

Although a number of activities were already under way at the Y-12 Plant, these activities were not part of a formalized program and were not focused strictly on safety aspects. Therefore, the Y-12 Plant assembled a core team of personnel to staff the Knowledge Preservation Program. This team will determine what information already exists (including procedures, safety documentation, photographs and videos, and expert systems); identify other activities ongoing in the Y-12 Plant that can provide input and be built upon; integrate that information into the program; and focus current and future activities on the capture and preservation of anecdotal knowledge (with an emphasis on safety issues) that has not already been captured. This ongoing program, which is described in Section III of this plan, will identify, capture, make available, and maintain the unique knowledge of individuals. First, the team will address the disassembly process and associated safety support processes, such as criticality safety, radiological control, etc.; then, QE and assembly processes (in that order) will be the next priorities.

A separate process is also under way to identify and interview both incumbent and former employees for key federal staff positions to capture and archive any unique knowledge. A follow-on effort will determine the best use of the captured knowledge to enhance current federal staff. This process is also described in section III.

II. BACKGROUND/PRIOR WORK

Approximately 75 percent of the process knowledge, including approximately 90 percent of the associated safety aspects, at the Y-12 Plant, is already captured in the form of safety authorization basis documents; health and safety Procedures; Criticality Safety Approvals (CSAs); Class I operating procedures; QE photographs, videotapes, and procedures; weapon materials master characterization list, dismantlement procedures, Build Books, and other existing records. To assess the "real time" aging of the canned subassembly stockpile, QE reports from individual weapon teardowns are being reviewed. The surveillance data of specific weapon types are being collected and analyzed to obtain a general assessment of the extent of degradation with time for given canned subassembly weapon types. Both reliability and safety information are being obtained through such analyses, and the information will be considered in establishing long-term canned subassembly storage requirements. In addition, the review is expected to provide feedback to determine the value of particular measurements that have been made during weapon teardowns and to determine if additional measurements are required to enhance the information obtained during future teardowns.

The existence of a substantial amount of documentation on the design and safety aspects of nuclear weapons was recognized and acknowledged by the DNFSB as mentioned in Recommendation 93-6, paragraph 3. Some illustrations of this existing knowledge, as well as examples of previous knowledge-capture efforts at the Y-12 Plant, are described in the following subsections.

As the economy improves, the latter may become more of a factor. DOE's near-term recruitment strategy focuses on providing tools to assist operations offices and their servicing personnel offices in their recruitment activities. The strategy, focused on recruiting outside of DOE, does not address how to better utilize the talents of existing staff.

The Academy staff recommends that DOE:

- ◆ **Use the results of its initiative to develop technical qualification standards and the up-coming workforce analysis to formulate a strategy to better utilize the talents of existing staff. This strategy should be folded into a long-term recruitment strategy for the department (referred to earlier).**

The use of recruiting flexibilities already available to DOE, such as recruiting bonuses, may enable DOE to hire highly qualified candidates for positions at sites that are considered geographically undesirable. The department should give senior managers throughout DOE the authority to use these recruitment tools. A redelegation of this authority beyond the Assistant Secretary for Human Resources and Administration would not only expedite the approval process and enhance DOE's recruitment and retention initiatives, but would also demonstrate the Secretary's trust in her managers-- a necessary ingredient for technical excellence.

The Academy staff recommends that the Secretary:

- ◆ **Reconsider her decision, and redelegate her authority for using recruiting, relocation and retention bonuses to senior managers throughout DOE.**

Managing to budgeted personnel estimates instead of FTEs would give managers the flexibility to do what is needed to achieve technical excellence as opposed to making decisions that are driven by an artificial control.

The Academy staff recommends that DOE:

- ◆ **Follow the NPR recommendation to seek whatever authority needed to budget and manage on the basis of operating costs rather than full-time equivalents.**

DOE is taking the appropriate steps to get a handle on the technical training available throughout DOE and clarify roles and responsibilities of DOE's organizational entities and individuals for training and developmental activities. But the department may not be going far enough to ensure that overlaps in technical training will not continue. Currently, there is no single office in DOE that organizations must notify of plans to develop or modify a new technical training program. Nor is

there a clearinghouse that can identify training programs being offered throughout the department with a mechanism to offer spaces, if available, to other sites.

The Academy staff recommends that DOE:

- ◆ **Modify its training policy to require that all DOE organizations with plans to develop, modify, or offer technical training programs notify the Office of Professional and Technical Training and Development. That office should be given the authority to ensure that duplication is avoided and integrated contractor/civil service training is encouraged.**

While primary responsibility for career development rests with the individual, an organization needs to provide employees with the necessary tools and opportunities to enable them to maximize their potential. Managers within the organization must also be prepared to assist staff with their career development activities, as necessary.

With the exception of the intern program, DOE does not have a formal rotational program designed for developing both technical and managerial staff. The department apparently tried to institute such a program a few years ago, but discontinued the program because staff did not favor it. Using the same methods it employed in developing the 93-3 implementation plan – obtaining stakeholders involvement and commitment – DOE should re-study this area and develop a rotational program that meets the competency needs of both technical employees at the "task execution level" and at the technical supervisor, managerial, and executive levels.

A formal mentor program, if properly developed and managed, can be an invaluable tool for improving the technical excellence of staff. If managers and employees express interest, a formal, voluntary program should be developed which includes a matching process, training for mentors, and an assessment of mentoring activities from both the mentor and mentee partner perspectives.

If individual development plans (IDP) are to be required for staff, the process needs to be as simple and streamlined as possible. DOE must also have the means to follow through on the training and developmental activities identified in the IDPs. If the resources are not available to provide the necessary developmental opportunities, the value of the IDP process will quickly evaporate.

The Academy staff recommends that DOE:

- ◆ **Develop a rotational assignment program that encourages cross-program and multi-site experiences for overall staff development. Begin by designating career technical positions at the policy officer level for rotational, not permanent, assignments. This will bring more technical input into policy decisions and provide developmental experiences with a policy balance.**

Plant restart process. Upgrading the existing QE procedures includes reviewing CSA, requirements for personnel and radiation protection, and requirements for hoisting and rigging operations; then, revising the procedures as needed. Copies of the QE Procedures are maintained in Y-12 Plant Records and the Quality Evaluation Department.

To assess the "real time" aging of the canned subassembly stockpile, QE reports from individual weapon teardowns are being reviewed. The surveillance data of specific weapon types are being collected and analyzed to obtain a general assessment of the extent of degradation with time for given canned subassembly weapon types. Both reliability and safety information are being obtained through such analysis, and the information will be considered in establishing long-term canned subassembly storage requirements and disassembly procedures development. In addition, the review is expected to provide feedback to determine the value of particular measurements that have been made during weapon teardowns and to determine if additional measurements are required to enhance the information obtained during future teardowns.

Photographs and Videotapes of Quality Evaluation Teardowns for All Weapons

A large bank of photographs and videotapes, which includes many examples of all types of QE teardowns for weapon system assemblies produced at the Y-12 Plant, is maintained by the Quality Evaluation Department.

Build-Book Records

Build-Book records are hard-copy (not electronic media) certification documentation for each War Reserve assembly built at the Y-12 Plant. Included in the Build Book is an Assembly Follow Sheet, leak test and rate measurement strip charts, and dimensional and radiographic inspection results. Printouts of dimensional contour inspection of certain components of the assembly may also be included. Radiographic film of the assembly and component certifications, filed separately from the Build Book, is also available.

Weapon Systems Master Characterization List

The Master Characterization List includes the toxicity and hazard rating of hazardous materials used in each of the weapon assemblies produced at the Y-12 Plant. This list was prepared by collaboration between the Industrial Hygiene Department and the Program Management Organization of the Y-12 Plant. Information from the Master Characterization List is used to identify operational hazards and disposal issues.

C. PREVIOUS KNOWLEDGE-CAPTURE EFFORTS AT THE Y-12 PLANT

Some time ago, the Y-12 Plant recognized the value of capturing the expertise of individuals with knowledge of unique systems and processes. A number of these knowledge-capture projects (including both videotapes and expert systems), which were completed before Recommendation 93-6 was initiated, are listed in the following subsections.

