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**DETERMINING TRAINING NEEDS FROM SUPERVISORS' ASSESSMENT OF
STAFF PROFICIENCY IN TASKS AND SKILLS**

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DETERMINING TRAINING NEEDS FROM SUPERVISORS' ASSESSMENT OF STAFF PROFICIENCY IN TASKS AND SKILLS*

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ABSTRACT

To provide the basis for establishing training opportunities, this project investigated supervisors' views of three components of staff activities. The project established the tasks that staff perform, identified staff's level of effectiveness in performing these tasks, and investigated staff's level of proficiency in performing the skills underlying these tasks. Training opportunities were then determined in those areas where knowledge and skills could be improved for staff to perform their tasks more effectively.

Staff currently perform their tasks sufficiently well. Furthermore, supervisors indicated that for the most part staff do perform the tasks they should perform. In carrying out these tasks, staff use primarily critical thinking, problem solving, and communication skills rather than discipline-specific skills. Although staff generally have working knowledge of most of these skills, additional training in critical thinking and problem solving, program and project management techniques, and communications is appropriate to further improve the organization's effectiveness.

INTRODUCTION

To successfully implement environmental restoration, federal agencies must have skilled staff to carry out the range of activities and tasks needed to achieve the agencies' missions. This project investigated the training needs of an environmental organization by examining the tasks that the staff must perform, staff effectiveness in performing these tasks, and staff proficiency in the skills and knowledge necessary to perform these tasks.

This project sought answers to the following questions:

- What tasks do staff currently perform and are these all or nearly all of the tasks they should perform?
- How well do staff perform these tasks?
- How proficient are staff in applying the knowledge and skills needed to perform these tasks?

Answers to these questions provide guidance on what training would most benefit and improve staff's knowledge and skills.

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The organization examined in this project is one headquarters office within the U.S. Department of Energy (DOE), the Office of Environmental Management (EM). This office is responsible for directing and overseeing programs rather than managing and implementing specific projects. Under this mission, DOE EM is charged with carrying out tasks under the broad functional areas of award fees, budget, communications, documents, guidance, integration and coordination, operations and contractor management, quality assurance, policy and planning, and safety (1).

METHODS

This section briefly describes the procedures used to examine tasks and the associated knowledge and skills needed to accomplish them. These procedures are further discussed in a complementary study by Young and Hensley (2).

The 4 supervisors^a of a headquarters organization of DOE EM completed a workbook that asked questions about the tasks their 24 staff members perform and the knowledge and skills needed for these tasks. The workbook listed 35 tasks and 57 knowledge and skill areas that staff might use to perform their daily activities. Supervisors specified the number of staff who perform each task. In addition, even though staff might not currently perform a task because of limitations such as work priority or budget constraints, supervisors specified how many staff members should perform each task. Supervisors further indicated how well staff perform each task and staff levels of expertise in relevant knowledge and skills. Responses from the supervisors were keyed into a spreadsheet and tabulated. The data were then examined to determine the following:

- Proportion of tasks that staff currently perform and should perform,
- Mean scores in staff's effectiveness in performing their tasks, and
- Staff level of knowledge and proficiency for skills associated with these tasks.

A previous study (2) provided baseline information on the knowledge and skill areas necessary for each task. Training opportunities were determined and prioritized by looking at the knowledge and skills needed for tasks performed least well.

RESULTS

This section presents the supervisors' views on the tasks that staff currently perform and those tasks that they should perform. It also describes staff levels of effectiveness in performing tasks. Finally, this section discusses the knowledge and skills needed to perform

^a This study explicitly examined supervisors' perspectives of how well this organization functions in terms of tasks and skills. A complementary study ascertained staff views of organizational functioning.

the various tasks that staff currently perform and staff proficiency levels in performing these skills.

What tasks do staff perform and are these all or nearly all of the tasks they should perform?

Environmental restoration tasks needed to carry out the mission of a headquarters EM organization are quite diverse (Table I). These tasks can be grouped into broad categories that range from communication activities, such as preparing and reviewing documents; to policy tasks, such as "advise, assist, and provide authoritative guidance"; to administrative activities, such as monitoring schedule constraints and managing files and records; to technical oversight tasks related to the National Environmental Policy Act, land use, and waste management.

