Los Alamos National Laboratory
Environmental Management Division

Business Overview

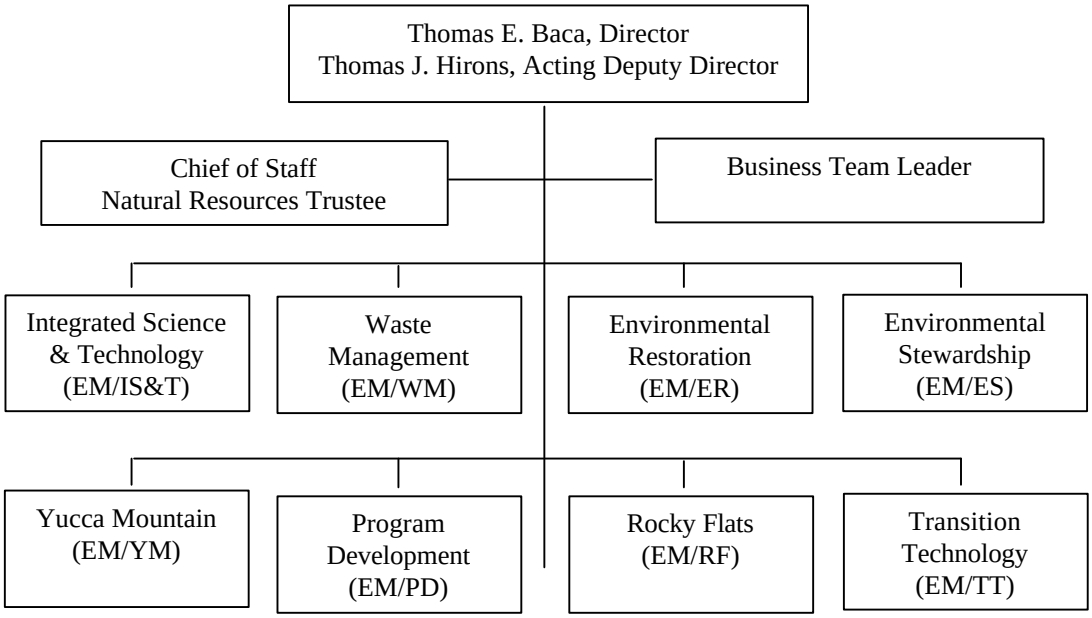
Los Alamos National Laboratory (LANL) is owned by the US Department of Energy (DOE) and operated under contract by the University of California (UC). Established in 1943 as part of the Manhattan Project, LANL's original mission was to design, develop, and test nuclear weapons. As technologies, US priorities, and the world community have changed, LANL's mission has broadened to enhancing global security by ensuring safety and confidence in the U.S. nuclear weapons stockpile, developing technical solutions to reduce the threat of weapons of mass destruction, and improving the environmental and nuclear materials legacy of the Cold War. In addition, the Laboratory applies its scientific and engineering capabilities to assist the nation in addressing energy, environment, infrastructure, and biological security problems. In FY98 LANL employed approximately 7,100 workers divided among 45 division and program offices. Overall LANL funding for FY98 was $1.36 billion.

At LANL, the Environmental Management Division (EM) has adopted the vision of supporting the execution of LANL's mission while contributing to the preservation of regional and world sustainability. In support of both DOE and LANL, EM has identified the following strategic thrusts:

- cleaning up and managing waste and contamination created during the Manhattan Project and Cold War era;
- promoting and implementing pollution prevention activities as the preferred environmental management technique;
- developing and deploying innovative technological solutions that meet local, national, and international environmental challenges such as those at Rocky Flats and Yucca Mountain; and
- contributing to local, regional, and global sustainability by facilitating and encouraging sustainable development and practices.

In FY98, EM Division employed 319 FTEs in the organizational structure shown in Fig. 1. The division is organized roughly along the lines of its major processes (see Category 6).

For FY98, EM's budget was $157.6 million, roughly 13% of LANL's total expenses. EM



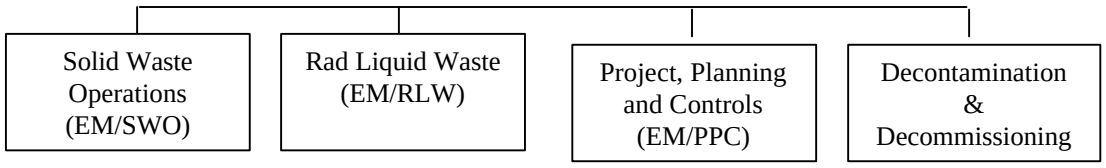


Fig. 1. Environmental Management Division organizational chart.

funds are used to manage environmental restoration projects, fund current waste management activities, and actively pursue pollution prevention efforts. More than half of EM's budget is designated for partnering with four major subcontractors who provide environmental services for LANL.

