

Integrating Environmental Restoration and D&D Activities across the DOE Complex

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ABSTRACT

As part of a major environmental management effort at the Department of Energy (DOE), teams of subject matter experts from throughout DOE's nationwide operations are busy planning how to best integrate environmental restoration and decontamination and decommissioning activities. Teams use a formulated systems engineering process to enhance efficiencies and avoid duplication in order to accelerate the cleanup process and lower costs.

INTRODUCTION

In July 1996, DOE's Assistant Secretary for Environmental Management (EM) initiated the EM Integration program to find ways to integrate its nuclear waste cleanup operations complexwide. A project management team of contractors was established to identify technically defensible, cost-effective methods for this cleanup, which was to include environmental restoration and decontamination and decommissioning. The team developed an evaluation process using systems engineering methodologies, with emphasis on:

- Eliminating redundant facilities.
- Maximizing waste storage capacity.
- Eliminating site-specific program boundaries .
- Maximizing the use of a complexwide learning curve.
- Implementing complexwide successes and lessons learned.
- Employing innovative technologies.
- Utilizing national procurement vehicles.

Corporate thinking required by the systems engineering process forces DOE officials, contractors, and subject matter experts to evaluate broader interests than their own and to focus on identifying complexwide integration opportunities.

SYSTEMS ENGINEERING

The EM Integration team developed a four-part integration process using systems engineering methodologies (see Fig. 1):

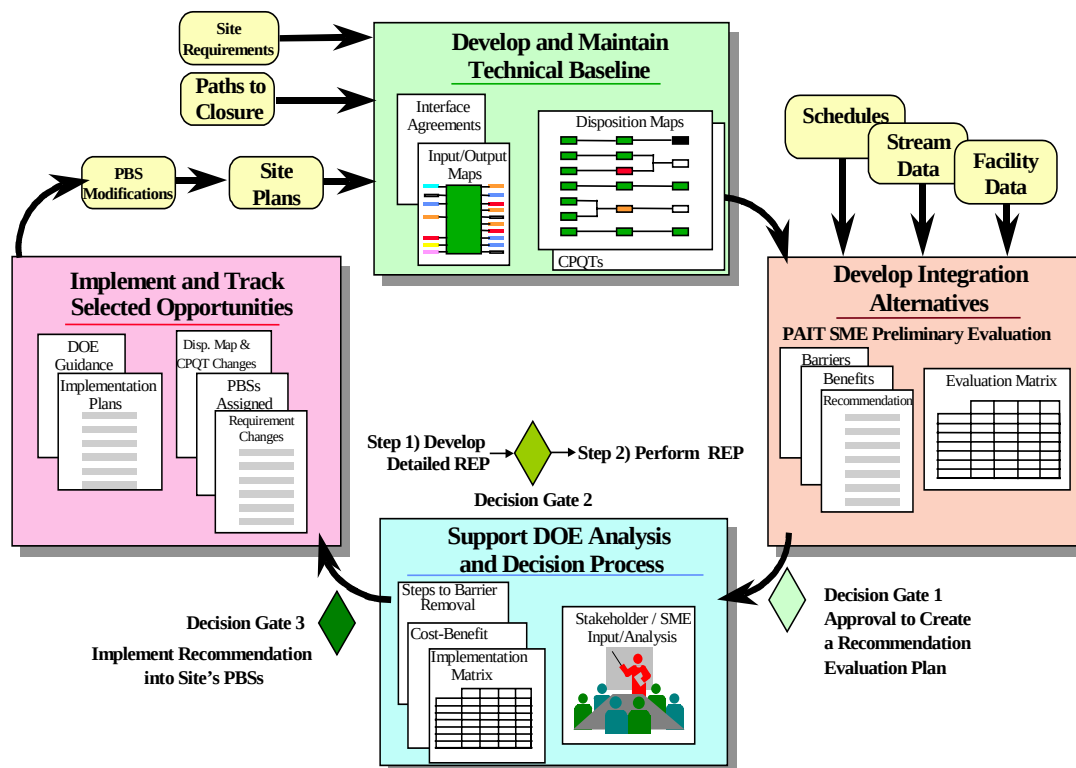


Fig. 1. Systems Engineering Integration Process.

There are four essential elements that culminate the systems engineering integration process. They are:

- Development of site baseline(s).
- Identification and development of alternatives.
- Analyses and decision of alternatives.
- Implementation of preferred alternative(s).