PLACE TABLE I HERE

The organization assessed in this project is functioning essentially as it should. Supervisors indicated that, for the most part, staff are performing the tasks that they should (Table I). Furthermore, these tasks are generally consistent with staff position descriptions and with the roles and responsibilities delineated for EM (1). Although a majority of staff currently perform all these tasks, a larger proportion of staff should be interfacing with other program elements both within and outside of the organization, conducting briefings and presentations, and planning for budget and personnel required to implement projects (Table I). In addition, more staff should be overseeing several aspects of headquarters operation: land use activities; decontamination and decommissioning; independently verifying that cleanup and decontamination activities are adequate; and checking surveillance, monitoring, and inspection activities.

How well do staff perform their current tasks?

For any organization to carry out its mission effectively, staff need to be proficient at the tasks they perform. Therefore, the project looked at how well staff accomplish these tasks as well as whether the tasks performed by most staff are also the tasks in which they are most effective. In general, those tasks that the largest proportion of staff perform are also those tasks that they perform most effectively (Table II). These include "coordinate document reviews"; "interface within and outside of DOE"; "prepare and review documents"; and "advise, assist, and provide authoritative guidance." However, four tasks that a relatively large percentage (75%) of staff should perform are performed between somewhat and sufficiently well (mean scores 2.95 to 2.74) (Table II): "establish cost, schedule, and technical baselines"; "provide analyses to determine effects of remediation projects"; "develop, coordinate, and disseminate program management policies and procedures"; and "formulate, define, and modify budget." Training would be appropriate for the underlying skills associated with these four tasks to improve proficiency because they are performed by a majority of staff.

PLACE TABLE II HERE

What knowledge and skills do staff need to perform their tasks?

For an organization to operate smoothly, staff should be proficient in all knowledge and skill areas needed to carry out the tasks they perform. A previous study determined the knowledge and skills needed for each task (2). Because the tasks that staff perform for environmental restoration are complex, the knowledge and skills needed to perform these tasks are also quite diverse (Tables III, IV, and V). Thirteen knowledge and skill areas applied to 12 or more of the 35 tasks that staff currently perform (Table III). These include knowledge of the DOE mission, keeping abreast of current developments, defining criteria applicable to solving problems, and being able to work within schedule constraints. As Table III illustrates, skills needed to carry out the majority of tasks are not technical or regulatory in nature, such as knowledge of the Resource Conservation and Recovery Act; rather, these skills are generally in the categories of problem solving and critical thinking. Table IV further supports the finding that communication skills, program management techniques, and process evaluation skills are needed to perform several tasks successfully. In contrast, several unique knowledge and skill areas are needed to carry out only a few tasks (Table V). These specialized skills include knowledge of radiation effects, health physics issues, land use issues, and emergency response procedures. Tasks associated with these specialized knowledge and skill areas are performed by fewer staff members. Consequently, although training in these areas may be appropriate for selected staff members, it would not necessarily provide the greatest benefit to the whole organization.

PLACE TABLES III, IV, AND V HERE

How proficient are staff in the relevant knowledge and skills needed to perform environmental restoration tasks?

Once the relevant knowledge and skill areas associated with 35 tasks that staff perform were identified (2), supervisors rated staff proficiency levels for each of the 57 knowledge and skill areas needed to carry out these tasks.

In a smoothly operating organization, staff first should be proficient in the knowledge and skill areas that are needed for most tasks they carry out. Once staff are proficient in these widely applicable skills, they can be trained in skills that apply to only a few tasks. Staff proficiency levels for all skills are adequate, although not outstanding (mean scores 3.6 to 2.6 on a 4-point scale) (Table VI). Staff are proficient in several of the skills common to many tasks (Table VI). Skills common to many tasks in which staff are quite proficient include working under schedule constraints, keeping abreast of current developments, providing clear guidance and direction to accomplish tasks, and prioritizing based on criteria.

PLACE TABLE VI HERE

On the other hand, staff proficiency levels are only moderate for some knowledge and skill areas that are common to many tasks (Table VI). These include knowledge of the DOE mission, knowledge of DOE management strategies, the ability to write succinctly and clearly, and the ability to assess strengths and weaknesses of alternatives (Table VI).