- ◆ **Consider establishing a human resource management council in coordination with its labor-management partnership efforts to facilitate a broad dialogue on human resource management in the department, and to identify and address both positive and negative trends.**
- ◆ **Move to fold labor-management partnerships into its approach to institutionalize excellence.**
- ◆ **Use the TEEC to include the DOE technical excellence policy initiative in both DOE's work on the Government Performance and Results Act and the Secretary's written performance agreement with the President under the NPR. This is in addition to the recommendation earlier to include DOE's technical excellence policy and strategy initiatives in the Strategic Plan.**
- ◆ **Consider initiating and funding a new department policy adopting the NPR "continuous training" philosophy as DOE's own philosophy for developing employees, including scientists and engineers. By continually developing the skills of workers, coupled with trust and empowerment, DOE can go a long way toward achieving excellence.**
- ◆ **Move to institute a policy for the line chain-of-command that demands development of a diverse scientific and engineering workforce and holds line management accountable through the same processes used for other line management oversight.**
- ◆ **Expand its use of alternative dispute resolution programs for grievance resolution, adverse actions and EEO complaint processing as another aspect of its culture of excellence initiative.**

STUDY METHODOLOGY

The NAPA project staff consisted of the project manager and two senior research associates. The methodology consisted of (1) interviews with executives and staff at DOE headquarters and two field managers; (2) a review of numerous policy and other documents related to or developed to meet the deliverables of the implementation plan; (3) eight benchmarking interviews at other departments and agencies; (4) a review and assessment of the NPR report and its supporting monographs on the Office of Personnel Management and on Reinventing Human Resource Management; and, (5) related contacts and analyses. Three members of the Academy reviewed the draft report.

DEPARTMENT OF ENERGY

TASK ANALYSIS

operations. However, in January 1995, the immediate scope of this project was narrowed to focus on disassembly and associated safety support processes, QE processes, and assembly processes (related to weapon modifications). If specific personnel to be interviewed are unavailable, the knowledge-capture process will continue with the next priority, and the initial personnel will be interviewed later. As personnel are interviewed in Step 5, they will be asked for the names of others who may possess specialized (particularly safety-related) knowledge, about the process. Names not already identified will be added to the list. Identification of personnel who have worked on weapons systems scheduled for dismantlement is of particular importance. A list of key functional positions, current incumbent names, and former personnel who held those positions will be generated. Additionally, the list of personnel who are incumbent to the identified key positions will be reviewed for projected near-term loss to identify positions with skills and knowledge that are at risk. The Memorandum of Intent and Commitment to be developed by the Y-12 Plant for critical knowledge preservation will address the responsibility of line management to periodically evaluate key positions for risk from loss of personnel and to plan for action to transfer the knowledge/skills to new individuals for preservation.

The list will be expanded to include additional personnel identified as possessing critical skills and knowledge by the JTAs and Table-Top Analyses conducted in Step 2. These personnel include both current and recently retired employees. Because of organizational and position description changes, retirees may be interviewed who previously worked in the key functional areas but were in different organizations or positions. Department of Energy Notice 3131.1, *Access to Skills, Knowledge, and Abilities of Retired Scientists and Engineers for the Nuclear Weapons Program*, specifically authorizes the use of retired scientists and engineers to support the DOE nuclear weapons program. The Y-12 Knowledge Preservation Program will take advantage of this authorization to arrange interviews with key retirees. A list of identified retirees to be interviewed will be prepared and transmitted to ORO for concurrence in making these former employees available for knowledge capture based on DOE Notice 3131.1. When it is developed, the Y-12 Plant Memorandum of Intent and Commitment for knowledge preservation will provide the mechanism for retaining access to former employees under this program. A list of former employees who are considered to be a part of the Y-12 Plant retiree corps will be submitted to the DOE.

Step 5: Conduct Interviews to Capture Knowledge and Skills Not Already Documented

Deciding Upon A Recording Medium

Initial experience at the Y-12 Plant indicates that most of the knowledge—which is held by separate individuals located in small, well-defined areas—can be captured in short personal interviews. Accordingly, the typical recording medium will be a text file on a computer. As appropriate, either handwritten notes or an audio recording will be used to document the interview. When the interview is scheduled, the interviewee will be asked about the scope of his or her technical area. If the scope is limited to one process or operation, handwritten notes are practical, but if the scope involves multiple processes or area operations, an audio recording may be used. Handwritten notes and audio recordings will be transcribed into computer text files. Interviews for some processes, such as subassembly teardown, are or will be recorded on either film or videotape with audio commentary.

Conducting Interviews

Staff workers at SNL developed an effective videotaping method for interviewing weapons designers, testing engineers, and others who have broad technical knowledge. However, at the Y-12 Plant, much of the expertise tends to occur in small, well-defined domains, such as the details of how to machine a particular part or how to safely disassemble a certain canned subassembly.

The Y-12 Plant will use personal interviews, which are a simpler variation of the SNL method, to capture most of the production-related knowledge economically. In the case of experts with general technical expertise such as direct support process engineers, the SNL method of videotaping or another medium may be used. An interviewer will conduct a 1- to 2-hour personal interview with the subject matter expert. If a peer of the subject matter expert is available, he or she may be invited to attend the interview (as is done in the SNL videotaping method). For the process engineers and similar technical support people, a related technical subject expert from the Y-12 Plant Development Division, if available, will be invited to stimulate the conversation and act as an informal peer reviewer. If the subject matter expert has key knowledge in more than one domain (for example, several different key processes), a separate interview for each domain might be needed because of the focus and time involved.

The interview is pivotal to the success of the project. Good interpersonal techniques must be used, since we are dealing with skilled individuals who may feel threatened by downsizing. The approach will be to elicit information in a concerned, interactive, and conversational way. In all cases, the person being interviewed must be given the first opportunity to talk.

The interviewer will concentrate on the knowledge and experience beyond the existing documentation. Some examples of such knowledge are as follows:

- Unusual or difficult nuclear safety issues (including specific weapon systems);
- Unusual or difficult work with hazardous materials;
- Work requiring great skill, precaution, insight, or experience;
- Undocumented "rules of thumb";
- Exception handling not fully specified in procedures;
- Subjective areas not covered by procedures;
- Common mistakes (commissions and omissions);
- Significant earlier problems and solutions;
- Undocumented alternative solutions to a particular problem;

TASK ONE

EFFECTIVENESS REVIEWS OF THE TECHNICAL PERSONNEL PROGRAM COORDINATOR, TECHNICAL PERSONNEL COORDINATING COMMITTEE, TECHNICAL EXCELLENCE EXECUTIVE COMMITTEE, AND OTHER KEY DOE OFFICIALS

DOE's civil service personnel and training operations are decentralized. This has resulted in some duplication of effort, reduced sharing of lessons learned, and priorities being uncoordinated at the department level. In the implementation plan for 93-3, DOE notes that its efforts to improve its technical work force have been inhibited by the lack of "centralized, consistent direction and the fragmented approach to implementing and coordinating these efforts."

Organizing Efforts

DOE has taken steps to address the issues of organizing the department and providing the necessary leadership to improve the technical capability of its defense nuclear facility personnel. The following key commitments in the implementation plan related to that area have been fully or partially completed:

- On September 21, 1993, a DOE Senior Executive Service technical manager was selected to serve as the Technical Personnel Program Coordinator (TPPC). This position reports to the Assistant Secretary for Human Resources and Administration and is tasked to facilitate and coordinate initiatives that develop and/or improve recruitment, classification, training, and qualification programs which enhance the technical capabilities of DOE's technical personnel. The TPPC also has a parallel focus on DOE's management and operating (M&O) contractors' technical employee training and qualification issues. The TPPC has two full-time staff members, a part-time secretary and four contractors who perform the day-to-day operations of the TPPC's office.
- On October 29, 1993, the Secretary issued a technical excellence policy that establishes department-wide goals to: develop and maintain technical excellence through planned education, training, and other opportunities; provide an environment conducive to the retention of technical expertise; recruit technically capable individuals; and regularly evaluate personnel. This policy is to serve as the TPPC's guideline.
- On February 22, 1994, the Technical Excellence Executive Committee (TEEC) was chartered. Its major role is to provide executive leadership, oversight and guidance in the implementation of the technical excellence policy and provide direction to ensure a uniform approach for implementing the department's 93-3 implementation plan initiatives. The TEEC is chaired by the Assistant Secretary for Human Resources and Administration. Its membership includes the TPPC, the Assistant Secretaries for

Environmental Management (EM), Environment, Safety and Health (EH) and Defense Programs (DP), the Associate Deputy Secretary for Field Management and two operations office managers. The TEEC is to meet quarterly. It has met only once since it was formed and has not yet developed its final charter.

