Guidance for Developing Environmental Management Science and Technology Site Needs Statements

Department of Energy
Environmental Management
October 4, 2000

Executive Summary

Site needs drive Environmental Management's (EM) research and development program. The purpose of writing Site Needs Statements is to guide researchers and developers to propose ways to address the technical and scientific problems they describe. The set of needs is not replaced wholesale each year; some needs are added and some are deleted. **The goal is not to create needs statements, but to dispose of needs statements by solving them.**

This guidance updates the *Outline for Science Needs and Opportunities Statements* and the *Outline for Technology Needs and Opportunities Statements* (September 11, 1998) located on the Office of Science and Technology (OST) web site. This guidance complements and expands on the summary needs data entered into the Integrated Planning, Accountability, and Budgeting System-Information System (IPABS-IS). Modifications from previous guidance are to define needs more precisely, apply national need priority consistently across Operations Offices, identify schedule requirements, capture long-term stewardship needs, collect science and technology needs in one location, and include in each need statement a clear definition of success.

Site Needs Statements are developed to provide the Department of Energy (DOE) programs, researchers, and technology providers with information about science and technology gaps impeding site cleanup goals. The updating of the science and technology needs statements is of significant importance in tracking the yearly assessment of the EM performance measure pertaining to the meeting of high priority needs through science and technology. The needs fall into two categories: technology needs and science needs. Technology needs include descriptions and requirements for a component, process, system, or a set of systems that presently does not exist, but is critical to a site's cleanup mission. Technology needs also include existing alternative technologies that would be an improvement over the current baseline, but require development to be applicable to EM's mission. Science needs are developed based on evaluations indicating there is sufficient foundational knowledge from which to develop necessary technologies or where there is a need to develop a better understanding of the underlying problem. Where appropriate, science needs will be coupled with their respective technology needs by reference.

The target audience of Site Needs Statements are primarily Focus Area personnel. The statements should provide sufficiently detailed information to enable responders to understand the needs well enough to determine when different sites have the same need and initiate preparation of technical responses to satisfy them. At a minimum, sufficient detail is required to enable the audience to understand the need well enough to determine whether they are able to contribute and where to go for more information. The need

statement initiates the process leading to a technical response, and a fully detailed request for proposals and work packages. Site Needs Statements also provide information for national oversight, planning, and performance measurement.

Following this executive summary is a description of elements to be included in a Site Need Statement. Any element that does not apply should be marked "Not applicable." If information is not available, then the element should be marked "Unavailable."

Modifications to the Site Needs Guidance

Each Operations Office is responsible for developing and maintaining its own detailed information about site needs. The central focus of this guidance is to improve the consistent development and documentation of site needs across Operations Offices without creating unwieldy or unnecessary data collection requirements. Modifications to the site needs guidance are the following:

1) Define needs precisely. Disposition of high priority site needs is a planned EM corporate performance measure. Consequently, EM must track which needs are being met and which are not. In addition, Focus Areas require specificity in the Site Need Statements to be able to develop detailed technical responses. Authors of need statements are requested to define needs more precisely to avoid (a) broadly defined needs that may be partially met, causing confusion as to what part is done and what part is still needed, and (b) wide variation in needs statements across Operations Offices. **At a minimum, sufficient detail is required to enable the target audience to understand the need well enough to determine whether they are able to contribute and where to go for more information.**

2) Apply need priority consistently across Operations Offices. High priority ratings affect both the corporate performance measures and OST's prioritization process. Therefore, consistent application of the need priority across Operations Offices is desired. A high priority need is defined as *critical to the success of the EM program, and a solution is required to achieve the current planned cost and schedule.*

3) Identify schedule requirements. Two elements relating to schedule requirements are included to ensure that there is clear identification of time criticality and deadlines. The *earliest date required* identifies when the need is requested to be satisfied to provide benefit, avoid schedule slip, or reduce costs. The *latest date required* identifies when the need must be satisfied or else lose benefits, incur schedule slip, or incur cost increases. Additional discussions of schedule requirements are to be identified by reference to regulatory or other drivers and milestones.

4) Capture long-term stewardship needs. Long-term stewardship needs have been identified by the National Academy of Sciences as an area of EM's planning that requires improvement. A better balance is needed between critical shorter term needs and needs planning for the long term. This is a major focus for EM. Readers are advised to identify long-term stewardship needs, particularly for the projects expected to transition into long-term stewardship following site

closure and for nearer-term projects. Late discovery of unidentified long-term stewardship needs would logically be expected to create schedule slips.

5) Collect science needs and technology needs in one system. Operations Offices are responsible for including science needs in their need collection and for indicating the need type as either "science" or "technology."