Furthermore, staff are quite knowledgeable about the National Environmental Policy Act process and waste treatment/disposal technologies even though these skills are not common to many tasks (Tables V and VI).

CONCLUSIONS

Supervisors in this headquarters office of DOE EM indicated that most of their staff perform the majority of their tasks quite effectively. Supervisors further indicated that, collectively, staff have working knowledge, although not expert understanding, of the subjects and skills associated with each task they perform.

Thus, training is suggested for the knowledge and skill areas associated with those tasks performed by most staff that are performed relatively least well. These knowledge and skill areas fall under the general categories of program and project management, critical thinking and problem solving, and communications. Program management skills include knowledge of EM's mission, DOE management strategies, and defining applicable criteria. Many of these skill areas are dynamic, so training is necessary to keep staff current.

Critical thinking and problem solving skills include examining trade-offs among alternatives, comparing existing conditions to preset standards, and assessing strengths and weaknesses of alternatives. Communication skills include the ability to write clearly and succinctly, interpersonal facility, and providing clear guidance and direction to accomplish tasks. Because these are the primary skills common to many tasks (Tables III, IV, and V), training in these areas is appropriate to help the organization continue to function effectively.

The knowledge and skill areas related to communications, problem solving, and project management have been further prioritized on the basis of the margin of improvement needed to achieve expert knowledge or highly proficient skill levels and how many times the skill is needed (Table VII). Training in the knowledge and skill areas identified in Table VII will strengthen this organization so it can better carry out its roles and responsibilities. This training will further benefit the organization by allowing staff to reach their potential and make their jobs more satisfying (3,4).

PLACE TABLE VII HERE

Different types of training opportunities should be explored. Existing training activities should be continued, and new training programs should be developed to address the diverse skills that underlie the tasks that staff perform. Supervisors should look beyond traditional training courses to improve performance. For example, supervisors may empower their staff by sharing opportunities usually performed by management, such as conducting briefings on projects with which staff have been greatly involved and delegating authority to staff members who are capable of performing new tasks. Job proficiency may also be improved by pairing experienced staff with less experienced staff, using in-house mentors, and encouraging short-term assignments in other organizations.

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TABLE I. Supervisors' Assessment of the Proportion of Tasks That Staff^a Currently Perform and the Proportion That Staff Should Perform

| Task | % Staff Should Perform | % Staff Perform |
|---|------------------------|-----------------|
| Interface within/outside DOE ^b | 96 | 83 |
| Prepare documents | 92 | 88 |
| Review documents | 92 | 88 |
| Coordinate document reviews (in/out of DOE) | 88 | 88 |
| Advise, assist, and provide authoritative guidance | 88 | 83 |
| Review remediation projects and their progress | 83 | 83 |
| Recommend actions to correct remedial problems | 83 | 83 |
| Identify and document deficiencies | 83 | 83 |
| Develop, coordinate, and disseminate program management policies and procedures | 83 | 79 |
| Conduct briefings and presentations ^b | 83 | 63 |
| Oversee costs reviews | 83 | 83 |
| Oversee program evaluations | 83 | 83 |
| Track and verify corrective actions | 83 | 83 |
| Manage files and records | 83 | 83 |
| Provide regulatory analysis and guidance | 79 | 79 |
| Set schedules | 79 | 79 |
| Oversee environmental restoration activities | 79 | 79 |
| Oversee National Environmental Policy Act activities | 79 | 79 |
| Evaluate alternatives for cleanup | 79 | 79 |
| Formulate, define, and modify budget | 79 | 79 |
| Provide analyses to determine effects of remediation projects | 79 | 79 |
| Establish cost, schedule, and technical baselines | 79 | 79 |
| Oversee land use activities ^b | 79 | 63 |
| Oversee surveillance/monitoring/inspection activities ^b | 79 | 58 |
| Oversee waste management activities (Resource Conservation and Recovery Act) | 75 | 75 |
| Develop resource requirements (budget/full-time equivalents) ^b | 71 | 58 |
| Develop testimony questions and answers | 67 | 67 |
| Implement regulations and policy | 67 | 67 |
| Evaluate contractors | 67 | 63 |
| Oversee quality assurance/quality control activities | 67 | 63 |
| Oversee assessments for cleanup | 63 | 63 |
| Oversee data/information management | 63 | 63 |
| Identify and allocate resources | 58 | 58 |
| Oversee decontamination/decommissioning ^b | 5 | 33 |
| Oversee independent verification ^b | 5 | 33 |
| ^a 24 total staff. | | |
| ^b Task should be performed by 10% or more additional staff. | | |