The following principles underlie the EM Integration systems engineering process:

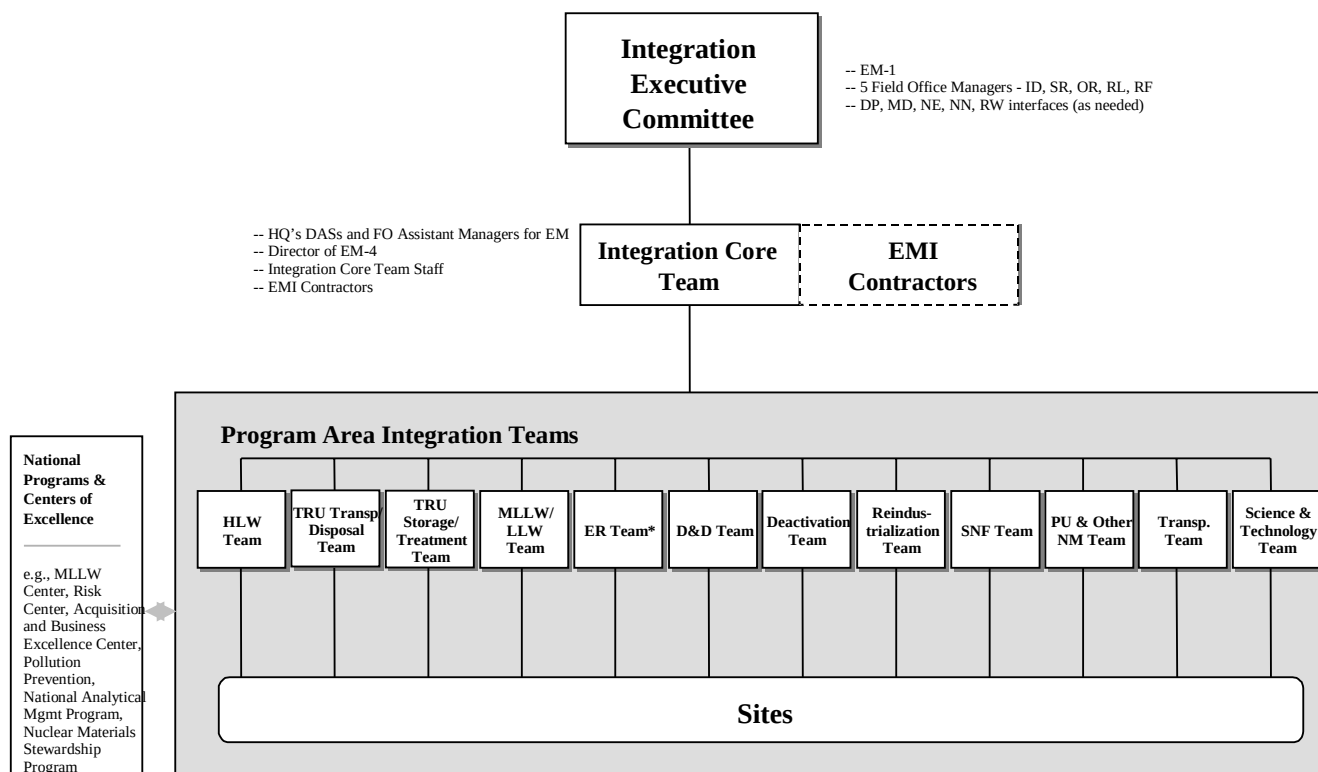
- Integration is not a one-time effort to fix DOE's planning base; it is institutionalized in the way the agency conducts business.
- Data collected through the EM Integrated Planning, Accountability, and Budgeting System will be used to the maximum extent possible.
- Integration is a partnership between DOE (headquarters and field organizations) and contractors.
- The integration process ensures a consistent, technically defensible approach.
- Innovative integration is fed by out-of-the-box thinking.
- Integration activities will interface with other departmental organizations, e.g., Defense Programs (DP), Fissile Material Disposition (MD), Nonproliferation and National Security (NN), Nuclear Energy (NE), and Civilian Radioactive Waste Management (RW).
- Small increases in efficiency are important. When applied across the complex, these increases can result in significant savings.
- Consideration of the health and safety of the public and workers and protection of the environment are integral parts of the process.
- Transportation is key to enable integration opportunities for treatment, storage, and disposal.
- Science and technology can provide opportunities for achieving efficiencies.
- Integration is intended to foster coordination with Tribal Nations, states, regulators, and other stakeholders.