- The Technical Personnel Coordinating Committee (TPCC) was formed on January 12, 1994. It is chaired by the TPPC and its membership includes the training managers, selected human resource representatives, and other designated representatives from field and program offices. The TPCC is responsible for facilitating intra-site and inter-site communications, coordinating initiatives, sharing lessons learned and resources, and coordinating progress in support of the department's initiative relative to the professional development of federal employees and the M&O contractor work force. The TPCC also supports the TEEC.
- Policy documents have been developed which outline roles and responsibilities for evaluating contractor and federal employee technical training and qualification programs and establish the infrastructure of DOE training organizations in operations offices and headquarters.

General Observations

DOE's organizing efforts to meet the challenge of improving the technical excellence of its staff were well received by the individuals NAPA interviewed. Interviewees see the TEEC, TPPC and TPCC as necessary to the successful implementation of 93-3 and view them as positive steps toward managing the department's efforts to pursue technical excellence. The roles of the TPPC and the two committees have been well-defined. Developing this structure to address technical excellence issues has been key to DOE's ability to generate the implementation plan's deliverables to the Board. However, the membership of the two committees raises some questions about who is involved with this initiative and their commitment to change, and whether key players are absent.

Everyone with whom NAPA spoke agreed that recruiting, training and qualification, and developing staff are important issues. However, there is some question as to what priority these issues have in the broader scheme of DOE operations. One assistant secretary described them as "quadrant two issues -- important but not urgent."

Noticeably absent from the TEEC's membership is the Secretary or Deputy Secretary. Forming the TEEC with line managers that represent only defense nuclear facilities does not reflect the importance of technical excellence to DOE's non-nuclear activities. Also, having the Assistant Secretary for Human Resources and Administration chair the committee may send the message that technical excellence is a problem for the department's "personnel types" to take charge of, not its technical leadership.

To date, the TEEC has been relatively inactive and invisible to the rest of DOE. A schedule

of quarterly meetings to provide oversight and guidance for an agenda as ambitious as improving the department's technical excellence may not be sufficient, particularly during the start-up phases of this effort when issues as basic as the group's final charter must be resolved. There is also no means for the TEEC to regularly report to DOE staff on the results of this project and its reactions and expectations. DOE publishes a quarterly training information newsletter, *Spectrum – Operations and Training*, which includes information on the initiatives under 93-3; there is no direct message from the TEEC to all DOE staff reinforcing the underlying goals of this effort.

The TPCC's membership includes, primarily, departmental training managers. A few of the field's personnel officers attend the meetings when their responsibilities include both personnel and training. But in many offices, training and personnel are not within the same organizational entity. A couple of interviewees stressed the importance of having the personnel community well-represented on the TPCC because the products of that committee will ultimately have an impact upon the personnel staff, policies, and programs. In a May 25, 1994 memorandum, the TPCC invited personnel staff members to participate as members of the TPCC to help keep servicing personnel offices apprised of activities relating to Recommendation 93-3 initiatives.

With the exception of two operations office managers who are serving on the TEEC on a rotational basis, senior-level technical managers below the assistant secretary level do not appear to be actively involved in the implementation of 93-3 during this developmental period. The organization structure of this initiative does not contain a forum or mechanism to involve DOE's managers. Yet, it is this very group, particularly DOE's senior technical managers, who will be instrumental in institutionalizing the changes 93-3 proposes.

According to one assistant secretary, recommendations in 93-3 are more straight-forward than other Board recommendations in the sense that it is easier to "get your arms around them" and address them. In his opinion, if DOE can focus management's attention on these issues and muster the resources, the department can be successful. It is not yet clear whether management's focus is strong enough.

According to some interviewees, efforts that were forerunners to 93-3 were not successful primarily because the needed commitment from the top of the organization was missing. However, the players at the top have changed since the last big push in this area about 4 years ago. Measuring current management's commitment is difficult at best. Some of those interviewed have indicated that commitment to 93-3 is uneven among top managers. However, it is not possible to confirm such a judgement based on a limited number of interviews. Below the assistant secretary level, NAPA has no way to judge how DOE's senior technical managers view the importance of these issues and their commitment to effecting change. Nor could NAPA determine whether DOE possesses the commitment and staying power to make the proposed changes a reality.

One way to measure commitment at the assistant secretary level is to see the leadership role they take, not just as members of the TEEC but within their program offices. Over time, those managers who are truly committed to this initiative will develop creative systems, programs and projects that improve the technical excellence of their staff and the department overall.

Another way to measure the department's commitment to technical excellence is to look at how it is reflected plans, guidance and policy documents that set the vision/direction for the agency. While the Secretary approved a technical excellence policy in October 1993 and a corresponding commitment to "excellence" is cited as a core value for all DOE employees in the department's April 1994 Strategic Plan, the latter does not reinforce a specific priority for "technical excellence" nor list the 93-3 implementation plan for improving technical excellence as an important strategy.

Conclusions and Recommendations

DOE's efforts to improve the technical excellence of its staff form a major organizational development initiative and need to be managed as such. Any effort to change an organization requires not just a plan that outlines activities or tasks to be done but a clear statement of how all the activities relate to the bottom line.

DOE needs to form a bridge between the 92-7 and 93-3 implementation plan's deliverables and the bottom line by institutionalizing this effort -- building technical excellence into the fabric of all its day-to-day operations. If this implementation plan is the forerunner for increasing technical excellence throughout the department, it should be more visible and reinforced in other department-wide plans, guidance and policy documents. It needs to be reflected in the performance management systems throughout the department. It also requires oversight to ensure that the department stays the course in its efforts to improve the technical excellence of its staff. Finally, DOE must have the institutional leadership at the departmental level to sustain this comprehensive agenda.

The Academy staff recommends that DOE:

- ◆ **Include the implementation plan for 92-7 and 93-3 and the technical excellence policy in the next version of its Strategic Plan and refer to it as an underlying goal of the department in other plans, guidance and policy documents.**
- ◆ **Require that its program and field offices' performance management plans incorporate performance criteria for the pursuit and achievement of technical excellence.**
- ◆ **Assign to a position or office, oversight and evaluation responsibility for the department's long-term implementation of 92-7 and 93-3 and any future programs related to improving the technical excellence of staff. The TPPC is a possible candidate for this responsibility. Evaluating an organization's progress toward improving the technical excellence of staff should also be included in each office's internal self-assessment.**

Implementing change of this magnitude requires a strategy for the organization to take ownership of the change process. DOE's approach to developing the 93-3 implementation plan and

the subsequent deliverables is a major step in developing that ownership. Stakeholders throughout the organization have been actively involved in these activities. But, if the effort is to succeed, DOE's top management must be its "executive owners" and a commitment to the effort must continue down through the management hierarchy. If the effort is to gain the attention it needs over the long term from staff who are already swamped with heavy workloads and dozens of other "priorities," staff must perceive it to be a top management priority. Top management has already made a strong statement about its commitment to this effort by forming the TEEC. But, the Secretary's/Deputy Secretary's absence from the committee, the lack of representation from non-defense nuclear program areas, and the lack of timely visible activity may cast some doubt on the importance of this issue throughout the department.

If management is to carry the banner for this initiative, it should develop a means to regularly report the results of this project to DOE staff. Reporting the progress of such an initiative from the Secretary's office would send a reinforcing message to staff that top management is serious about this project. Reporting on this initiative can take the form of staff meetings, employee meetings and/or a regularly published message from the Secretary. DOE may also want to consider setting up some mechanism, either through its computer system or a toll-free number, where staff can call in with their ideas or concerns about the deliverables being produced. Somehow, DOE employees should be kept aware of top management's support for, and line management's performance under, this initiative, and encouraged to get involved as opportunities present themselves.

Just as top management support is essential to success, it is equally important that commitment to this project and the ensuing changes to the way DOE does business must be reflected and reinforced by DOE's entire management team. While many employees have been actively involved in developing the deliverables for 93-3, there appears to be a disconnect at the upper management level within DOE. Top management needs to bring its senior technical managers into the mainstream of this change effort while, at the same time, reinforcing its commitment to improving technical excellence throughout the department.