EM oversees LANL's handling of hazardous waste, transuranic waste, low-level and mixed low-level waste, and sanitary waste. Although current LANL operations produce some new waste, environmental restoration work managed by EM produces the greatest volume of waste products, most of it legacy waste from LANL operations during the Cold War. Additional waste comes from decontamination and decommissioning of buildings no longer adequate for LANL's programmatic work.

Major facilities operated by EM include a nonreactor category II nuclear facility at Technical Area 54 for dealing with nuclear wastes and the Radioactive Liquid Waste Treatment Facility at Technical Area 50.

Federal regulatory agencies with oversight for various LANL operations include EPA, DOE, OSHA, and the NRC. The New Mexico Environment Department (NMED) also oversees and regulates LANL activities.

1. Leadership

The leadership system that supports environmental excellence in EM Division begins with the director of LANL who, in 1998, issued a vision for LANL that included zero environmental incidents. A comprehensive, proactive, ethics-based system cascades down from this leadership goal.

The EM director declared in 1994 that his goal was the generation of zero waste by LANL operation. At his direction, EM has been working to establish both processes and behaviors to achieve the zero-waste goals. The system begins with this vision, which is articulated in a strategic plan for the organization (discussed in Category 2). In addition to articulating a vision and set of objectives for a "sustainable" laboratory, the EM strategic plan also identifies how each individual in the program is expected to contribute to the vision. This plan has become a cornerstone for the operations within EM and is regularly referenced at quarterly all-hands meetings. The leadership system uses these and other meetings to review and strengthen our approach to environmental excellence.

An integrating framework that EM in particular and LANL overall hope to use as an environmental management system is Integrated Safety Management (ISM). The broad definition of "safety" encompasses all aspects of environment, safety, and health—including pollution prevention and waste minimization. The term "integrated" is used to indicate that the safety management system is a normal and natural element of the performance of work; safety isn't a workplace addition, it is how we do business. ISM supports LANL's goal "to accomplish its mission cost-effectively while striving for an injury-free workplace, minimizing waste streams and avoiding adverse impacts to the environment from its operations." ISM implementation is a major emphasis at LANL, and senior leaders formally review progress toward full implementation on a quarterly basis.

EM's management system is based on frequent and open communication. Program managers and group leaders meet weekly with the division director, both individually and in all-manager meetings. These sessions focus on expectations and progress toward goals. For example, ISM is a standing topic at these

meetings. In addition, senior leaders review action plans for all projects to ensure work is being completed as scheduled and budgeted or to determine necessary adjustments to the plans.

Information regarding organizational goals and current progress cascades to individual employees through the management structure. In addition to the quarterly all-hands meetings already mentioned, EM holds regular program and group meetings to discuss programmatic issues. EM also maintains a web site with a wide range of available information for employees, customers, and stakeholders.

EM places great emphasis on stakeholder interactions and helps sponsor several ongoing activities that promote sustainability for northern New Mexico. A regional task force composed of individuals from EM, state agencies, non-profit organizations, and other relevant organizations has coordinated several forums and workshops designed to encourage and facilitate sustainable development and practices. The meetings have created an opportunity for shared learning and dialogue on some of New Mexico's most pressing environmental and economic challenges.

In December of 1997, EM co-sponsored its first all-day workshop on sustainability for the public. Presentations topics included pollution prevention, strategic sustainability, DOE sustainable development efforts, and conserving biodiversity. A second forum in April of 1998, entitled " Use of New Mexico's Water Resources," focussed on numerous pertinent water issues including water law, regional water planning, water quantity and quality, Rio Grande basin science, and sustainable water use. Participants included state and federal agencies, grass-root organizations, policy makers, and the community at large. EM sponsored a May 1998 workshop entitled "Designing and Building with Sustainable Technologies" for architects, builders, and those interested in learning about and using sustainable building technologies. A second workshop in May provided community and city planners with consultation and tools for community development. The most recently sponsored forum, "Deregulation of the Electric Industry in New Mexico," occurred in late July and provided attendees with an in-depth understanding of the current status of the electric utility industry; the environmental, economic, and political issues; and utility alternatives associated with deregulation.

