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**Education for Senior Reactor Operators and Shift Supervisors at Nuclear Power Plants; Policy Statement**

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Policy statement

**SUMMARY:** This policy statement presents the policy of the NRC regarding education for senior operators and shift supervisors at nuclear power plants. The Commission believes that the safety of commercial power reactors is enhanced by having on each shift a team of NRC licensed professionals that combine technical and academic knowledge with plant-specific training and substantial hands-on operating experience. The Commission believes the licensed reactor operator, senior operator, and shift supervisor positions are very important to the safe and reliable operation of nuclear power plants and therefore encourages the utilities to continue their efforts to sustain and increase, where appropriate, the professionalism of these positions.

**EFFECTIVE DATE:** August 15, 1989.

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**SUPPLEMENTARY INFORMATION:**

**Background**

Since the Three Mile Island Unit 2 (TMI-2) accident on March 28, 1979, to which human error was a major contributor, the issue of academic requirements for reactor operators has been a major concern of the Nuclear Regulatory Commission. In July 1979, the NRC issued NUREG-0578, "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations,"<sup>1</sup> which contained

<sup>1</sup> Copies of all NUREGs referenced may be purchased through the U.S. Government Printing Office by calling (202) 275-2080 or by writing to the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082. Copies may also be purchased from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. A copy is available for inspection or copying for a fee in the NRC Public Document Room, 2120 L Street, Lower Level, NW, Washington DC

specific recommendations for a shift technical advisor (STA) to provide engineering and accident assessment expertise during other than normal operating conditions. On October 30, 1979, the NRC notified all operating nuclear power plant licensees that STAs should be on shift by January 1980, and that they should be fully trained by January 1981. In November 1980, NUREG-0737, "Clarification of TMI Action Plan Requirements," provided further details to licensees regarding implementation of the STA requirement. It identified the STA as a temporary measure pending a Commission decision regarding long range upgrading of reactor operator and senior operator capabilities.

The qualifications of operators were also addressed in 1979 by NUREG-0585, "Lessons Learned Task Force"; in the 1980 Rogovin Report, "Three Mile Island: A Report to the Commissioners and to the Public", (NUREG/CR-1240); and in SECY-82-162, "Report of the Peer Advisory Panel and the Nuclear Regulatory Commission on Operator Qualifications",<sup>2</sup>. Although the 1982 Peer Advisory Panel report recommended against imposition of a degree requirement, the consensus among these reports was that technical and academic knowledge among shift operating personnel greater than existed at that time would be beneficial to the safety of nuclear power plants.

On October 28, 1985, the NRC published in the Federal Register (50 FR 43621) a Final Policy Statement on Engineering Expertise on Shift, which described two alternatives for providing the necessary technical and academic knowledge to the shift crew. Option 1 of the policy statement permits an individual to serve in the combined senior operator/shift technical advisor (SO/STA) role if that individual holds either a bachelor's degree in engineering technology, or physical science from an accredited institution, or a professional engineer's license. Option 2 permits continuation of the separate STA, on each shift, who holds a bachelor's degree or equivalent, and meets the criteria as stated in NUREG-0737. The Commission also encouraged the shift supervisor to serve in the dual-role position and the STA to take an active role in shift activities.

On May 30, 1986, the NRC published an Advance Notice of Proposed Rulemaking (ANPR) (51 FR 19581). The purpose of the ANPR was to solicit public comments on a Commission

<sup>2</sup> The documents with SECY designators are available at the NRC Public Document Room at 2120 L Street, Lower Level, NW, Washington, DC

proposal to extend the current level of engineering expertise on shift and to ensure that senior operators have operating experience on a commercial nuclear reactor operating at greater than twenty percent power. Two hundred letters were received in response to the ANPR; most of them were opposed to a degree requirement for Senior Operators.