6) Include a clear definition of success. Each need statement is to define specific parameters that establish when the need is met.

Schedule

The following table reflects the anticipated schedule for the FY 2001 program development process, beginning with site needs development. This schedule is tentative and subject to final approval by EM's Chief Information Officer.

Date	Event
April 2000	767 needs submitted by sites. (338 high priority)
October 4, 2000	Distribute revised guidance for developing site needs.
October 13, 2000	OST Module in IPABS-IS is on line.
October 13, 2000 to November 15, 2000	STCGs update FY 2001 site needs in IPABS-IS OST Module.
November 15, 2000	The FY 2001 site needs set is locked.
November 15, 2000 to January 31, 2001	Focus Areas review site needs, develop technical responses, and enter technical response number and title into IPABS-IS. Focus Areas update full technical responses.
January 31, 2001	Technical response number and title locked in IPABS-IS.
January 31, 2001	Details of Focus Area technical responses available from Focus Areas.
March 31, 2001	Focus Area Work Packages completed by Focus Areas, crosswalked to technical responses, and entered into IPABS-IS OST Module.
April 27, 2001	PBS Managers update needs association to technical responses, material streams, milestones, Treatment/Storage/Disposal (TSD), and potential cost savings in the Technology Needs Tab of IPABS-IS.

Site Need Statement Elements

General Reference Information

1. **Need Title.*** Provide a short and descriptive title. Do not presuppose the solution to the problem.
2. **Need Code.*** This is the site-created need identifier that begins with the two-letter Operations Office designator. To enable year-to-year tracking, need numbers are to remain the same until the need is dispositioned. If a need has been partly met, but there

are significant aspects of the need that remain to be solved, then a new need should be created that includes the aspects of the need that remain.

3. **Need Summary.*** This is a summary statement and key word field limited to 800 characters.
4. **Origination Date.*** Required for new entries (mm/dd/yyyy). For existing needs, this is set at FY 2000. This is a new field to allow tracking of the number of years a need has been in the system.
5. **Need Type.*** Select if it is a technology need or science need as defined in the Executive Summary.
6. **Operations Office**. Enter the standard name of the Operations Office.
7. **Geographic Site Name.** Enter the standard name for the geographic site. It is recommended that each Operations Office have a pick list of sites.
8. **Project.*** Enter the PBS ID number (s) and name (s) that are associated with this need.
9. **National Priority.*** Enter the national priority ranking for the need.
   a. High - Critical to the success of the EM program, and a solution is required to achieve the current planned cost and schedule.
   b. Medium - Provides substantial benefit to EM program projects (e.g., moderate to high life-cycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays).
   c. Low - Provides opportunities for significant, but lower cost savings or risk reduction, may reduce the uncertainty in EM program project success.
10. **Operations Office Priority.** X of Y, as determined by the appropriate Operations Office personnel.

Problem Description Information

11. **Operations Office Program Description.** Provide enough detail on the Operations Office Program or provide a current reference where this information is located, so that an individual not familiar with the current mission has a basic understanding of what is going on. This can be available boilerplate information.
12. **Problem Description.** Define in detail the problem that needs to be solved. Describe general technical or process capability or scientific knowledge that is needed to address the problem. Describe the specific known outcomes if the need is not satisfied. What will happen? Who will care? Provide enough detail so that a Focus Area, material stream manager, principal investigator, or commercial vendor will be able to understand the details of the problem. Identify the problem location, media of concern, and contaminants of concern. Also, describe basic science that may be required to address the problem.
13. **Functional Performance Requirements.** This is the key section for technology needs. Spell out technical details needed for design and include parameters that are measurable. Provide as many requirements as necessary to adequately define what is needed, such as desired final contaminant levels, expected throughput, design constraints (size limitations, configuration, power supply), special material requirements, etc.
14. **Definition of Solution.** Define what it means to solve the need, recognizing that this may need to be revisited as a result of the iterative Focus Area/end user process. It is essential to know the criteria to determine need disposition. If the functional

performance requirements are well defined, they can supply the definition of success by cross reference or summary. Inability to define the solution set is a clear indication that the need is not yet precisely defined or should be redefined or both.