EM representatives participate in an ongoing local sustainability study group, "Vision Los Alamos." In partnership with other area leaders, EM will also participate in the National Town Meeting for a Sustainable America, sponsored by the President's Council on Sustainable Development and scheduled for May 2-5, 1999. EM representatives continue to participate in ongoing regional water planning activities and chair the Governor's Blue Ribbon Task Force for Water Resources.

For the past year, members of EM have partnered with NMED and have played key roles to help develop the Green Zia Environmental Excellence Awards Program. EM members helped develop the overall program plan, helped craft the award criteria, and piloted the use of Green Zia improvement tools in EM organizations. Members of EM serve on the New Mexico Pollution Prevention Council and serve on both the Green Zia Board of Examiners and the Green Zia Panel of Judges.

2. Planning for Environmental Excellence

LANL has developed and uses as a guiding blueprint a strategic plan for the next five years. The current LANL strategic plan (available online to both the public and LANL employees) sets out major programmatic objectives and strategies. It also identifies environmental objectives related to most LANL major goals. In addition, a major objective of demonstrating operational excellence in all activities specifically calls out the following strategies:

- Achieve measurable improvements in safety and environmental stewardship through full implementation of ISM throughout LANL.
- Manage wastes and hazardous legacy materials effectively and accept the challenge of minimizing the generation of hazardous wastes in the future, with a long-term direction toward zero emissions.

Each year LANL also produces an Institutional Plan, a five-year perspective on LANL operations. This document (available online to the public and to employees) identifies strategic requirements for LANL organizational units, including EM Division; summarizes strategic, tactical, and programmatic plans; and helps ensure the integration of LANL activities with DOE priorities.

Based on LANL strategic directions and DOE requirements, EM then develops its own strategic plan. The vision EM uses to set direction for all its operations states: "In support of the Laboratory's mission, we are stewards of natural, operational, and human resources. We are partners in the regional economy and contribute scientifically to understanding and solving energy and environmental problems." The most recent version of the EM strategic plan is entitled *Roadmap to Sustainability* and was published in 1998. This plan is scheduled for a major revision in spring/summer 1999 to reflect the results of the LANL strategic planning process currently under way. Each organization in EM has identified how it will contribute to achieving this strategic vision within EM while also delivering the results expected by DOE. Additionally, EM is currently developing an implementation strategy for ISM, focusing on how to involve all employees in making this program a routine part of all operations. In combination with the leadership systems previously described, these efforts then set the stage for development and execution of tactical action plans.

The contract developed between DOE and UC supports environmental excellence by specifically identifying the scope of work and costs associated for each year. Commonly referred to as a programmatic baseline, this plan provides a detailed description of ***what*** activities will be conducted and the resources required. Established through an exhaustive planning process that identifies all the environmental work yet to be done, the baseline assures DOE that resources are appropriately aligned for the current year to accomplish work with the highest priority. EM's Project, Planning, and Controls Office (PPC) creates a highly detailed project or action plan for each environmental or waste management activity included in the annual baseline. The plan includes resource and cost details that allow managers to project activities down to the level of individual workers.

EM and LANL in general also use the ESH-ID review process, which is designed to assist line management in meeting the quality expectations of the ISM program at LANL. The ESH-ID process assists managers in the integration of the operational requirements for environment, safety, and health into work planning and execution of proposed activities. It provides a formal, systematic, and documented approach for risk identification and hazard management. EM project managers use the ESH-ID process to ensure compliance with applicable federal, state, and local regulatory requirements and LANL policies. The ESH-ID process helps characterize new projects by providing a project profile that includes information related to

- administrative issues,
- purpose and type of project,
- location and site information,
- potential impact to site and facility systems,
- environmental factors, and
- safety and health factors.

Action plans are typically designed to include activity over several years. EM senior leaders review plan projections against actual performance on a regular basis (see Category 1) and use the analysis to improve performance projections. Through a formal change control process, as cost or process improvements in the activity are made, resources can be reprogrammed to take advantage of the savings. Both time and financial resources are considered in this reprogramming effort.

EM also must ensure the safe and compliant operation of the facilities it manages on both a short-term and a long-term basis. Operational plans include the following:

- facility management plans,
- configuration management plans,
- facility safety plans,

- quality assurance plans,
- emergency action plans,
- training program description and job analysis, and
- maintenance implementation plans.