TABLE II. Staff Proficiency Levels in Performing Tasks

| Tasks | Mean Proficiency Score ^a | % of Staff Performing Task | Ranking of Staff Performing Task ^b |
|--|-------------------------------------|----------------------------|---|
| Coordinate document reviews (in/out of DOE) | 3.62 | 88 | 2 |
| Interface within/outside DOE | 3.50 | 83 | 3 |
| Identify and document deficiencies | 3.40 | 83 | 3 |
| Oversee assessments for cleanup | 3.40 | 63 | 7 |
| Manage files and records | 3.35 | 83 | 3 |
| Review documents | 3.33 | 92 | 1 |
| Implement regulations and policy | 3.31 | 67 | 6 |
| Review remediation projects and their progress | 3.30 | 83 | 3 |
| Oversee environmental restoration activities | 3.26 | 79 | 4 |
| Prepare documents | 3.25 | 92 | 1 |
| Recommend actions to correct remedial problems | 3.25 | 83 | 3 |
| Evaluate alternatives for cleanup | 3.21 | 79 | 4 |
| Develop testimony questions and answers | 3.19 | 67 | 6 |
| Oversee National Environmental Policy Act activities | 3.16 | 79 | 4 |
| Oversee quality assurance/quality control activities | 3.13 | 63 | 7 |
| Evaluate contractors | 3.13 | 63 | 7 |
| Provide regulatory analysis and guidance | 3.11 | 79 | 4 |
| Advise, assist, and provide authoritative guidance | 3.10 | 83 | 3 |
| Oversee waste management activities (Resource Conservation and Recovery Act) | 3.06 | 75 | 5 |
| Set schedules | 3.05 | 79 | 4 |
| Track and verify corrective actions | 3.00 | 83 | 3 |
| Oversee program evaluations | 3.00 | 83 | 3 |
| Oversee costs reviews | 3.00 | 83 | 3 |
| Conduct briefings and presentations | 3.00 | 63 | 7 |
| Oversee data/information management | 3.00 | 63 | 7 |
| Formulate, define, and modify budget | 2.95 | 79 | 4 |
| Oversee land use activities | 2.93 | 63 | 7 |
| Develop, coordinate, and disseminate program management policies and procedures | 2.89 | 79 | 4 |
| Provide analyses to determine effects of remediation projects | 2.79 | 79 | 4 |
| Develop resource requirements (budget/full-time equivalents) | 2.79 | 58 | 8 |
| Establish cost, schedule, and technical baselines | 2.74 | 79 | 4 |
| Identify and allocate resources | 2.71 | 58 | 8 |
| Oversee surveillance/monitoring/inspection activities | 2.64 | 58 | 8 |
| ^a 4-point scale: 4= extremely well, 3 = sufficiently well, 2 = somewhat well, 1= not at all well. | | | |
| ^b The rank corresponds to the percentage of staff performing each task. | | | |

TABLE III. Knowledge and Skill Areas Common to Multiple Tasks That Staff Perform

| Knowledge or Skill Area | Number of Tasks to Which It Applies |
|--|-------------------------------------|
| EM mission, policies, management plans, procedures, priorities, goals and objectives | 27 |
| Keeping abreast of current developments | 22 |
| Identifying relevant materials/requirements | 19 |
| Providing clear guidance and direction to accomplish tasks | 18 |
| Assessing strengths and weaknesses of alternatives | 16 |
| Defining applicable criteria | 16 |
| Examining trade-offs among alternatives | 15 |
| Organizing/categorizing | 14 |
| DOE management strategies | 14 |
| Prioritizing based on criteria | 13 |
| Schedule constraints | 13 |
| Writing succinctly and clearly | 12 |
| Project or program management techniques | 12 |

