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Principles for Enhancing Professionalism of Nuclear Personnel

INPO

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Foreword

The nuclear professional is thoroughly imbued with a great respect and sense of responsibility for the reactor core—for reactor safety—and all his decisions and actions take this unique and grave responsibility into account.

The management principles that follow were developed by a committee of senior utility officials with assistance by the staff of the Institute of Nuclear Power Operations (INPO) and with input from virtually all U.S. nuclear utilities.

The principles are aimed at creating an environment within a nuclear power plant that promotes a healthy respect for the unique technology that nuclear electric power represents and, thus, to promote great care and conservative, thoughtful decision-making by the nuclear plant staff.

The scope of the principles includes all nuclear personnel and gives guidance in the selection and development of management and supervisory personnel and other key individuals in the areas of operations, maintenance, technical support and engineering.

Utility managers are encouraged to make in-depth comparisons between these principles and their day-to-day policies and practices, and to use such efforts as opportunities to communicate their organization's management philosophy to all nuclear personnel.

1. Managing for Excellence and Professionalism

1. The corporate management philosophy and structure ensures that the senior nuclear manager possesses sufficient nuclear power plant knowledge and experience. Other corporate officers, managers, and staff personnel responsible for supporting plant operations possess the necessary knowledge and experience to understand nuclear plant activities, problems, and events. Corporate officers and directors above the senior nuclear manager are involved with and informed of plant performance and problems in sufficient detail to maintain a clear understanding of the status of plant safety. Necessary resources and support are provided in a timely manner.
2. Management provides an environment that is conducive to excellence and professionalism. This includes the following elements:
 - Senior management establishes an overall corporate philosophy that permeates the organization.
 - Management sets the example by conducting itself with commitment and integrity.
 - Management establishes safety as a personal, moral responsibility and ensures the safety of the public, utility personnel, and the plant.
 - Management maintains an atmosphere of open communication such that problems are brought to its attention undiluted.
 - Management sets goals that encourage continual improvement in performance and avoid a sense of self-satisfaction or complacency.
3. Management ensures that work is performed in accordance with established plans, schedules, and procedures to achieve maximum clarity of direction, quality of performance, and management credibility.
4. Appropriate levels of management are actively involved in the day-to-day activities of the plant, including routine operations, testing, and outages.
5. Management provides plant personnel with a quality plant to operate and maintain by ensuring that plant systems and components are reliable and maintainable and conform to approved design and that high standards for materiel condition are maintained.
6. Management is proactive and responsive. Solutions to problems are pursued with the objective of correcting root causes and improving performance. Solving problems is viewed as an opportunity for making productive improvements.

2. Managing Nuclear Personnel

A. General

1. People and their professional capabilities are regarded as the nuclear organization's most valuable resource. Authorized staffing is sufficient to perform all required tasks, and positions are filled with highly trained and fully qualified individuals.
2. Programs are established and implemented to recruit and select individuals with the qualifications and abilities to perform the jobs for which they are being hired and also with the ability to develop the skills and knowledge required for higher-level positions.
3. Knowledge and skills are developed, maintained, and enhanced through appropriate training and career development. In addition, opportunities are provided for personnel at all levels to work with good role models to foster development. The initial and continuing training programs for applicable plant personnel are accredited by the National Nuclear Accrediting Board. Other training programs are also maintained at high standards.
4. Management practices and policies convey an attitude of trust and an approach that is supportive of teamwork at all levels. These practices and policies recognize and expect professionalism from all personnel. Policies that spell out expectations and standards of performance are well-established and documented. These policies are clearly communicated and are well-understood by all personnel and are routinely reinforced in training and in the daily conduct of business.
5. The line organization is the principal focus of management, the principal source of information, and the only source of management direction. Committees, review boards, and other activities that provide management information essential to effective self-analysis are not allowed to dilute or undermine line authority or accountability.
6. Management practices encourage communication and require teamwork among and between groups that operate, maintain, and support the plant. These practices also encourage personnel to view themselves as a part of the overall "team" with successful operation of the plant being a common goal and that conflicts between the workers and management or between groups are resolved. Management conscientiously examines these issues on an ongoing basis.
7. Management encourages personnel to seek help and admit mistakes.

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8. Appropriate personnel have professional codes that set forth certain practices, including ethical practices, that they adopt as a part of their way of doing business. These practices embody high standards of technical and ethical performance and help build a foundation for safe and reliable plant operations. These codes are developed and maintained such that individuals feel ownership and pride in their code and its implementation.
9. Management seeks input on the development, and feedback on the effectiveness, of policies and practices. Open channels of communication are established and maintained such that personnel at all levels are encouraged to provide complete, undiluted input and feedback.
10. Management encourages individual accountability and provides appropriate recognition of personnel for their achievements, both within their work groups and in the company as a whole.
11. Management provides a clear assignment of responsibilities and promotes a sense of pride and ownership in the plant and its equipment.
12. Affiliation with professional societies and industry organization is encouraged.
13. When conditions arise which are unexpected or are outside the scope of normal conditions or procedures, management promotes a culture which ensures that appropriate guidance is obtained before proceeding. Implementation of this principle is not intended to prevent personnel from taking necessary action in the event of an emergency.