EM's nonreactor category II nuclear facility requires even more stringent plans such as a Safety Analysis Report (SAR). The SAR describes ***how*** all the activities are being done and postulates scenarios that could impact the facility and how those scenarios would be managed. Several other plans are also produced from the SAR. These include

- fall protection plan,
- fire protection plan,
- joint environment & safety plan,
- industrial and radiation monitoring plan,
- project management plan,
- procurement procedure,
- storm water pollution prevention plans, and
- spill prevention plans.

All of the above plans include a formal change control process that manages the communications, distribution, and training requirements. Although the reader might consider the presence of so many different plans as unmanageable, they represent a process that is integral to assuring high quality work being conducted on very hazardous material often in difficult working conditions (such as respirators and bulky personal protective equipment) is accomplished with minimal risk to the worker, his peers, surrounding communities, and the environment.

In partnership with DOE, UC has also developed specific overall performance goals, contained in Appendix F of the operating contract, that emphasize results most important to DOE on an annual basis. Each year LANL renegotiates with UC and DOE this set of specific performance measures in ten administrative and operational functional areas, one of which is environmental restoration and waste management. (See Category 3.)

3. Customer, Market, and Stakeholder Focus

Just as frequent and open communication marks EM's internal management practices, so does it characterize interactions with customers and stakeholders. Historically, LANL and EM have perceived the DOE Complex as a captive market. This attitude has shifted recently. Although DOE might be a captive market, UC is not necessary the only organization that can provide waste services at LANL. As a result EM is much more conscious of improving the efficiency of work, integrating with other vendors, and demonstrating a sustainability ethic in daily operations.

The performance measures found in Appendix F of UC's operating contract provide clear expectations, increase accountability, and improve customer relations by addressing performance issues that concern DOE. Appendix F contain approximately one hundred specific performance measures and associated goals. Over twenty-four of those measures fall within the functional area of environmental restoration and waste minimization. Many more measures directly related to environmental excellence fall within the functional area of environment, safety, and health. The negotiation steps for these measures, the process to set priorities, the improvement steps, and the resulting evaluations (see Fig. 2) all help focus EM resources on key business processes, improve operational quality, and increase the effectiveness of external oversight by sharing performance results with EM's key customers. Appendix F requires an annual self-assessment and evaluation by both UC and DOE, but EM senior leaders also meet quarterly with UC and DOE representatives to discuss current progress against goals and to identify any issues. The regular and frequent interaction helps prevent surprises, mitigate problems, and create a cooperative rather than an adversarial atmosphere.

In addition to the discussions centered on Appendix F, LANL senior leaders formally meet with UC and DOE representatives on a quarterly basis to discuss progress on key issues, including implementation of ISM. EM managers also meet on a regular basis with DOE customers to review the status of specific

programs, funding, and other *ad hoc* issues. Some EM program managers engage DOE in weekly meetings and through weekly status reports so they can hear issues close to the source.

Although much of EM's work for DOE is performed at Los Alamos, our products and services are also used throughout the DOE Complex. For example, EM provides advice and environmental consulting service for DOE operations at Rocky Flats outside Denver, Colorado, and to the Yucca Mountain Project in Nevada. In addition, EM's Integrated Science and Technology Program (EM/IS&T) helps DOE develop state-of-the-art environmental remediation techniques for use around the nation. The program uses the study of basic science to develop applied technologies that make environmental work faster, better, safer, and more cost effective. For example EM/IS&T is now piloting a new *in situ* vitrification process for soil cleanup. EM's Program Development Office (EM/PD) works with other national and even international customers to create an eco-efficient society for the 21st century. Under EM/PD's leadership, LANL has become the