Many of the issues the TPCC is addressing relative to the professional development of employees will have an impact on, and be affected by, personnel policies and practices within the department. As such, DOE should ensure that its personnel community is adequately represented on the TPCC.

The Academy staff recommends that DOE:

- ◆ **Restructure the TEEC to include the Secretary or Deputy Secretary. As technical excellence is of concern to all DOE program areas, DOE should consider expanding the TEEC membership to include representation from the remaining program areas. DOE should also consider rotating the position of chair among the Secretary/Deputy Secretary and line cognizant secretarial officers.**
- ◆ **Direct its cognizant secretarial officers to designate a senior technical management**

staff member to spearhead efforts internal to their offices to improve the technical excellence of staff and coordinate with other efforts throughout the department.

- ◆ **Ensure that the TPCC membership includes adequate representation from the department's personnel community.**

TASK TWO

DOE PERSONNEL RECRUITMENT POLICIES AND PRACTICES THAT ARE/ARE NOT CONTRIBUTING TO THE OBJECTIVES OF DNFSB RECOMMENDATION 93-3

RECRUITMENT AND RETENTION

The recruiting environment DOE now faces is different from that of the 1980's. In the 1980's, with the defense build-up and a growing economy, DOE was in the difficult position of competing with a thriving private sector. The inflexibilities of the civil service system made it difficult for DOE to compete in high-wage labor markets and attract and retain talented technical personnel in general. This contributed to DOE's loss of technical capability.

According to a National Research Council report, today's recruiting environment is being influenced by a number of factors favorable to governmental hiring. The end of the Cold War and the sluggish economy has resulted in a significant cutback in defense and nuclear spending. Independent of the business cycle, the private sector has for some years been engaged in downsizing activities in an effort to remain competitive in world markets. Similarly, academic labor markets are sluggish. These factors, coupled with the passage of the Federal Employees Pay Comparability Act (FEPCA) in 1990, which provides a process for achieving greater comparability with private sector pay as well as a number of mechanisms for greatly increased flexibility to deal with specific problems as they occur, have made the federal government a more attractive employer.¹ The changes in the defense mission, on the other hand, have tarnished that attractiveness to some degree.

According to the National Research Council's report, however, future conditions may operate to undermine this favorable position. Long-range projections indicate increased needs for scientists and engineers. In the 1990s, the number of experienced scientists and engineers who will be retiring from the federal workforce is expected to increase dramatically, while the number of new scientists "in the pipeline" is expected to fall. The academic labor market is expected to recover in the mid or late 1990s, which could create a further upturn in demand for scientists and engineers. In addition, when the economy starts growing again, the federal government will once again be competing for scarce resources.²

General Observations

DOE has taken a major step toward building more excellence in its technical programs by launching the technical intern program. The program is well-designed and the initial interns are high quality. The training, mentoring, development and effective placement of the first group of interns and adherence to the planned program expansion are vital to the efforts to attract and hire high quality technical personnel. Intern programs of this type are proven contributors to the effectiveness of agency programs for developing technical leaders.

DOE has a cooperative education (co-op) program which allows high school and/or college students to work part-time within the department while going to school. Such programs give an organization its best chance to find qualified minorities and women for permanent positions. NAPA did not find any evidence of a postdoctoral program in DOE. Both co-op and postdoctoral programs give an organization the opportunity to observe the performance of individuals for 1 or 2 years prior to offering them permanent positions. Interviews indicated that benchmarking agencies rely on these two programs extensively to ensure excellence at the hiring level.

Due to the decentralized nature of personnel activities within DOE, recruiting practices differ among program and field offices. This has enabled offices to tailor their recruiting practices to meet their specific needs and capabilities and to best work within the idiosyncracies of their geographic locations.

The director of the Office of Personnel holds monthly meetings, sometimes via teleconference, with the department's personnel officers to discuss issues, develop new systems, e.g., the project on classification and pay banding, and to share problems, experiences, and insights. In August 1994, the Office of Personnel also published its first edition of "Spotlight on Exemplary Personnel Programs and Practices." All DOE servicing personnel offices were asked to submit brief write-ups on their noteworthy personnel practices, which might be used as models for the rest of the department. This exercise is to be a continual process.

In response to the 1,200 position "ramp up" in EM, the Office of Personnel surveyed servicing personnel offices to determine where they were having problems and what kinds of assistance they desired. The survey indicated that delegated examining is already a primary tool used by the servicing personnel offices. One initiative that resulted from the survey was the creation of a national recruiting ad. The Office of Personnel is also working with the Office of Personnel Management (OPM) to help DOE's personnel servicing offices gain an understanding of OPM's microcomputer assisted recruitment system (MARS) to support the EM "ramp-up."

The Office of Personnel has distributed a handbook which provides information on available administrative flexibilities that can be used in day-to-day human resource management activities -- especially those bearing on recruiting and retaining high quality technical staff. In the past 3 years, the department has received OPM approval for 10 dual compensation waivers and 26 critical pay positions, and has requested 33 additional senior level technical positions. The department does not make broad use of some recruiting authorities now delegated to department heads, such as recruiting, relocation and retention bonuses. The Secretary has redelegated those authorities only to the Assistant Secretary for Human Resources and Administration.

DOE is faced with reorienting itself to a significant change to its mission. As such, the skill mix of its current staff within program areas is no longer appropriate. DOE does not yet have a system in place to assess overall the skill needs of the department or the skills of current staff. Nor does DOE have a long-term strategy to address future recruiting needs. For example, environmental engineers now working in EH exceed the current demand but their skills and capabilities make them excellent candidates for positions in EM. Other than the assistant secretaries identifying these

situations and addressing them among themselves, there is no system in place within DOE to identify these situations and facilitate the movement of current staff into more suitable positions. DOE's current efforts to develop qualification standards for 23 technical functional categories should provide the framework for developing and using staff. In addition, the Secretary has recently announced that the department will embark on a broad-gauged "workforce analysis," which will examine how to improve the skills mix of DOE's workforce and ensure the proper utilization of human resources.

Similar to the lack of any system that would enable DOE to better utilize current staff, there is no formal system for DOE's numerous recruiting offices to share information on external applicants. DOE is now experiencing situations where a significant number of highly qualified individuals are applying for positions. Through the use of delegated examining, Albuquerque received 1,300 applicants for nine positions. With so many applicants for so few jobs, it is likely that many highly qualified applicants are "lost" to other DOE opportunities. In isolated instances, some offices refer non-selectees to other offices who are also hiring. But DOE lacks a systematic mechanism for doing this.

Further complicating the overall staffing and recruiting processes are the full-time equivalent (FTE) ceilings DOE must use to manage its human resources and the lengthy hiring time to fill many positions. Managing to FTE and not to a budget reduces management's flexibility and makes it difficult to implement any recruiting strategy developed. The length of time it takes to complete a hiring action discourages high quality individuals from applying. While OPM is often cited as a major reason for the slowness of the hiring process, DOE should continue to examine its own practices, both within program offices, the headquarters office of Human Resources and Administration, and field servicing personnel offices, to ensure that they are as efficient as possible.

DOE has a wonderful opportunity to improve the quality of its technical staff as a result of the "ramp-up" in EM. DOE is expecting to use this opportunity to improve its technical to non-technical ratio. According to an August 19, 1994 report, which did not have complete data, engineers and physical scientists had been allocated 47.3 percent of the FTE. Health and safety were allocated 3.3 percent, financial had 9.9 percent, and other occupations had been allocated 39.6 percent.

The department must respond to numerous recruiting objectives over and above the need to improve the technical capability of its staff. Many issues -- diversity goals, relocating individuals being affected by right-sizing efforts within DOE and its contractors, availability of FTE, the department's sense of responsibility to DOD applicants, special considerations required by OPM -- affect recruiting practices throughout the organization. Implementation plan 93-3 does not incorporate these other recruiting goals and objectives with the goal of improving technical excellence. Many of the individuals NAPA interviewed addressed these other recruiting objectives in their comments. In addition, EM is receiving regular reports on the field's recruiting initiatives which captures data on the diversity of both applicants and new hires in order to factor such data into the selection process.