15. **Targeted Focus Area.*** Enter the primary Focus Area when known.
16. **Potential Benefits.** Describe the benefits of solving this need. Benefits can include health and safety risk reduction, programmatic risk reduction, cost savings, cost increase avoidance/reduction in baseline cost uncertainty, schedule acceleration, and enabling technology.
17. **Potential Cost Savings.*** Congress and other external parties require EM to provide estimates of future benefits of investing in technology development. Potential cost savings is one benefit. Accordingly, the Office of the Principal Deputy Assistant Secretary has directed that Operations Offices provide potential savings associated with each site need/Project Baseline Summary (PBS) combination. If no estimate is made, Focus Areas can assist their STCG contacts to make a cost savings estimate. Unlike actual cost savings where spending figures are available to directly compare baseline to an alternative technology, potential cost savings are market based, that is, are based on the size of the potential "market" the need/PBS combination represents. Operations Offices are to compute potential savings based on the following criteria:
    a. Potential cost savings estimates are to be based on best engineering judgment.
    b. Only "order of magnitude" estimates written to one significant figure (e.g., $2 million or $100 thousand) are required; however, estimates greater than $10 million require engineering cost analysis documentation.
    c. Since large confidence intervals are acceptable, sites should be careful that the sum of potential cost savings for needs within a project does not exceed the project's life-cycle cost.
    d. Cost savings from environmental technology research and development innovations typically are limited to 30 percent of a project's total cost. To be credible, estimates should adhere to this limit.
    e. If only a range of estimates can be established, then the midpoint of this range should be entered as the estimate.
18. **Potential Cost Savings Narrative.*** Explain the method used to derive the cost savings estimate including the range of the estimate.
19. **Cultural/Stakeholder Basis.** Describe why the baseline, or lack of a baseline, is unacceptable to stakeholders or other cultural concerns and represents a need. Include the details necessary to understand actions taken to date and the current situation.
20. **Environment, Safety, and Health Basis.** Describe the environment, safety, and health (ES&H) justification for the need. Why are existing technologies not adequate? What ES&H drivers represent risk for the baseline or alternatives? Include the details necessary to understand the current situation.
21. **Regulatory Drivers.** Describe the regulatory justification for the need. Why are existing technologies not adequate for existing regulations, judicial actions, consent orders, or other drivers? Include as much information on the regulatory drivers as necessary.
22. **Milestones.*** Enter the milestone name, ID number, and technical risk linked to this need. Indicate if the milestone is on the site's critical path to closure. Note that a site need description should support the technical risk assigned to an associated milestone.

Recall that technical risk is a measure of the confidence or maturity in the current site baseline and is scored from one to five (low to high).

23. **Material Streams.*** Enter the material stream name, ID number, and technical risk linked to this need. Indicate if the stream is on the site's critical path to closure. A site need description should support the technical risk assigned to an associated stream.
24. **TSD System.*** Enter the TSD name, ID number, and technical risk linked to this need. A site need description should support the technical risk assigned to an associated TSD.
25. **Major Contaminants.** List the major contaminants. Each site should develop a standard list or pick list to standardize entry.
26. **Contaminated Media.** What are the contaminated media? Each site should develop a standard list or pick list to standardize entry.
27. **Volume/Size of Contaminated Media**. Provide an estimate and reference source documents.
28. **Earliest Date Required.*** Identify the earliest date (mm/yyyy) when the need is requested to be satisfied to match project schedule and provide benefit or avoid schedule slip or cost increases. The earliest and latest dates required should identify the best estimate of the time range when this need must be met. If this is a long-term stewardship need, put LTS.
29. **Latest Date Required.*** Identify the latest date (mm/yyyy) when the need must be satisfied, or else place benefit at risk, incur probable schedule slip, or incur probable cost increases. If this is a long-term stewardship need, enter LTS.

Baseline Technology Information

30. **Baseline Technology/Process.** The baseline technology or process should be described. Include the extent of application, efficiency, limitations, operating, and maintenance characteristics, and length of time the current technology will require to resolve the need. Describe the technology or process that is currently planned to address the need. A need may not have an existing technology baseline; however, targeted process alternatives are probably available and should be discussed. Include the technical justification for the need, as much technical detail as necessary, why existing technologies are not adequate, why current information or technical assumptions are at risk, and answers to the questions that may be a cross reference to the functional performance requirements.
31. **Life-Cycle Cost Using Baseline.** This is the life-cycle cost related to the PBS.
32. **Uncertainty on Baseline Life-Cycle Cost.** Any projects exhibiting high technical risk factors would be expected to have a larger degree of uncertainty in the baseline cost.
33. **Completion Date Using Baseline.** This is the fiscal year that the associated PBS is to be completed.

Points of Contact (POC)

34. **Contractor End User POCs.** Name, affiliation, phone, fax, and email must be kept current.
35. **DOE End User POCs.** Name, affiliation, phone, fax, and email must be kept current.
36. **Other Contacts.** Name, affiliation, phone, fax, and email must be kept current.

* Element of a Site Need Statement appearing in IPABS-IS.