B. Developing Management Personnel

1. Formal programs are established to select and develop individuals to fill key management positions.
2. Management development and selection practices reflect the fact that work in plant operations provides the broad, integrated view of plant activities needed by nuclear managers. Individuals with experience in day-to-day plant operations are considered as an important source of management talent. The policies and practices that govern career development ensure that individuals are aware of the opportunity to develop into management positions and that selected individuals are encouraged and provided with opportunities to pursue this career path.

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3. Promotion and management development practices seek a balance between career operations individuals and others who obtain operations experience as part of their career development. Operations personnel with the potential to fill key management positions are provided an opportunity for acquiring experience in other groups. Also, other personnel with the potential to fill key management positions are provided an opportunity for obtaining an SRO license or certification and operations experience. Engineers who hold bachelor's degrees in technical fields are considered a key source of such personnel.

4. The plant manager or assistant plant manager in the line organization holds or has held an SRO license or has been certified for equivalent SRO knowledge and has extensive nuclear power plant experience, preferably in the operations department. The operations manager or middle manager to whom the shift supervisors report holds a current SRO license and has extensive nuclear power plant operations department experience, preferably as a shift supervisor.

In addition, in the long term, it is highly desirable that other key plant management positions be filled by personnel with plant operations experience and who hold or have held an SRO license or certification. Examples of such positions include the following:

- maintenance manager
- technical services manager
- training manager
- site manager
- outage manager
- the various assistants for these key positions

5. Management personnel and candidates for management positions are provided appropriate management and interpersonal skills training and experience to enable them to perform management and supervisory functions.

6. Candidates for management positions or for promotion to higher-level management positions are provided with opportunities to work with and for individuals who can serve as role models to enhance the development of leadership and management capabilities.

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7. Selected personnel are provided opportunities in a variety of functional areas in the nuclear organization and are given opportunities to work with utility groups and to visit other nuclear stations to broaden their exposure and perspective.

C. Managing Operations Department Personnel

In addition to the practices and principles described above, the following apply specifically to operations department personnel.

1. The initial screening of applicants or candidates for operations positions takes into account the positions of great responsibility that these personnel are likely to fill, for example, as reactor operators.
2. Subsequent screening, with nuclear line management involvement, is conducted as operators and others are selected as candidates for the senior reactor operator and shift supervisor positions. This screening focuses on integrity, leadership, management capabilities, and technical competency.
3. While a college degree in a technical field is not a necessary requirement for operations positions, operators with bachelor's degrees in technical subjects have a greater likelihood of promotion to and success in management positions. Management practices ensure that an appropriate number of personnel with such degrees, or the potential and desire for acquiring such degrees, are selected for operations positions. In addition, management assists and encourages selected operators who have the potential to acquire bachelor's degrees; programs that lead to degrees in technical subjects are given preference. To assist in accomplishing this, college credits may be sought for successful completion of utility training programs.
4. Management practices governing the conduct of control room operations and simulator training ensure the following:
 - The line responsibilities and authorities during off-normal or casualty conditions are spelled out with absolute clarity. To the maximum extent possible, the roles of control room personnel during an off-normal or casualty situation are the same as for routine duties. (A transfer in responsibility when things begin to go wrong is undesirable for many reasons, including the fact that personnel are often unable to determine when such a transfer should be made.)

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- Simulator practices of normal, off-normal, and casualty situations are conducted, to the maximum practical extent, with the same personnel and with the same responsibilities and authorities that are assigned in the plant control room (the team concept).

5. Line management, including the site manager, is sufficiently involved in all phases of the training, qualification, requalification, and simulator programs to ensure that operators are properly qualified to perform their assigned tasks.

6. Management policies and practices ensure that the person responsible for the plant after hours (in effect, the person who acts for the plant manager), whether this is a shift manager, shift engineer, or shift supervisor, is selected keeping in mind the great responsibility that the person assumes. The individuals selected have the training, experience, maturity, and judgment to assume this responsibility. In selecting and approving these individuals, it is recognized that this person enforces the professional standards and sets the tone not only for the operators but for all personnel at the plant during off-hours. Final approval of the qualifications of individuals assigned to this position is reserved for an appropriate level of senior management.

7. When conditions arise which are unexpected, or are outside the scope of normal operating conditions or procedures, management promotes a culture which ensures that operations personnel do not proceed in the face of uncertainty, but instead place the plant in a safe condition and then obtain the appropriate guidance before proceeding. Implementation of this principle is not intended to prevent operators from taking necessary action in the event of an emergency.