Excepted Service

DOE has taken several steps to activate existing excepted service authority that for many years

laid dormant. Of major concern is how DOE will determine who is eligible for excepted service status and how to avoid misusing the system. In September 1993, the Office of Personnel director asked DOE's General Counsel for its opinion on the use of the authority. In May 1994, the Office of Personnel got a green light to proceed and developed draft policy guidelines to use the authority. DOE' Executive Resources Board "indicated its general approval of this policy approach" and the policy guidelines are now being reviewed by the General Counsel.

DOE is also seeking new excepted service authority via the legislative process. The House and Senate have passed bills which would give the department authority to appoint up to 200 employees without regard to Civil Service laws. These bills await the outcome of a House-Senate conference committee.

Many of the individuals with whom NAPA spoke are not convinced that excepted service is the solution to DOE's technical capacity deficit. According to many of the benchmark agencies we interviewed, an organization which gets excepted service authority for only some of its staff may create a sense of inequity throughout the organization. Excepted service deals primarily with pay issues. There are other intangible issues that hinder DOE's ability to attract highly qualified individuals. DOE has witnessed the loss of technical capability over the last 10 years. As such, the reputation of the organization has diminished. Factors, such as the quality of facilities, the amount of responsibility and flexibility available to an employee, the ability to develop professionally, and the ability to make a difference, all contribute to an organization's ability to hire and retain the best and the brightest.

Conclusions and Recommendations

DOE's intern program is an excellent step toward improving the technical qualifications of its staff. DOE should be equally aggressive in using co-op and postdoctoral programs to identify future talent for the organization. These programs offer DOE and the individuals in these programs the advantage of being able to evaluate one another for possible future employment.

If the response EM is receiving to its "ramp-up" is an indicator, a large number of engineers and scientists are expressing a strong interest in DOE as an employer. While not all applicants are qualified for the positions being advertised, it appears that many highly qualified applicants are seeking employment with DOE. DOE must also ensure that its other recruiting needs are given proper attention in the long term, when the recruiting environment may not be as friendly. This suggests that DOE develop a long-term recruitment strategy, considering all factors, not just technical excellence. Given DOE's challenge to redirect its resources to a dramatically new mission, this is not something that each program area should do separately. DOE's top management must first collaborate to assess its overall needs and how to best utilize existing staff, and then identify its recruitment goals and develop a strategy for meeting them.

The Academy staff recommends that DOE:

- ◆ **Develop a long-term recruiting strategy and the supporting systems needed to ensure the necessary influx of highly qualified technical people to perform the department's mission. This strategy should assess and address future changes in the recruitment climate for scientists and engineers and consider all recruiting needs, not just technical excellence.**
- ◆ **Develop a postdoctoral program and expand the use of its co-op program to serve as the primary tools, along with the intern program, to identify, hire, and groom for the future highly qualified technical staff for all DOE programs.**

As borne out in NAPA's interviews with benchmarking agencies, there are many other factors, other than pay, that attract highly qualified technical specialists to an organization. An organization's reputation, the quality of staff, state-of-the-art facilities and equipment, flexibility and responsibility, the ability to develop professionally, and the ability to make a difference all factor into the decision-making process when an individual is weighing employment opportunities. Excepted service alone cannot deal with those issues. Two of the factors that lure talent to an organization -- reputation and the quality of its staff--are the very issues that DOE is trying to improve by hiring individuals with technical excellence. It becomes a case of "the chicken and the egg." While DOE needs to hire highly qualified individuals to improve its reputation and overall quality of staff, the fact that it needs to do so may cause quality candidates to look elsewhere. Through its training and qualification effort, DOE has the opportunity to improve the competence and reputation of its existing technical staff. These efforts, coupled with the department's current hiring initiative in EM, can go a long way toward turning around DOE's declining reputation. However, DOE's reputation will not improve overnight. This problem has been developing for more than a decade and will take a long time to resolve.

According to some staff NAPA interviewed, DOE appears to be suffering from low morale. Many factors affect morale. Some are intangible, while others are more concrete. Any or all can attract, or repel, highly qualified individuals to an organization. Currently, the department has several efforts underway to survey customers, employees, supervisors and managers on their attitudes regarding the department as an employer, their long-term individual interests, and the needs of the department.

The Academy staff recommends that DOE:

- ◆ **Analyze the results of the surveys underway within the department to identify factors affecting the morale and technical excellence of staff. If the data are not adequate to accurately identify problems, DOE should consider alternative data gathering measures, e.g., another survey or focus groups, to thoroughly address the issues affecting morale.**

Excepted service is an excellent "tool in the tool box" for attracting highly qualified people,

particularly for some senior technical positions where DOE is experiencing difficulty finding qualified candidates, such as the health sciences. While there may be potential problems with implementing its existing excepted service authority, DOE has not moved aggressively enough to address the concerns about excepted service and get a working program in place to help with the major hiring initiative in EM, which must be substantially complete by September 30, 1994.

The Academy staff recommends that DOE:

- ◆ **Move more aggressively to develop an action plan with a time line to implement its current excepted service authority.**

We urge DOE to consider the unintended effects of the use of excepted authority on the rest of the DOE workforce and take deliberate steps to counter them. We suggest DOE talk further with NRC, NASA and NSF to obtain their perspectives on the potential pitfalls of differential treatment of both nontechnical workers and those technical workers not covered by the authority. This may help DOE devise policies that are acceptable to those covered by the excepted system and their associates who are not.

If talented staff are not being effectively utilized, it not only affects organizational effectiveness but also increases the likelihood that good people will look outside of DOE for employment. As the economy improves, the latter may become more of a factor. DOE's near-term recruitment strategy focuses on providing tools to assist operations offices and their servicing personnel offices in their recruitment activities. The strategy, focused on recruiting outside of DOE, does not address how to better utilize talents of existing staff.

The Academy staff recommends that DOE:

- ◆ **Use the results of its initiative to develop technical qualification standards and the up-coming workforce analysis to formulate a strategy to better utilize the talents of existing staff. This strategy should be folded into a long-term recruitment strategy for the department (referred to earlier).**

Even if DOE has a system for referring highly qualified applicants to other offices with vacancies, the location of some DOE sites may not be attractive to many applicants. Geography may limit DOE's ability to attract someone who applied for a position in Savannah River from accepting a job in Amarillo. However, the use of other recruiting flexibilities already available to DOE, such as recruiting or relocation bonuses, may enable DOE to hire a highly qualified candidate for a position in Amarillo who may not have otherwise been available for consideration. If not in the near term, DOE's recruitment strategy should address this issue in the long term. The department should give senior managers throughout DOE the authority to use these recruitment tools. A redelegation of this authority beyond the Assistant Secretary for Human Resources and Administration would not only

expedite the approval process and enhance DOE's recruitment and retention initiatives, but would also demonstrate the Secretary's trust in her managers -- a necessary ingredient for technical excellence.

The Academy staff recommends that the Secretary:

- ◆ **Reconsider her decision, and redelegate her authority for using recruiting, relocation and retention bonuses to senior managers throughout DOE.**

Managing to budgeted personnel estimates instead of FTEs would give managers the flexibility to do what is needed to achieve technical excellence as opposed to making decisions that are driven by an artificial control.

The Academy staff recommends that DOE:

- ◆ **Follow the NPR recommendation to seek whatever authority needed to budget and manage on the basis of operating costs rather than full-time equivalents.**

TRAINING AND QUALIFICATION PROGRAMS

Efforts to address problems in DOE's training and qualification programs were underway prior to the Board's issuance of 93-3 on June 1, 1993. In May 1993, the Office of Professional and Technical Training and Development (HR-33) began a series of field office visits to get field input for how to better structure and manage DOE's technical training curriculum.

In September 1993, HR-33 hosted a technical training excellence workshop, attended by technical program managers and staff and training and human resource professionals from all headquarters offices with management and oversight responsibility of nuclear-related programs, all operations offices and two field offices. The purpose of the workshop was to build consensus and develop strategies on training and qualification issues related to achieving technical excellence at nuclear facilities. Five issue areas were formed:

- systematic approach to training
- qualifications and testing
- technical training infrastructure
- career system and intern program, and
- technical training curriculum.

The follow-on actions that resulted from the workshop have made significant contributions to the 93-3 deliverables related to these issues.