TABLE IV. Knowledge and Skill Areas Needed for a Moderate Number of Tasks That Staff Perform

| Knowledge or Skill Area | Number of Tasks to Which It Applies |
|--|---|
| Analyzing information | 11 |
| Organizing information and presenting cogent arguments | 11 |
| Planning, programming funding and acquisition management | 11 |
| Resource Conservation and Recovery Act/Comprehensive Environmental Response, Compensation, and Liability Act of 1980 process | 10 |
| Principles of DOE budget formulations, budget execution, and cost accounting, and the procedures involved | 10 |
| Defining boundaries of a problem | 9 |
| Comparing existing conditions to preset standards | 9 |
| Interagency agreements, administration, and process | 8 |
| Facility, site, operations, and processes | 8 |
| Anticipating unintended consequences | 7 |
| Remediation techniques | 7 |

TABLE V. Unique Knowledge and Skill Areas

| Knowledge or Skill Area | Number of Tasks to Which It Applies |
|--|---|
| Weighing costs versus benefits | 6 |
| DOE departmental organization | 4 |
| Interpersonal facility (e.g., public, media, other employees, and special interest groups) | 4 |
| Negotiating/conflict resolution | 4 |
| Time management | 3 |
| Hazardous chemical, radioactive, and mixed waste management | 3 |
| Quality assurance | 3 |
| Operating and using computer | 2 |
| Public speaking (e.g., public presentations, employee/employer interactions) | 2 |
| Meeting facilitation/leadership | 2 |
| Using software and applying it to tasks | 2 |
| National Environmental Policy Act process | 2 |
| Supervising staff | 2 |
| Decision analysis | 2 |
| Waste treatment/disposal technologies | 2 |
| Decontamination and decommissioning techniques | 2 |
| Proper engineering/technical standards | 2 |
| Contractor organization and procedures | 2 |
| Human health impacts | 2 |
| Consolidating materials | 1 |
| Delegating tasks | 1 |
| Understanding principles of database requirements and baseline techniques | 1 |
| Conducting analyses involving complex variables | 1 |
| Radiation effects | 1 |
| Emergency response procedures | 1 |
| Safety and health | 1 |
| Land use | 1 |
| Health and radiological safety impacts and benefits | 1 |
| Health physics | 1 |
| Packaging issues | 1 |

TABLE VI. Mean Scores of Staff Levels of Expertise on Knowledge and Skill Areas

| Knowledge or Skill Area | Mean ^a | Number of Tasks to Which It Applies |
|--|-------------------|-------------------------------------|
| Schedule constraints | 3.35 | 13 |
| Waste treatment/disposal technologies | 3.32 | 2 |
| Interagency agreements, administration, and process | 3.26 | 8 |
| Remediation techniques | 3.21 | 7 |
| Keeping abreast of current developments | 3.21 | 22 |
| National Environmental Policy Act process | 3.20 | 2 |
| Providing clear guidance and direction to accomplish tasks | 3.18 | 18 |
| Analyzing information | 3.18 | 11 |
| Prioritizing based on criteria | 3.17 | 13 |
| Time management | 3.17 | 3 |
| Resource Conservation and Recovery Act/Comprehensive Environmental Response, Compensation, and Liability Act of 1980 process | 3.16 | 10 |
| Meeting facilitation/leadership | 3.15 | 2 |
| Defining applicable criteria | 3.14 | 16 |
| Defining boundaries of a problem | 3.14 | 9 |
| DOE departmental organization | 3.13 | 4 |
| Organizing/categorizing | 3.13 | 14 |
| Operating and using computer | 3.13 | 2 |
| Safety and health | 3.11 | 1 |
| Human health impacts | 3.11 | 2 |
| Delegating tasks | 3.10 | 1 |
| Principles of DOE budget formulations, budget execution, and cost accounting, and the procedures involved | 3.10 | 10 |
| Understanding principles of database requirements and baseline techniques | 3.10 | 1 |
| Identifying relevant materials/requirements | 3.09 | 19 |
| Hazardous chemical, radioactive, and mixed waste management | 3.05 | 3 |
| Facility, site, operations and processes | 3.05 | 8 |
| Comparing existing conditions to preset standards | 3.05 | 9 |
| Organizing information and presenting cogent arguments | 3.00 | 11 |
| Assessing strengths and weaknesses of alternatives | 3.00 | 16 |
| Examining trade-offs among alternatives | 2.95 | 15 |
| Interpersonal facility (e.g., public, media, other employees, and special interest groups) | 2.95 | 4 |
| Conducting analyses involving complex variables | 2.95 | 1 |
| Supervising staff | 2.93 | 2 |
| Proper engineering/technical standards | 2.93 | 2 |
| Using software and applying it to tasks | 2.91 | 2 |
| Anticipating unintended consequences | 2.91 | 7 |
| EM mission, policies, management plans, procedures, priorities, goals, and objectives | 2.91 | 27 |
| Planning, programming, funding, and acquisition management | 2.90 | 11 |
| Project or program management techniques | 2.90 | 12 |
| Negotiating/conflict resolution | 2.90 | 4 |
| DOE management strategies | 2.90 | 14 |
| Health and radiological safety impacts and benefits | 2.89 | 1 |
| Consolidating materials | 2.88 | 1 |