D. Managing Maintenance Personnel

In addition to the practices and principles described in Sections 2A and B above, the following apply specifically to maintenance personnel.

1. The initial screening of applicants or candidates for maintenance positions takes into account the importance and potential impact of tasks that these personnel are likely to perform, for example, working on critical system equipment and controls. The objective of the selection process is to ensure personnel have the aptitude to develop the skills and knowledge required for advancement to the highest level of their profession (e.g., mechanical, electrical, and instrument control).

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2. Subsequent management screening is conducted as personnel are selected as candidates for foreman or supervisor positions. This screening focuses on integrity, leadership, management capabilities, and technical competency.
3. Formal programs are established and implemented for the training and development of first-line supervisors so that they can elicit professional performance in their subordinates, effectively supervise the work of others, and ensure that management policies and standards are adhered to. First-line supervisors should complete essential portions of the training and development program prior to or as soon after assuming supervisory duties as possible.
4. Management assists and encourages selected personnel who have management potential to acquire bachelor's degrees; programs that lead to degrees in technical subjects are given preference. To assist in accomplishing this, college credits may be sought for successful completion of utility training programs.
5. Line management, including the site manager, is sufficiently involved in the maintenance training and qualification programs to ensure that the programs are of high quality and that maintenance personnel are properly qualified to perform their assigned tasks.
6. Management ensures that maintenance is conducted in a professional manner through the following techniques:
 - Procedures are technically correct, easily understood, and consistently used.
 - Planning, scheduling, and coordination enhance teamwork and the timely accomplishment of maintenance activities.
 - Recurring and long-standing problems are identified and corrected.
 - Methods are established for workers to provide direct input of their ideas to enhance job-related procedures and maintenance techniques. Timely feedback is provided to workers on the disposition of their suggestions.
 - Station and maintenance department goals and objectives are clearly communicated to maintenance workers. Management stresses responsibility of workers in achieving these goals.

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7. Management provides facilities, equipment, and tools that effectively support both plant maintenance and maintenance training.

E. Managing Technical and Support Personnel

In addition to the practices and principles described in Sections 2A and B above, the following apply specifically to technical and support personnel.

1. The initial screening of applicants or candidates for technical and support positions takes into account the importance and potential impact of tasks that these personnel are likely to perform.
2. Subsequent management screening is conducted as personnel are selected as candidates for supervisory positions. This screening focuses on integrity, leadership, management capabilities, and technical competency.
3. Formal programs are established and implemented for the training and development of first-line supervisors so that they can elicit professional performance in their subordinates, effectively supervise the work of others, and ensure that management policies and standards are adhered to. First-line supervisors should complete essential portions of the training and development program prior to or as soon after assuming supervisory duties as possible.
4. Management practices and policies for personnel promote and stress an understanding of the plant and a broad perspective of plant activities.
5. Management assists and encourages selected personnel who have management potential to acquire bachelor's degrees; programs that lead to degrees in technical subjects are given preference. To assist in accomplishing this, college credits may be sought for successful completion of utility training programs.
6. Management provides facilities, equipment, and tools that effectively support technical and support activities and associated training.

F. Managing Engineering Personnel**

In addition to the practices and principles described in Sections 2A and B above, the following apply specifically to engineering personnel.

**This includes all engineering positions (e.g., technical support, design, maintenance, chemical, radiological, etc.), that normally require an engineering degree.

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1. The initial screening of applicants or candidates for engineering positions takes into account the importance and potential impact of the tasks these persons are likely to perform.
2. Subsequent management screening is conducted as personnel are selected for supervisory positions. This screening focuses on integrity, leadership, management capabilities, and technical competency.
3. Policies and practices encourage engineering personnel to obtain a combination of plant operations and engineering knowledge as applicable for their responsibilities.
4. Management provides an environment where engineers are expected to take a proactive role in identifying and pursuing solutions to plant problems. A sense of responsibility for the safety and reliability of the plant and a commitment to engineering excellence is fostered at all levels of the organization.
5. Management gives a high level of attention to the following areas:
 - maintaining the design intent
 - controlling plant configuration
 - identifying root causes of problems and follow-up of associated corrective actions
 - defining the division of responsibility between engineering groups
 - using and sharing industry operating experience information
 - ensuring the quality of engineering products including proper field applications
 - applying diagnostics to predict and minimize failures or unsafe conditions
6. Management provides engineers with the opportunities to further their education and to maintain awareness of technological advances in their field of expertise. Achieving qualification as a registered professional engineer is encouraged and appropriately recognized within the organization.

Ad Hoc Committee to Develop Principles for Enhancing Professionalism of Nuclear Personnel

The following individuals served from early 1988 to early 1989, in conjunction with the INPO staff, in the development of the principles described within.

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