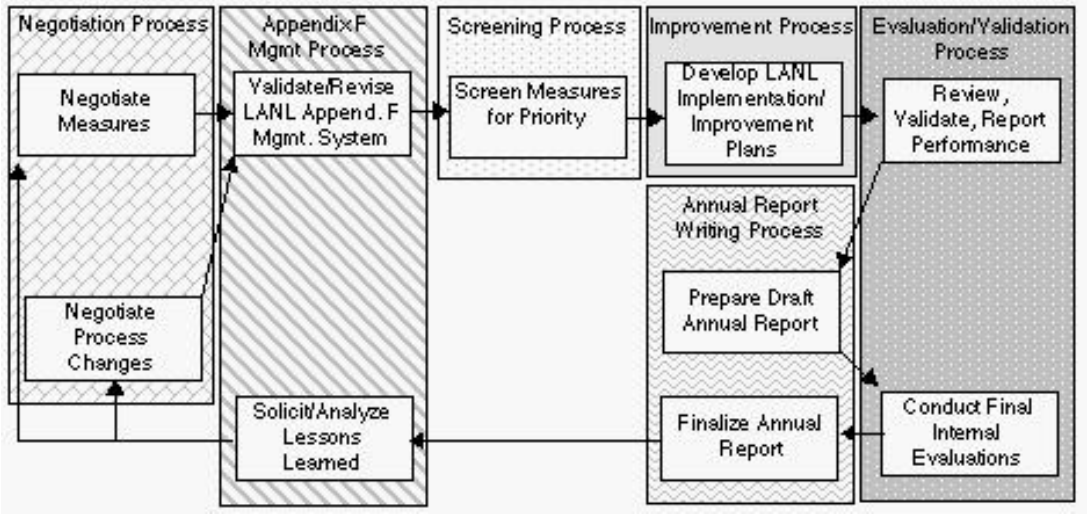


Fig. 2. Appendix F Process (18-month continuous cycle.)

EPA's lead laboratory for green chemistry programs. Green chemistry is a dramatically growing field that seeks to develop and deploy chemical products and processes that reduce or eliminate the use and generation of hazardous substances. EM/PD is also championing the use of supercritical carbon dioxide to replace hazardous chemicals currently used in wafer cleaning and in the dry cleaning industry. An international endeavor uses LANL's simulation and computer modeling capabilities to help the government of China anticipate environmental impacts as it plans water resource management activities. LANL is the lead laboratory for the White House in creating and executing this bilateral program.

EM uses its world wide web site to communicate with customers, stakeholders, and suppliers. By using photographs and text as well as frequently updated statistics, EM keeps all parties well informed of current and projected progress. All EM program offices also have their own web sites and provide extensive information on such things as the status of current projects, regulatory controls that impact operations, schedules for public meetings, and the names of contacts. Special articles in LANL newsletters and fact sheets distributed at LANL's Bradbury Science Museum also describe the EM

program and how it is being managed. Additionally, some EM projects provide direct contact with stakeholders through tours. For example, approximately two tours a week of the Transuranic Waste Inspectible Storage Project (a $50M activity) are conducted with outside parties. These tours range from technical tours for DOE management to official visits from organizations such as the Association of Western Governors. EM has also provided tours to state legislators, local citizens, activist organizations, various television stations and newspapers, and foreign groups from the former Soviet Union and China.

To further monitor public perception, LANL has since 1990 conducted a quarterly survey of public opinion. The resulting reports profile New Mexico residents' views and identify results from specific geographic areas around the state. In addition to asking about general perceptions of LANL, the survey specifically asks respondents their opinion of LANL's environmental responsibility. Results from the survey are recorded, analyzed, reviewed, and used in planning activities.
EM considers employees to also be key stakeholders. A major formal method for determining employee attitudes and the climate in the workplace is an annual Employee Perspective/Checkpoint survey. The survey contains standard types of questions in general categories including safety, productivity, and customer focus. The structure of the survey allows us to perform comparisons with other operational divisions within LANL and also with other companies. In addition, for the past four years EM has participated in LANL's annual Upward Appraisal Program, which allows employees to provide direct feedback to managers regarding the supervisors' behavior and ability in areas such as environment, safety and health; communication; and accountability. EM managers review the information from these instruments and use it to help establish goals and corrective actions.

To partner with stakeholders from around the state, EM leaders participate in an executive team of senior environmental leaders from NMED, DOE, and Sandia National Laboratories in Albuquerque. This team, which meets at least bimonthly, works to address the state's major concerns by coordinating environmental activities, establishing priorities, and identifying funding requirements. EM also has assigned a staff member to serve as a focal point in interactions with the state and to help integrate EM and NMED activities.

4. Information Analysis

The Appendix F Process (see Category 3) is a key performance indicator of our contractual requirements and also a measure of customer satisfaction. Managers monitor progress related to project and performance goals and use that information to develop and/or modify operational plans and to identify areas for improvement. Figure 3 shows that overall scores in the Appendix F functional area of environmental restoration and waste management have improved over the past three years, indicating increasing DOE approval of performance in this area.

LANL senior leaders also monitor progress toward full implementation of ISM. The ISM Project Office has established a detailed implementation schedule and monitors all portions of LANL, including EM, to ensure that milestones are achieved and that performance goals are met.