EM INTEGRATION ORGANIZATION AND PROCESS

Resulting from a successful contractor-led effort initiated in July 1996, DOE adopted integration as the way of conducting EM business. To facilitate the systems engineering approach, DOE established an EM Integration charter to plan, direct, facilitate, and evaluate program integration efforts across the DOE complex. Fig. 2 depicts EM Integration's organization, which identifies the relationship of the Integration Executive Committee and each of its supporting entities.

Integration Executive Committee

The Integration Executive Committee is chaired by the Assistant Secretary for Environmental Management (or designee) and consists of five senior DOE EM field office managers who oversee complete operation of the integration process. The five DOE EM field office managers are from Idaho, Oak Ridge, Richland, Rocky Flats and Savanna River.



* Including focus on buried waste issues (e.g., complex-wide pre-1970 buried TRU/CERCLA issues)

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Fig. 2. EM Integration organization.

The Integration Executive Committee serves as the decision authority within EM for implementing integration opportunities. This committee will establish the integration culture throughout DOE and its operating contractors.

Specific responsibilities of the Integration Executive Committee include the following:

- Provide overall direction and leadership.
- Establish the Program Area Integration Teams and assign team leaders.
- Approve the Integration Core Team assignment of opportunities to the Program Area Integration Teams.
- Make decisions on integration opportunities based on input and analyses provided by the Program Area Integration Teams or the Integration Core Team.
- Ensure adequate resources are applied at the sites and headquarters.
- Ensure coordination and interface directly with other field offices, as well as the other program offices within DOE (e.g., DP, MD, NE, NN, and RW).

- Resolve process and organizational issues raised by the Integration Core Team or Program Area Integration Teams.
- Provide corporate leadership to ensure an aggressive effort to deploy alternative(s) and more effective technology through full integration of technology development and user organizations.
- Facilitate cross-site actions and ensure implementation of recommendations once decisions are made.
- Continually review the progress of Program Area Integration Teams.
- Continually evaluate the structure and process of the EM Integration effort and determine any changes needed in the structure, process, or continuance of the EM Integration team and its organizational entities.
- Collaborate in order to work equity issues among states with regard to integration opportunities.
- Meet quarterly to review status and progress.

Integration Core Team

The Integration Core Team provides support and resources to the Integration Executive Committee and the Program Area Integration Teams. The Integration Core Team consists of deputy assistant secretaries; assistant managers from ID, SR, OR, RL, and RF; a representative from the Carlsbad Area Office; the director of EM's Office of Safety and Health (EM-4); and other members as selected by the Integration Executive Committee.

The Integration Core Team has three main functions:

- Ensure that direction from the Integration Executive Committee is implemented.
 - Assign opportunities to the Program Area Integration Teams.
 - Champion changes in culture.
 - Coordinate and provide guidance to the Program Area Integration Teams.
- Bring items promptly to the Integration Executive Committee.
 - Perform additional analysis and provide a staff recommendation from a national perspective on results from the Program Area Integration Teams.
 - Track progress and raise issues for resolution.
 - Propose new ideas for consideration.
 - Plan and facilitate meetings.

- Manage day-to-day activities of the EM Integration process.
 - Ensure that EM Integration contractor resources are available.
 - Ensure that support is readily available from the national programs and centers of excellence
 - Ensure coordination across Program Area Integration Teams.
 - Communicate and coordinate with other headquarters programs and teams (e.g., site teams, waste type managers).
 - Ensure that Program Area Integration Teams are fully staffed.
 - Develop and staff a location at DOE headquarters to facilitate information exchange and communication, including disposition maps and other integration tools.

Program Area Integration Teams

There are 12 Program Area Integration Teams. These teams are staffed with DOE and contractor subject matter experts and are organized by waste/material type as follows:

- High-level waste.
- Transuranic transportation and disposal.
- Transuranic storage and treatment.
- Mixed low-level and low-level waste.
- Environmental restoration.
- Deactivation.
- Decontamination and decommissioning.
- Reindustrialization.
- Spent nuclear fuel.
- Plutonium and other nuclear materials.
- Transportation.
- Science and technology.

The Integration Executive Committee selects a chairperson and co-chairperson for each of the Program Area Integration Teams. The chairperson is from a DOE field office and the co-chairperson is from DOE

headquarters. The chairperson is directly accountable to the Integration Executive Committee for team activities.