General Observations

Implementation plan 93-3 is beginning to address an underlying problem in DOE's technical training program -- fragmented authority and responsibility which results in overlap and duplication. DOE has pockets of training expertise and activities throughout the entire department. In headquarters, several offices under one assistant secretary will have their own training courses and requirements, which may not necessarily be coordinated at the assistant secretary level. As a result, working on the implementation plan has been likened to a discovery process by one staff member because new programs are being unearthed with direct applicability throughout DOE. The document, Professional Development of Federal Technical Personnel, clarifies technical training roles and responsibilities and requires cognizant secretarial officers to designate a focal point to facilitate coordination and standardization of the department's training, development, education experience, and qualification programs and activities.

Several staff interviewed said that DOE has devoted ample dollars to its training initiatives. As federal budgets continue to shrink, however, DOE is being pressed to cut expenses. Typically, one of the first things to be cut is training. To continue its pursuit of technical excellence DOE will need to continue to give training a high funding priority. At the same time, it will need to ensure that training dollars are not being wasted because of redundancy. Through the on-line training course catalogue now being operated by the Central Training Academy in Albuquerque and the networking now taking place via the TPCC, DOE training managers now have some vehicles by which they can share information on available training and avoid developing duplicate courses.

The overlap and duplication in technical training and development is a microcosm of the issues facing an organization that is organized in stovepipes. DOE's program areas don't appear to naturally think about how activities for one area, such as technical training, might benefit or be easily adapted for another area. The Board recognized the value of transferring lessons learned at one site to others in its Recommendation 92-2, where it recommended that DOE and its contractors improve their training and qualification programs by incorporating the principles applied at the Savannah River Site K-Reactor in response to Board Recommendation 90-1. In training, as in other areas, the culture of the department will need to change to open the avenues for communicating and coordinating horizontally across the department in order to more effectively utilize the resources already available.

The qualification program is considered by several of those we interviewed to be one of the most important pieces of the implementation plan needed to improve the technical capability of current staff. To build a highly competent technical staff, the organization must first determine the technical competencies needed for each position. (This assumes that the organization has a clear mission and has determined what technical skills are needed to fulfill it.) Once qualification standards are developed and approved, DOE can assess where training programs need to be developed or modified.

While technical qualification standards sound logical and reasonable, they are being developed in a climate where jobs are being cut and DOE is still reeling from years of change. Individuals who have been performing jobs for years are being told that they now will be tested to see if they are qualified to hold those positions. This will be threatening to some staff and it raises the question of

how DOE plans to deal with individuals who are unable to meet the qualification standards for the jobs they hold. The process of qualifying individuals for their jobs may also drive away some individuals DOE would like to keep, simply because it is just one more thing for staff to deal with in an organization that, according to some staff interviewed, already faces serious morale problems.

Conclusions and Recommendations

DOE is taking appropriate steps to get a handle on the technical training available throughout DOE and clarify roles and responsibilities of DOE's organizational entities and individuals for training and developmental activities. But, the department may not be going far enough to ensure that overlaps in technical training do not continue. There needs to be a cultural shift throughout the department which promotes horizontal communication so information about technical training development and resources are regularly and voluntarily shared among program areas. Changing an organization's culture is a long-term process. Even if an organization is successful in changing its culture some mechanism needs to be developed for information sharing.

Currently, there is no single office in DOE that organizations must notify of their plans to develop or modify a new technical training program. Once the universe of technical training programs is defined, there is no clearinghouse that can identify training programs being offered throughout the department with a mechanism to offer spaces, if available, to other sites.

The Academy staff recommends that DOE:

- ◆ **Modify its training policy to require that all DOE organizations with plans to develop, modify, or offer technical training programs notify the Office of Professional and Technical Training and Development. That office should be given the authority to ensure that duplication is avoided and integrated contractor/civil service training is encouraged.**

While qualification standards are an integral part of developing a highly qualified technical workforce, implementing such a program must be done with great care to minimize staff concerns and avoid unnecessary disruption in the workforce.

EDUCATION PROGRAMS, CAREER PATH DEVELOPMENT AND SUCCESSION PLANNING

Although they generally do not receive as much publicity as an organization's training programs, education programs, career path development and succession planning systems play a vital role in developing the technical capabilities of staff and the organization.

General Observations

DOE's examination of its education programs is still on-going. The work is not due until October 1994. The department's fellowship program has already been redrafted, although not yet finalized. Of particular interest is the requirement that participating offices allocate sufficient funds to provide fellowship opportunities for a minimum of one percent of their eligible employees. This mandate for funding fellowships will help reinforce DOE's commitment to technical excellence.

According to one assistant secretary, there is no succession plan that keeps top management informed of the talent in DOE's pipeline. Some individuals we interviewed do not believe that the next group in line for senior management positions has the necessary experience. One manager believes that people are rising up the hierarchy too quickly and do not have the time to make mistakes at lower levels, where they can learn without causing harm to the organization. In addition, he believes that staff stay too long at the same location and are thus less capable of seeing problems.

Developmental assignments are critical to developing technical staff and ensuring that they have the necessary skills to assume greater responsibility. Rotational programs are an excellent tool to broaden the staff's knowledge of DOE's operations and expose staff to different ideas and ways of doing business. They can be particularly valuable for staff located in small offices who may not have as much opportunity to learn from experts in their fields. Different from details, formal rotational programs establish as a cultural norm that cross-program and multi-site experiences are important to the overall development of staff. Rotational assignments have an additional advantage. Staff who work with people in various parts of the organization build relationships throughout DOE's stovepipes. This may serve to help break down communication barriers between program areas. Disadvantages to rotational programs that need special attention include their cost and disruption to families. Relocation and retention bonuses along with family-friendly programs can help ameliorate these issues.

An active mentor program is another staff development tool that can greatly help staff as they grow professionally. Women and minorities often find such programs particularly valuable as they attempt to "break the glass ceiling" and rise to senior management positions.

DOE has designed its individual development plan (IDP) program as a tool in the career development process. Based on a staff member's assessment against the qualification standards and his/her career goals, training and development activities are included in an IDP. In theory, IDPs make sense. If nothing else, they get staff to focus on where they are and where they want to go professionally. In practice, however, they often become bureaucratic and a paperwork exercise for both staff and managers. They also may tend to reflect "pie-in-the-sky" goals that are not based on the needs of the individual or the organization.

Conclusions and Recommendations

While the primary responsibility for career development rests with the individual, an organization needs to provide employees with the necessary tools and opportunities to enable them to

maximize their potential. Managers within the organization must also be prepared to assist staff with their career development activities, as necessary.

With the exception of the intern program, DOE does not have a formal rotational program designed to develop staff. The department apparently tried to institute such a program a few years ago, but discontinued it because staff did not favor it. DOE should restudy this area to see where the department could benefit from such a program. Using the same methods it employed in developing the 93-3 implementation plan -- getting stakeholders involved and committed -- DOE could develop a rotational program that meets the needs of staff and advances the technical excellence of the department.

A formal mentor program, if properly developed and managed, can be an invaluable tool for improving the technical excellence of staff. If managers and employees express interest, a formal, voluntary program should be developed which includes a matching process, training for mentors, and an assessment of mentoring activities from both the mentor and mentee partner perspectives.

If IDPs are to be required for staff, the process needs to be as simple and streamlined as possible. DOE must also have the means to follow through on the training and developmental activities identified in the IDPs. If the resources are not available to provide the necessary developmental opportunities, the value of the IDP process will quickly evaporate.

Organizations need a means to assess whether it has staff with the necessary knowledge, skills and abilities to lead it into the future. The current lack of such a mechanism in DOE is being addressed by responding to the Board's recommendation to develop a technical succession planning program.

The Academy staff recommends that DOE:

- ◆ **Develop a rotational assignment program that encourages cross-program and multi-site experiences for overall staff development. Begin by designating career technical positions at the policy officer level for rotational, not permanent, assignments. This will bring more technical input into policy decisions and provide developmental experiences with a policy balance.**
- ◆ **Assess the need for a formal mentor program as a means to further develop the technical excellence of staff.**
- ◆ **Evaluate the IDP process over time to determine if the training and developmental needs identified in the plans are being addressed. If these needs are not being addressed, IDPs should not be a mandatory program for staff.**

TASK THREE

COMPARISON OF DOE METHODS OF BUILDING A QUALIFIED STAFF WITH THOSE OF OTHER GOVERNMENT AGENCIES WITH PREDOMINANTLY TECHNICAL MISSIONS

DNFSB Recommendation 93-3 proposed "an independent external assessment" that "could include" a comparison of DOE's practices with other technically-oriented agencies. The NAPA staff conducted at least one interview and gathered materials from each of seven federal government organizations with heavy concentrations of scientists and engineers:

- Environmental Protection Agency (EPA),
- National Aeronautics and Space Administration (NASA) -- both headquarters in Washington, D.C. and Goddard Space Flight Center, in Greenbelt, Maryland,
- National Institute for Standards and Technology (NIST),
- National Science Foundation (NSF),
- Naval Research Laboratory (NRL),
- Nuclear Regulatory Commission (NRC), and
- Office of the Secretary of Defense.