EM maintains extensive databases related to environmental information for LANL as an institution. This data ranges from measurement of progress toward goals for routine waste minimization for various waste types (Fig. 4) to percentage of sanitary waste recycled (Fig. 5).

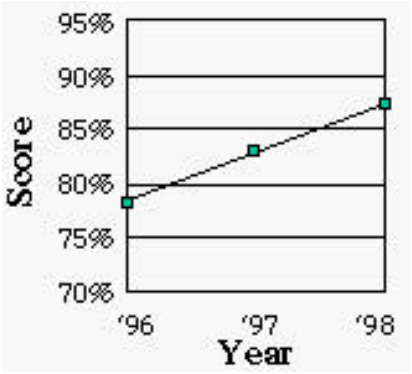


Fig. 3. Appendix F scores for environmental restoration/waste management.

Fig. 4. Low-level waste generation.

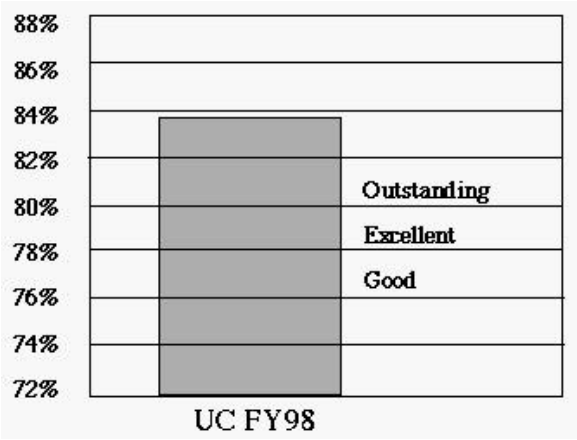


Fig. 5. Percentage of sanitary waste recycled.

Additional customer input comes from weekly, monthly, and quarterly meetings held by program managers and other EM senior leaders. Monthly and quarterly status review meetings provide more formal input, but customer views and concerns are captured at all interactions.

EM's PPC monitors progress against project goals for the EM program offices. Reports, which in some cases include progress in specific pollution prevention activities and upstream waste minimization efforts, are provided monthly. Program managers also provide EM senior leaders with more up-to-date but less formal progress reports in their weekly management sessions. Information from the ESH-ID review process (see Category 2) is collected and monitored.

Other environmentally related data that is tracked and analyzed includes (see Category 3)

- information from the annual Employee Perspective/Checkpoint Survey,
- results from the annual upward appraisal process that allows employees to, and
- information from the quarterly public opinion survey that tracks public perception of LANL's environmental responsibility.

5. Employee Participation

A major goal in EM is that every employee understand his or her role in achieving organization and institutional goals. For example, the ISM implementation strategy currently being developed for the division will emphasis employee understanding and involvement.

EM managers are also responsible for preparing individual development programs—both short-term and long-term—for each employee on an annual basis as part of LANL's Performance Management System. This system requires EM groups and programs to establish objectives which support the organizational echelons above them. Objectives for each employee are then designed to ensure that the organizational objectives are met and that the employee has a clear view of how his or her work requirements contribute to the success of the entire organization. The Performance Management System ensures clear two-way communication during the goal-setting phase of the process and provides a focus for ongoing discussion about work objectives and processes. Specific goals include

- aligning individual expected results with institutional goals,
- identifying and assessing individual performance results/accomplishments,

- evaluating performance of institutionally defined behaviors,
- describing how individuals helped to meet organizational objectives,
- linking performance to rewards or consequences,
- designing development plans to support improving performance in current jobs and/or increasing impact on the organization,
- enhancing employee/manager ownership of individual and organizational performance,
- improving two-way communication between supervisors and employees.

EM employees may also participate in LANL's institutional career development program, which helps identify skills gaps and excesses. Using available information and training, employees can choose to enhance their existing skills or to further develop other skills that LANL needs now or for future programs.

Training programs are a key component to assuring actions by workers that reflect integrated plans. EM employs several training generalists who work with managers and employees to identify specific training requirements for work being performed, establish appropriate programs, enhance quality, and assure continuity between all aspects of training. Training on standardized practices such as hazardous material management or emergency operations is conducted on a LANL-wide basis. Site- and task-specific training is also provided for EM projects and facilities.

To assure an adequate safety envelope and compliance with laws and regulations, EM facilities must produce several operations plans and risk-reduction plans. Text in Category 2 outlines these short- and long-term approaches and demonstrates the comprehensive measures used to ensure employee well-being.