Program Area Integration Teams have the following responsibilities:

- Implement the EM Integration systems engineering process.
- Upon identification of an integration opportunity, determine the level of evaluation required and prepare the Recommendation Evaluation Plans (these plans detail the scope of the evaluation, schedule, and deliverable); establish “integrated product teams” to implement the evaluation; and submit the Recommendation Evaluation Plan to the Integration Executive Committee for approval.
- Aggressively pursue and complete evaluations of proposed integration opportunities, per the approved Recommendation Evaluation Plan.
- Assume full accountability for the disposition of integration opportunities.
- Identify specific implementation steps required and work directly with site and headquarters project managers.
- Hold periodic workshops to identify new integration opportunities and provide a brief summary of any new opportunities.
- Communicate activities to the appropriate program entities, i.e., the EM program.
- Ensure adequate stakeholder input and adherence in the integration and evaluation process.

Baselining and the Opportunity Process

Baselining establishes system boundaries, functions, and interfaces which aid in the identification and development of opportunities. Baselining also provides the basis for change that occurs during opportunity implementation.

Baselining is conducted using several methods, with resulting site functions being depicted on baseline disposition maps. The baseline disposition maps along with other tools are used in workshops to fully understand the current plan for waste/material disposition. With baselines established alternatives to the baseline are developed and analyzed to identify opportunities for enhanced cost savings and acceleration of cleanup.

As opportunities progress through the systems engineering process, documentation is required. Documents are submitted to the Integration Core Team and/or the Integration Executive Committee for approval. Documentation includes an Opportunity Description Document, Recommendation Evaluation Plan, and an Opportunity Change Control Package.

The Opportunity Description Document provides a brief description of the selected opportunity, a statement of the problem the opportunity will solve, sites potentially affected, and an estimate of potential cost savings should the opportunity be implemented. The intent of this document is to provide the Integration Core Team with adequate information to make a decision about whether to move forward with the opportunity.

Should the Opportunity Description Document be accepted, a Recommendation Evaluation Plan is developed. The Recommendation Evaluation Plan takes the Opportunity Description Document a step further, delineating the level and scope of evaluation needed. Level and scope issues could include factors such as cost, schedule, risk, technology, environment, and regulations.

In addition, programmatic factors are considered. Programmatic factors could include impacts on existing compliance agreements, regulatory compliance, timing to implement, availability of technology, cost, and equity considerations. Should the Recommendation Evaluation Plan be accepted by the Integration Executive Committee, an Opportunity Change Control Package will be developed. The Opportunity Change Control Package is a complete package of site specific information that can be handed to a Project Breakdown Structure (PBS) manager for implementation.

INTEGRATING ER AND D&D ACTIVITIES

Through the EM Integration systems engineering process, Program Area Integration Teams are taking the first steps toward integrating environmental restoration (ER) and decontamination and decommissioning (D&D) activities complexwide.

ER and D&D Program Area Integration Teams

The Environmental Restoration and D&D Program Area Integration Teams are made up of subject matter experts from across the DOE Complex. The team members follow the Systems Engineering process to identify potential opportunities and develop necessary documentation. The Program Area Integration teams will rely on other DOE organizations and committees such as ER Business Line Teams and the National D&D Committee to assist in the overall integration effort.

ER Baseline Disposition Maps

A total of 114 ER baseline disposition maps were created, which portrayed waste type, processing, and ultimate disposition.

The initial step in the integration process is to establish a technically defensible baseline. Alternatives, issues, and opportunities are then developed from the baselines. To meet customer needs DOE site subject matter experts went through several iterations of the ER baseline disposition maps.

Since environmental restoration activities are approved by decision documents that involve numerous stakeholders, there became an increasing need to develop a product that could be used by all stakeholders.

In August 1998, a revised ER baseline disposition map was developed in response to a request from the National Governors Association (NGA). This association requested that the ER baseline disposition maps be modified to delineate the status of the cleanup decision-making process as it relates to waste disposition planning. The association was interested in knowing the waste volumes connected with approved decision documents and waste volumes connected with future decision documents and the regulatory process planned for the future waste volumes.

To meet the request of the NGA, the ER Program Area Integration Team members worked together to update and revise its ER baseline disposition maps (see Fig. 3).