The purpose of this "benchmarking" was to identify recruitment, retention, development and training policies and programs that could be useful in expanding and refining DOE methods. We also contacted the director of information systems, OPM and the Bureau of Labor Statistics of the Department of Labor to explore their use of technical to nontechnical personnel ratios to measure technical capacity, a subject added to our review at the kickoff meeting for this study.

We prepared a special annex to this report to cover full details of our benchmarking work and are transmitting that under a separate cover. We also have a number of related documents at our NAPA offices and a list of contacts for DOE's use. Those documents and contacts are identified in the annex and in Appendix D.5.

General Observations

We compared the data collected in the seven organizations to identify key similarities and effective practices.

Attracting and Retaining Excellence

Sampled agencies say their ability to attract and retain high quality scientists and engineers is closely related to four factors:

- reputation for excellence of on-board scientists and engineers,
- challenging work,
- the ability to make-a-difference in the work, and
- the opportunity to grow.

The agency contacts said that using pay as a factor to attract and retain high quality technical staff usually ranks lower than those four factors. Some have surveys showing that. On the other hand, all the agencies focus a great deal of attention on using the pay and total compensation flexibilities in ways that make them as competitive as possible in entry salaries, promotions, use of honorary and monetary awards, the 3R bonuses (recruitment, retention and relocation) advanced education, conferences and training.

Entry Level Recruiting and Selection

Field elements and some headquarters elements of all the benchmarking agencies tend to have very organized and systematic college recruitment programs, marked by shared responsibility between the personnel office and technical managers. They believe continuous, and shared, college relations programs throughout the year are essential to the recruiting effort. These relations go beyond recruiting activities and most frequently include programmatic contacts and meetings with colleagues for purposes of advancing the discipline.

Selection of entry level personnel is a critical step in the science and engineering hiring programs. Recruiting trips by joint teams of personnel officers and line managers to colleges and universities result in managers identifying the best students available for their entry-level positions. The organizations we interviewed often pay to bring students to the hiring site for a round of several interviews and an orientation prior to final selection and job offers.

Cooperative Education and Postdoctoral Programs

There is heavy dependence on co-op programs and postdoctoral fellowship programs to insure excellence at the hiring stage. Both programs are dependent on managers' observing program participants' work performance 1-2 years before permanent jobs are offered. The co-op students and the postdoctoral fellows also get a chance to make more informed decisions if offered permanent positions. Success rates in both programs are very high. Co-op programs have been touted for their utility in recruiting scientists and engineers at the B.S. level. Users conclude they are particularly useful to agencies in recruiting minority engineers and scientists because minorities are more heavily

concentrated in baccalaureate degree programs. These efforts, of course, are very useful in improving overall representation as well.

Systematic Career Management

The defense departments and agencies, which employ nearly 50 percent of all federal civil service workers, generally have more organized and more centrally controlled career management efforts. While we did not visit the Departments of Air Force and Army, we know that each of them has extensive civilian career management programs, including programs for scientists and engineers, that focus on development from entry level to senior executive level. In the acquisition field, the Department of Defense even has legislation and very specific and centrally developed civilian and military policies, programs and systems applicable to all elements of the department. These cover requirements for hiring, promotion, education, training and development of anyone who has, or will have, acquisition responsibilities. These requirements are passed down for implementation to the military services which use them in managing and developing both their military and civilian workers. For example, all scientists and engineers in the Army's Tank Automotive Research and Development Center in Warren, Michigan are considered to be in acquisition positions. They are designated as such and the incumbents must meet prescribed requirements for them. Where the acquisition responsibilities are considered "critical" to the position, the incumbents and prospective incumbents are part of an Acquisition Corps. The Corps' requirements, defined by the Secretary of Defense, cover qualification, hiring, promotion, job movement, professional development, advanced education, training, and service agreements.

Training Delegations

All the non-defense agencies that we contacted delegate responsibility for individual career development and training to managers in subordinate organizations below the headquarters level. But even the subordinate organizations have no specific policies for systematic career management. Instead, they tend to make the individual scientist or engineer responsible for the management of his/her career and expect supervisors to be responsible, when asked, for counseling and assistance in preparing individual development plans and acquiring education, training, and assignment experiences. Mentoring, at the option of the individual, is made available and encouraged, but not required, in nearly all the agencies visited. One of the laboratories we visited just implemented a mentoring policy after a 1-year test in the laboratory. The women scientists and engineers in the laboratory were especially persuasive in obtaining approval for this policy.

Excepted Personnel System

Organizations with partial (NASA and NSF) or no excepted personnel systems (all others except NRC, NASA and NSF) had differing views on the effectiveness of, and need for, excepted personnel systems. Those with partial coverage (NASA and NSF) said it was difficult to deal with the problems encountered with respect to inequities for employees not covered by the excepted system. NRC, an organization with an excepted system covering all employees, considers its system very superior to the General Schedule (GS) civil service system or to partial excepted systems. The NIST

demonstration project covers all employees within a competitive system but utilizes some of the same flexibilities as NRC's excepted system. NIST shares NRC's views but believes NIST still does not have the "ideal" federal system. For example, NIST believes that the Department of Agriculture's demonstration project is better in the staffing function.

Grade-Banding Classification System

Like the National Performance Review (NPR) team, the agencies in our sample identified the need to develop alternatives to the current federal position classification and pay systems as essential to facilitate simplicity and flexibility for managers' use to hire and retain technically excellent staff. Grade-banding is the classification system of choice and major delegation to managers is the preferred method of operation. The Department of Energy (HR-3) has a project team that is developing a grade-banding policy. HR-3 is collaborating with and partially funding a NAPA project -- Implementing Real Change in Human Resource Management: Alternatives for Federal Agencies. A major element of the this multi-agency project is devoted to building operational grade-banding models for implementation by agencies. A DOE personnel officer is being detailed to NAPA to work on that portion of the study.

Personnel Management Councils

Several of the agencies visited make very effective use of councils to focus on excellence and to develop and review the status/effectiveness of their human resource management policies, systems and programs. Councils made up of managers or executives, depending on the level, can be a very effective way to involve management in developing, reviewing and evaluating human resource management policies. EPA, NRL and the Goddard Space Flight Center have such councils. Goddard Space Flight Center has also used management councils for years to evaluate promotions to corporate positions and consider person-in-the-job promotions to non-supervisory technical positions at the highest grades. EPA has a departmental level council representing all its business units. The designation of its chair is rotated among the managers and the council meets at different geographic sites for each quarterly meeting.

Technical to Non-Technical Ratios (T:NT)

T:NT ratios are commonly used in organizations which have a heavy concentration of technical employees. Most frequently they are used at the installation level as one indicator of the trends in the organization with respect to its technical capacity for doing its work. Some focus on the cost aspects - a "how much bang are we getting for our technical buck" approach. Others watch the trends in the ratio in order to ask questions about the technical health of the organization.

Each organization we contacted believes that the use of ratios needs to be considered very carefully. They advised us to avoid using them in comparing one organization to others or using them as an absolute indicator of anything. We were cautioned that ratios are influenced heavily by the mission, culture, structure, and other factors, and can be very misleading if these factors are not taken into account. For example, in an organization that uses many contractor employees to do its

operational work, the failure to include the contractor force in the computation would bias T:NT ratios substantially. Those same organizations said that ratios tend to be more useful at the field level than for agencies or departments as a whole because there is usually less variability in mission at the field level. But even that conclusion comes into question when you look at the DOE operations offices.

We did establish the ratios in each organization contacted: EPA (1:2.6); NASA (1.3:1); Goddard Space Flight Center, NASA (1.3:1); NIST (1.3:1); NSF (1:3.4); NRL (1:1); NRC (1.6:1). We did not calculate a ratio for the Department of Defense because of the specialized nature of our contact with the Office of the Secretary of Defense. The data on each federal department and agency are available through OPM's Office of Information Systems, which routinely collects such information.

