Environmental Management System to set objectives and targets, which focus on cleaning up past legacy contamination, controlling environmental impacts for current operations and planning for a sustainable future. The Plan consists of a strategy document, an expert system to visualize current environmental activities and a public communications tool to highlight key environmental issues and LANL performance.

Why the best practice was used: The core national security missions of LANL include certifying the safety and operability of the nuclear stockpile, high-explosives research, counter-terrorism, nuclear materials sciences and energy sciences. The inherent environmental risk associated with these activities makes it incumbent on the Laboratory to have a cohesive, long-range plan to protect both the environment and mission execution.

The complexity of environmental situation at LANL has made it difficult to paint a cohesive picture. The site is addressing legacy contamination and buildings from two previous site incarnations, managing a complex permitting structure for current operations, developing long-term stewardship requirements, measuring interactions of the site eco-system with surrounding neighbors and executing multiple programs with tasks in cleanup, waste management, compliance and infrastructure all managed separately.

LANL made the business decision that a long-range management system was necessary to bring a cohesive structure to these elements and to provide cost-effective decision enabling tools to guide further actions.

The purpose of the LANL 50-Year Environmental Stewardship Plan is to provide an integrated view of LANL site environmental stewardship by:

- Highlighting key geographical, public or project environmental interest areas,
- Providing an ongoing metrics scorecard of LANL performance against requirement standards (including trends),
- Enhancing outreach communications to address community and regulator interests
- Providing technical justification for decisions on regulated actions, and
- Aligning long-term site stewardship with range of long-term development plans across programs.

What are the benefits of the best practice: Four key benefits accrue from this long-range planning process:

- It allows us to clearly define Laboratory environmental policy and strategies to execute that policy;

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- It sets objectives and targets for environmental stewardship and establish metrics to accurately monitor and measure environmental performance;
- It integrates stewardship efforts across organizations and programs to assure that the entire life-cycle of work at the Laboratory is designed and executed in a manner that is protective of human health and the environment; and
- It provides transparent and relevant communication on the Plan, the strategy and our performance to surrounding neighbors, regulators, and the public.

What problems/issues were associated with the best practice: The broad scope of future environmental activities coupled with a range of possible approaches forced the Team to engage in considerable brainstorming and triage prior to being able to narrow the approach. Definitions of a sustainable future are highly variable but did fit well within the ISO 14001/EMS framework. A major issue is that this effort tapped into a top tier of environmental staff members at LANL. While this has resulted in a high quality outcome, time and funding pressures are often most acute for top-level staff members. This was ameliorated somewhat by top management support for the effort. Another key success factor is the fact that the effort was incentivized in the contract and had significant attention from the NNSA site office.

How the success of the Best Practice was measured: While individual performance metrics are still being discussed within the Team, the overall Plan effort is a contractual performance measure with specific objectives, deliverables and a project plan that is negotiated with the site office.

Description of process experience using the Best Practice:

The Plan was created by a strong cross-disciplinary/organizational team of planners, data managers, natural resource managers, outreach professionals, hydrologists, air quality, waste management, GIS staff and graphics designers.

The Team assumed change as a constant factor for future operations rather than conducting a predictive exercise. The Team accepted the premise that LANL's ISO 14001 certified Environmental Management System and Integrated Safety Management System would identify changing environmental aspects with sufficient lead-time for informed management planning and response. The existing LANL EMS provides a framework for work assessment, environmental risk assessment, corrective and preventive pathways, a system to set objectives and targets, metrics and independent third-party assessment. It remained for the Team to establish a strategy and communication framework.

Three key tools were developed to accomplish the purpose of the Plan. First, a written document was developed that serves to describe the strategies that guide long-term environmental stewardship. Key strategies in the Plan include:

"Defenses-in-Depth" Strategy: This strategy is implemented through an extensive monitoring system coupled with a series of physical and administrative controls that restrict the movements of potential contaminants off site. For example, for surface water, a series of nested defenses, represented by a series of physical barriers located throughout drainages and at the Laboratory boundary, constitute a proactive compliance approach to environmental protection. Similar systems for airborne contaminants are described.

ALARA Strategy: The Laboratory evaluates all new and modified operations that involve radioactive materials and assures that impacts to human health are as

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low as is reasonably achievable (ALARA). This concept will also be applied to environmental stewardship and sustainability. E-ALARA encourages positive impacts to the environment, such as planning and siting of new facilities that protects and enhances cultural and ecological resources or the use of waste glycol from a local biodiesel plant to “feed” the wastewater treatment plant, enhancing operational capacity.