One new key element of the training program is inclusion of the Green Zia tools for environmental excellence. EM helped in the development of the tools for NMED and piloted their early use. EM now offers training in use of the tools and facilitation for the Green Zia improvement process to other divisions and programs across LANL. Figure 6 shows EM's vision for full deployment of the Green Zia approach throughout LANL.

LANL senior leaders have chartered the Employee Advisory Committee (EAC). EAC

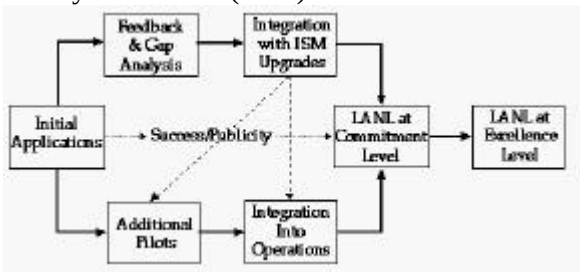


Fig. 6. Deployment of Green Zia approach.

is composed of members from each division, including EM, who are committed to making the LANL a better workplace for all employees. The purpose of EAC is to serve as a communication link providing employee input, feedback, and recommendations to LANL management on existing and proposed LANL policies, practices, operations, and procedures. EAC also identifies issues of employee concern and communicates these issues and possible solutions to LANL management.

Another mechanism to capture employee input is the annual Employee Perspective/ Checkpoint Survey (see Category 3). The annual upward appraisal process also allows employees to provide direct feedback to managers (see Category 3).

There are also incentives to encourage staff to work smarter and utilize additional resources to accomplish their work. The Pollution Prevention Awards Program, sponsored by EM Division but open to all LANL employees and subcontractors, is designed to encourage individuals and teams to develop plans, programs, or ideas for minimizing waste; conserving water, electricity or natural gas; reducing air or water pollution; or procuring products with recycled content. Recipients of the awards receive recognition and a cash grant from specially allocated congressional funds.

The Los Alamos Awards Program, administered by LANL institutionally but tailored for application at the division or program level, provides a link between

the organization's mission and those employees or teams that achieve significant accomplishments toward that mission. EM managers use the program to recognize exceptional contributions and noteworthy achievements by awarding their employees, either individually or as teams, cash awards ranging from $250 to $2000.

6. Process Management

As stated in EM's vision statement (see Category 1), EM operates to help LANL fulfill its mission. One key process that serves as an overarching framework for all work is ISM. Throughout LANL the goal of ISM is the systematic integration of a focus on environment, safety, health, waste minimization, and pollution prevention into work practices at all levels so that our missions are accomplished and our workers, the public, and the environment are protected. This is further refined in LANL's goal to accomplish its mission cost-effectively while striving for an injury-free workplace, minimizing waste streams, and avoiding adverse impacts to the environment from its operations.

EM's key processes are developed, managed, and reviewed around the concepts of environmental excellence and customer satisfaction. To a great extent, EM itself is organized around key environmental processes. Environmental restoration, waste management, and pollution prevention activities are directly funded by DOE and account for nearly three-quarters of EM's total annual budget. As detailed in Category 2, EM's PPC Office prepares a detailed baseline for all environmental work to be performed at LANL annually. From this baseline of projects, a subset of activities is actually selected for action based on both DOE's determination of priorities and available funding. PPC then sets up highly specific project plans for the activities. EM program managers report monthly to DOE, analyzing work accomplished and comparing actual performance against plan estimates.

The following descriptions, while organized around EM's programmatic structure, also explain the organization's key work processes and how environmental excellence activities are integrally developed and used.

Waste Management

The Waste Management Program Office (EM/WM) has the responsibility for overseeing the waste management process and implementing a compliant and cost-effective program for managing six types of regulated waste. EM/WM's scope is to assess LANL waste management needs; identify necessary policies, programs, services, capabilities, and facilities; develop and gain approval of the required strategies, plans and budgets to ensure that the necessary programs, services, capabilities, and facilities are available to support DOE's and LANL's missions; and contract with other LANL organizations to provide these programs, services, capabilities, and facilities.
EM/WM provides overall fiscal and technical management of the waste management process, including the minimization and pollution prevention functions at LANL, to achieve program goals and schedules within authorized budgets and serves as the single point of contact and unified voice to customers within and sponsors outside LANL.