Conclusions and Recommendations

Technical excellence, as it relates to hiring, developing, training and retaining scientists and engineers, is a complex issue. Agencies tell us that technical excellence is a product of a culture of excellence reflecting environment, history, structure, leadership, mission, people, work and reinforcing management systems. Organizations that are technically excellent know it and work to build and retain it. The agencies we sampled know, too, that skillful use of total compensation, including position classification and pay systems, incentive and awards systems, career development systems, and training systems is essential if they are to compete for excellence with either the private sector or their fellow agencies. They say they are successful using the current systems but know that systems change, particularly as changes affecting classification and pay are demanded. The agencies are very favorable to implementing grade-banding. Some already have it in place either through demonstration projects or excepted service authority.

Like the DNFSB, the sampled agencies and the NAPA study team believe sustained leadership emphasis, deliberate actions and continual reinforcement are needed to realize technical excellence.

The Academy staff recommends that DOE:

- ◆ Consider establishing a human resource management council in coordination with its labor-management partnership efforts to facilitate a broad dialogue on human resource management in the department, and to identify and address both positive and negative trends.
- ◆ Task the TEEC to develop a 5-10 year strategic plan, which includes a detailed cost analysis, for realizing the full implementation of the technical excellence policy across the department.

As a part of that TEEC effort, we suggest that the department give attention early on to a DOE-led, in-depth, benchmarking study to produce in substantially more detail the best of the programs in this baseline external assessment. We suggest DOE look at the NIST material and the

Department of Agriculture demonstration project (we did not visit Agriculture) to study their classification, pay, and hiring approaches. In coordination with DOE's HR-3 grade-banding system proposals, DOE should consider developing staffing systems change proposals to OPM to take advantage of what NIST and Agriculture have demonstrated successfully.

The Academy staff recommends that DOE:

- ◆ **Propose to OPM a unique DOE personnel demonstration project at a defense nuclear facility or facilities. Consider combining this effort with a manage-to-budget system and a demonstration project under the Government Performance and Results Act, such as DOE's environmental management pilot.**

We urge DOE to use its best technical managers, supported by HR-3 staff, to lead the overall benchmarking system change or demonstration effort. If DOE is unable to produce the desired changes because of external barriers, we recommend the department take its proposals in the form of legislation to the appropriate energy committees on the Hill. The NIST experience could be a model for that.

TASK FOUR

SPECIFIC MEASURES IN THE NPR THAT WOULD BE PARTICULARLY APPLICABLE AND EFFECTIVE IN IMPROVING THE DOE FEDERAL WORKFORCE

DNFSB Recommendation 93-3 was produced prior to the NPR. In the follow-up actions to the implementation plan for 93-3, the department stated its commitment to using flexibilities arising from the NPR prospectively, depending on the passage of legislation. The NAPA staff carefully reviewed DOE's (HR-3) own analysis and the specific NPR recommendations contained in the basic report of September 7, 1993 and the two accompanying reports: one on the Office of Personnel Management and the other on Reinventing Human Resource Management. The two accompanying reports were dated September 1993 but were not released until mid-1994.

The President, by endorsing the recommendations of the NPR, commits the federal government to "a long-term investment in change". The NAPA staff concludes that is precisely what DOE needs to effectively implement the department's technical excellence policy. While the 93-3 implementation plan is a fine beginning, the NPR recommendations can be good tools for refining, strengthening and enhancing DOE's technical excellence efforts.

All the recommendations relating to the grade-banding, recruiting, hiring, developing, training and retaining have merit and should be implemented. Some others deserve mention with respect to the recommendations of 93-3 and the subsequent action plan. Because HR-3 has already conducted a very similar review, we will not duplicate their findings in our report. We will add some different perspectives which we think will be useful to DOE in promoting technical excellence. Grade-banding, performance management and staffing, three of the major change ingredients of NPR, have received sufficient attention in the HR-3 work and in other parts of this report.

General Observations

Donald F. Kettle, is a professor of public affairs and political science at the La Follette Institute of Public Affairs, University of Wisconsin and a member of the National Academy Panel for our new NAPA HRM Study. The August 18, 1994 edition of *The Washington Post*, quotes a recent study Kettle conducted for the Brookings Institution. According to the article, Kettle concluded, among other things, that the NPR "has the potential, together with the New Deal and the Hoover commissions to be one of the three most important administrative initiatives of the 20th Century." Kettle is also quoted by the *Post* as saying that "no reform that really matters can be achieved without at least implicit congressional support." While this may be true of NPR as a whole, the NAPA staff believes DOE can begin to reinvent its own piece of the federal personnel system in the absence of such support. Even without systems legislation, which is very important to major progress, DOE can continue to make progress in creating more responsive, flexible, and customer-oriented human resource management policies which take advantage of the spirit of NPR and of the recommendations of its reports.

Full-Time Equivalent Ceilings (FTE)

NPR recommended that OMB and the agencies stop using FTEs, managing instead with ceilings on operating costs to control spending. We have addressed this earlier in this report.

Training

NPR says knowledgeable workers are our biggest source of progress and "training is the key that unlocks the power of bottom-up decisionmaking." It also cites "ongoing training for every worker is essential for organizations to work well." NPR recommended and Congress has just passed legislation that eliminates "narrow restrictions on employee training to help develop a multi-skilled workforce." These changes should be exploited broadly.

Family-Friendly Workplace

NPR recommended "the federal government update and expand family-friendly workplace options."

Diversity

NPR recommended a presidential executive order committing the administration to increase representation in the federal workforce.

Partnerships

NPR recommended, and the President has directed, the establishment of labor-management partnership councils. A variety of partnering relationships (with customers, for example) are also encouraged.

Alternative Dispute Resolution (ADR)

NPR recommended that, "agencies will expand their use of alternative dispute resolution techniques."

Conclusions and Recommendations

The National Performance Review outlines a course for reinventing the roles, philosophy and systems through which the federal government leads its people in accomplishing its work more effectively. The tenor of its focus, analyses and recommendations creates a "window of opportunity." Through this window, individual departments and agencies have been given license to be more innovative and aggressive in taking agency actions, designing agency systems, developing agency programs, and seeking needed change in the federal personnel system itself.

The Academy staff recommends that DOE:

- ◆ **Consider another approach to obtaining OPM approval to conduct its own recruiting and examining where authority has been previously denied. Using NIST and the Department of Agriculture as examples, seek similar authority using the NPR and DOE's other initiatives as persuaders even before proposing a demonstration project. The department's administrative costs will be recouped in recruiting excellence.**
 - ◆ **Take advantage of the opportunity to design its own performance management and reward systems to reinforce the importance of achieving technical excellence.**
 - ◆ **Use the TEEC to include the DOE technical excellence policy initiative in both DOE's work on the Government Performance and Results Act and the Secretary's written performance agreement with the President under the NPR. This is in addition to the recommendation earlier to include DOE's technical excellence policy and strategy initiatives in the Strategic Plan.**
 - ◆ **Consider initiating and funding a new department policy adopting the NPR "continuous training" philosophy as DOE's own philosophy for developing employees, including scientists and engineers. By continually developing the skills of workers, coupled with building trust and empowerment, DOE can go a long way toward achieving excellence.**
 - ◆ **Move to institute a policy for the line chain-of-command that demands development of a diverse scientific and engineering workforce and holds line management accountable through the same processes used for other line management oversight.**
- Performance management is not just performance plans and appraisals. It's face-to-face discussions up front of action desired and periodic review of action taken. Regular high-level reviews by the Secretary with line cognizant secretarial officers should include the progress of representation in the workforce as an agenda item. Cascading reviews of the same sort in the line can follow. Diversity is a management issue, not a personnel office issue.
- ◆ **Move to fold labor-management partnerships into its approach to institutionalize excellence.**
 - ◆ **Expand its use of alternative dispute resolution programs for grievance resolution, adverse actions, and EEO complaint processing as another aspect of its culture of excellence initiative.**

ENDNOTES

1. National Research Council, Improving the Recruitment, Retention, and Utilization of Federal Scientists and Engineers, 1993. pp. 28-29.
2. *Ibid.*, pp. 31-34.