Off-site Disposal Strategy: Discontinue on-site disposal of wastes whenever possible. The intent is not to create any additional future remediation liabilities. The strategy is two-fold. First, as current disposal and storage sites are closed and remediated, the management of radioactive and hazardous wastes will be transferred to new facilities that are intended as packaging and transportation hubs rather than disposal sites. Second, for newly generated waste characterization, packaging and transportation will be accomplished at the generating site whenever possible.

Prevention Strategy: Prevent pollution whenever and wherever possible. This approach not only serves to protect the environment, it is a sound business strategy to improve mission processes and safety, as well as avoid significant waste management costs of managing pollutants. The Laboratory Pollution Prevention Program requires that organizations develop annual Environmental Action Plans under the ISO 14001 EMS. These Action Plans lead to hundreds of local improvement actions annually.

Management Integration Strategy: An integrated schedule of projects is presented that, in support of the Plan’s objectives and strategies, address legacy issues and current operations to the future Laboratory of zero waste strategies and environmental sustainability.

Second, the public communication tool is designed to clearly explain and illustrate using more than the written word. The goal is to provide interactive means for sharing information and interpretation so users can separate Laboratory legend from reality. The Public Communication Tool is structured around the three principle objectives that guide the EMS and the Plan: Clean the Past, Control the Present and Create a Sustainable Future. These objective help address frequently asked public questions about how LANL manages the environment within the 40 square miles of Laboratory property guide the Public Communication Tool such as:

- How does LANL minimize the impacts from ongoing programmatic activities?
- How does LANL protect human health and the environment from impacts of legacy contamination released over the last 60 years?
- How does LANL accomplish stewardship of natural and cultural resources?

The Public Communication Tool is designed to provide verified data, illustrations, and explanations so the public can find answers to these and others questions for themselves. The objective is to increase public knowledge of environmental management science and remediation methodology, and to inform the public of the status of the regulatory compliance and protection and compliance programs. The tool includes Sections that use today’s tools (e.g., the Web, Google Earth, and a virtual view of the geography of LANL) to provide a more complete picture of the LANL environment.

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The LANL environmental narrative is told using three different technical platforms. While the three differ in approach, the message and content remain the same. Audiences self-choose which platform they prefer to use. The first platform is a traditional website designed for members of the general public who use the Web to obtain everyday news and communications. The second platform, using Google Earth, is accessed through the website and targets existing users, spatial thinkers, and explorers. Content, including three step-by-step virtual tours and site-specific information about each stop on the tours, can be downloaded. The third platform requires the user to download a browser plug-in. After downloading the browser plug-in, users can enter a virtual LANL via a gaming interface and explore. This tool targets the generations raised with gaming as a choice for recreation and provides both programmed tours and free exploration of environmental stewardship measures in areas of LANL closed to the public.

Finally, the 50-Year Environmental Stewardship Plan Decision Support Application has been developed capitalizing on the extensive Geographic Information Systems (GIS) database for LANL and new advances in graphical user interface (GUI) tools. The tool provides project and program managers access to an integrated environmental spatial database linked with analytical information to support decision-making. The integrated database includes spatial data on a wide range of environmental themes including, a high resolution digital elevation model, orthophotography, hydrology, sensitive habitat, cultural resources, solid waste management units, areas of concern, site monitoring areas, monitoring and sampling locations, flood control features, infrastructure, facilities, utilities, and a host of other derived spatial environmental themes.

The spatial database is linked to environmental analytical information that allows comparison of analytical data to regulatory standards. It provides a powerful decision-support environment with full GIS capability with much of the "learning curve" of using a GIS system and an analytical database reduced through an easy to learn GUI. It employs Microsoft Silverlight, a freeware GUI application framework for writing and running rich internet applications that support multimedia, graphics and animation and is coupled with Environmental Systems Research Institute, Inc. (ESRI) ArcGIS Server software. The Decision Support Application brings to bear the full advantage of the considerable LANL investment in spatial and analytical data to support environmental stewardship decision-making. It provides information for decision-making, which can be used to compare and identify alternatives with the lowest environmental impact.

In summary, the Plan has brought together expertise from across the range of LANL environmental and infrastructure programs to develop common strategies and tools to enable improved decision making and public information.