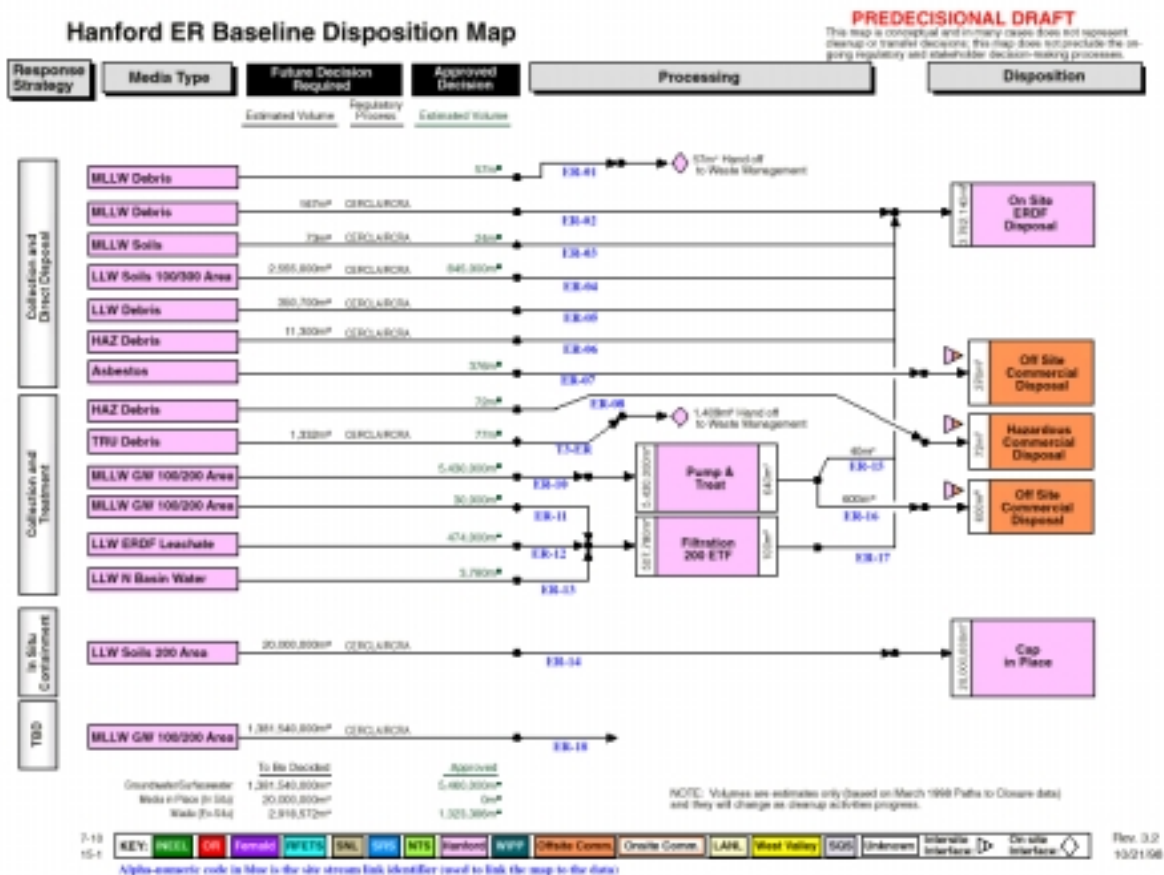


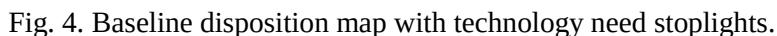
Fig. 3. ER baseline disposition map.

D&D Baseline Disposition Maps

At the present time, a number of ER baseline disposition maps include D&D wastes. However, a complete estimate of D&D wastes/volumes within the DOE complex has not been represented on baseline disposition maps. The EM Integration team and the D&D Program Area Integration Team are working together to initiate the D&D baselining effort.

Technology Needs

Another activity of EM Integration is to link technology needs to waste and material streams identified on the baseline disposition maps. This activity is essential for identifying waste streams where a technology, or lack thereof, results in wastes not being able to be dispositioned. Linking technologies to waste streams also ensures that technology development monetary resources are allocated to needed technologies.



Both the ER and D&D Program Area Integration Teams are in the process of developing integrated schedules. The schedules detail the main activities each group will accomplish throughout the year. A few of the items expected to be shown on the integrated schedule include team meetings/workshops, baselining activities, Core Team and IEC meetings.

Specific emphasis will be placed on supporting the D&D Program Area Integration Team in developing site-specific baselines and subsequent disposition maps, or modifications to existing disposition maps.