TABLE VI. (Cont.)

| Knowledge or Skill Area | Mean ^a | Number of Tasks to Which It Applies |
|--|-------------------|---|
| Public speaking (e.g., public presentations, employee/ employer interactions) | 2.86 | 2 |
| Weighing costs versus benefits | 2.85 | 6 |
| Quality assurance | 2.84 | 3 |
| Land use | 2.79 | 1 |
| Contractor organization and procedures | 2.75 | 2 |
| Writing succinctly and clearly | 2.68 | 12 |
| Radiation effects | 2.68 | 1 |
| Decision analysis | 2.65 | 2 |
| Emergency response procedures | 2.63 | 1 |
| Health physics | 2.53 | 1 |
| Decontamination and decommissioning techniques | 2.47 | 2 |
| Packaging issues | 2.47 | 1 |
| ^a 4-point scale: 4 = highly proficient/expert knowledge, 3 = working knowledge, 2 = familiarity, 1 = little or no knowledge. | | |

TABLE VII. Priorities to Improve Staff Performance

| Knowledge or Skill Area | Category of Skill | Number of Tasks to Which It Applies | Margin for Improvement | Priority Ranking |
|---|--------------------|-------------------------------------|------------------------|------------------|
| EM mission, policies, management plans, procedures, priorities, goals and objectives | Program management | 17 | 1.09 | 1 |
| Identifying relevant materials/requirements | Program management | 11 | 0.91 | 2 |
| DOE management strategies | Program management | 9 | 1.1 | 2 |
| Examining trade-offs among alternatives | Problem solving | 9 | 1.05 | 2 |
| Writing succinctly and clearly | Communication | 7 | 1.32 | 2 |
| Providing clear guidance and direction to accomplish tasks | Communication | 11 | 0.82 | 2 |
| Keeping abreast of current developments | Problem solving | 11 | 0.79 | 2 |
| Defining applicable criteria | Program management | 10 | 0.86 | 2 |
| Assessing strengths and weaknesses of alternatives | Problem solving | 8 | 1 | 3 |
| Organizing/categorizing | Problem solving | 9 | 0.87 | 3 |
| Analyzing information | Problem solving | 9 | 0.82 | 4 |
| Prioritizing based on criteria | Problem solving | 8 | 0.83 | 5 |
| Project or program management techniques | Program management | 6 | 1.1 | 5 |
| Organizing information and presenting cogent arguments | Program management | 6 | 1 | 5 |
| Comparing existing conditions to preset standards | Communication | 6 | 0.95 | 5 |
| Planning, programming, funding, and acquisition management | Problem solving | 6 | 1.1 | 5 |
| Defining boundaries of a problem | Program management | 5 | 0.86 | 5 |
| Facility, site, operations and processes | Problem solving | 6 | 0.95 | 6 |
| Schedule constraints | Program management | 5 | 0.65 | 6 |
| Principles of DOE budget formulations, budget execution, and cost accounting, and the procedures involved | Problem solving | 7 | 0.9 | 6 |
| Anticipating unintended consequences | Program management | 5 | | |
| Interpersonal facility (e.g., public, media other employees, and special interest groups) | Problem solving | 4 | 1.09 | 6 |
| | Communication | 4 | 1.05 | 6 |