LANL's waste management program is focused on providing necessary waste management services, increasing cost effectiveness, decreasing waste generation, and aggressively reducing legacy wastes. The program manages hazardous and toxic waste (chemical waste), low-level waste, low-level mixed waste, radioactive liquid waste, and transuranic and mixed transuranic waste. EM/WM also implements a waste minimization program for these five types of wastes plus industrial waste.
EM/WM provides services and facilities to manage wastes generated by ongoing LANL programs and operational facilities and by environmental restoration including facility decommissioning and decontamination activities. EM/WM manages LANL's waste treatment facilities and conducts activities to reduce the amount of legacy waste that is in storage.

EM/WM program managers have specific performance goals for operations. These goals, established by DOE and UC, provide not only a set of operations requirements but also a key method of

identifying opportunities for improvement. Typical goals include waste avoidance, volumes of waste handled, and cost-effectiveness.

Environmental Restoration

The Environmental Restoration Program Office (EM/ER) manages the environmental restoration process and evaluates LANL sites to determine if restoration is needed to comply with today's environmental standards. Sites that need restoration are ranked so that limited funds are spent first on the areas that could most negatively impact people, animals, and the environment. During World War II and the Cold War, LANL operated without giving a great deal of thought to how hazardous or radioactive wastes were disposed. As society became more aware of man's impact on the environment in the early sixties and federal legislation was passed in the seventies to establish the EPA, LANL improved its methods for handling these materials, and today environmental restoration is an ongoing process. Currently the EM/ER project focus areas include

- regulatory compliance,
- analysis and assessments,
- remedial actions,
- canyons, and
- material disposal areas.

Environmental Stewardship

The Environmental Stewardship Office (EM/ES) champions the pollution prevention process and is responsible for integrating pollution prevention into a systems framework. The three main duties of this office are to disseminate waste generation and pollution prevention data, establish incentives for pollution prevention, and broker pollution prevention investment projects.

EM/ES maintains a database of pollution prevention success stories and reports to DOE and other entities on all LANL waste avoidance plans and successes. EM/ES also produces the division's *Environmental Stewardship Road Map*, which outlines long-term pollution prevention philosophies and strategies, administers EM's Pollution Prevention Awards Program, and provides coordination of EM's and LANL's participation in the New Mexico Green Zia Awards Program.

EM/ES has assigned pollution prevention experts to work cooperatively with the managers of LANL's major waste streams and to identify proactive methods of preventing or minimizing pollution. Examples of current EM/ES process successes include the following:

- Use of a mobile unit to pretreat wastewater containing hazardous chemicals allows generators to dispose of the water as sanitary rather than hazardous waste.
- Development and testing of an electrolytic decontamination apparatus can be used to decontaminate process equipment that is being decommissioned. A far superior decontamination is realized, and the contaminant dissolved in the solution can be precipitated or filtered on-line, allowing for solution reuse.

Some aspects of EM operations are less predictable and are dependent on EM's ability to competitively win funding for development of new initiatives. For example, EM/IS&T processes and projects are contingent upon successful response to requests for proposals issued by program offices within DOE. These types of projects typically involve approximately one-fourth of EM's annual budget. The process EM/IS&T uses to develop innovative environmental solutions includes, almost by definition, evaluation of ways to identify and improve environmental activities and to meet or surpass environmental requirements. This process, shown in Fig. 7, moves from basic research into environmental problems to full deployment of new solutions.

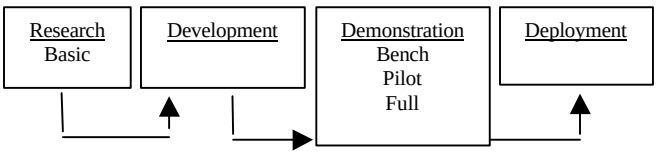


Fig. 7. EM/IS&T process for developing innovative environmental solutions.

Other portions of EM operations, such as support for Rocky Flats and the Yucca Mountain Project, are directed by DOE site managers and are not self-contained operations.

Acronyms

DOE	Department of Energy
EAC	Employee Advisory Committee
EM	Environmental Management Division
EM/ER	Environmental Restoration
EM/ES	Environmental Stewardship
EM/IS&T	Integrated Science and Technology
EM/PD	Program Development
EM/PPC	Project, Planning and Controls
EM/WM	Waste Management
EPA	Environmental Protection Agency
FTE	Full-time equivalent (employee)
ISM	Integrated Safety Management
LANL	Los Alamos National Laboratory
NMED	New Mexico Environment Department
NRC	Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
SAR	Safety Analysis Report
UC	University of California