Although comments received on the ANPR were generally opposed to a degree requirement, the Commission believed that it would be beneficial to obtain additional public comment on two alternative proposals. On December 29, 1988, (53 FR 52718) the Commission published a proposed rule for degree requirements for shift personnel, with two alternate approaches—additional education and experience requirements for either senior operators or shift supervisors.<sup>3</sup>

Approximately 95% of the comment letters received are opposed to any rule. As described elsewhere in this issue of the Federal Register, the Commission has decided to terminate the rulemaking.

**Development of Final Policy Statement**

In deciding not to proceed with the rulemaking, the Commission carefully considered the comments received on the proposed rule and the status of industry initiatives to enhance the education level of its operating personnel. In particular, the Commission noted that many utilities have provided opportunities for members of their operating staff to further their education. Where programs are in place, they have included:

1. Financial assistance for taking college courses off-site;
2. Development of programs, in conjunction with universities and colleges, that provide college level courses and degrees—including arrangements that provide appropriate credit for nuclear power plant training courses and work experience; and
3. On-site programs that provide college level courses and degrees for members of the operating staff.

The Institute of Nuclear Power Operations (INPO), in cooperation with

<sup>3</sup> The term "shift supervisor" is being used to refer to that person holding a senior operator license for all fueled units at the site who is assigned responsibility for overall plant operation at all times there is fuel in any unit. Where a single senior operator does not hold a senior operator license on all fueled units at the site, a licensee must have at the site two or one more senior operators, who in combination are licensed as senior operators on all fueled units. The Commission recognizes that persons may have a different title than "shift supervisor" at different utilities.

many nuclear utilities, has developed "Principles for Enhancing Professionalism of Nuclear Personnel", dated March 1, 1989. INPO encourages utilities to implement these principles. Among other important matters, these principles directly address developing management personnel and managing operations department personnel. In particular, they encourage that:

Management development and selection practices reflect the fact that work in plant operation 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.

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 (Senior Reactor Operator) license or certification and operations experience. Engineers who hold bachelors degrees in technical fields are considered a key source of such personnel

While a college degree in a technical field is not a necessary requirement for operations positions, operators with bachelors 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 bachelors 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.

In addition, INPO has an effort underway to review the training and education requirements for shift supervisors, with the goal of ensuring that shift supervisors have the necessary knowledge, skills, understanding, and the education to supervise the safe operation of a nuclear power plant.

The NRC monitors the level of technical knowledge of licensed operating personnel with its licensing and requalification examinations and inspection programs to ensure that personnel holding these important positions are receiving the training needed, and are otherwise qualified, to

meet the requirements of the jobs. The Commission is convinced that the existing level of technical knowledge of licensed personnel is sufficient to safely operate nuclear power plants and ensure the protection of the health and safety of the public.

However, since the level of technical knowledge of the shift operating staff has a direct bearing on the safety of nuclear power plants, the Commission continues to look for measures that can further improve the capability of the shift operating staff. The following policy statement presents our views concerning education for senior operators and shift supervisors.

#### Policy Statement

The Commission believes that the level of engineering and technical knowledge of shift operating personnel has a direct bearing on the safety of nuclear power plants. Accordingly, the Commission believes that the safety of commercial power reactors is enhanced by having on each shift a team of NRC-licensed professionals<sup>4</sup> that combine technical and academic knowledge with plant-specific training and substantial hands-on operating experience.

The Commission's position is predicated on the fact that, even though reactor licensees try to anticipate and address in training programs and reactor operating procedures all conceivable situations which could arise during normal and off-normal operation, there will always be the potential for situations to arise which are not covered through training or operating procedures. The Commission is persuaded that there is a need for some individuals on each nuclear power plant operating shift who have an innate understanding of the systems-level performance of a nuclear power plant. The types of knowledge that are needed are scientific and engineering fundamentals and the basic scientific principles that govern the behavior of electrical, mechanical, and other engineered systems. This is precisely the type of knowledge that academic institutions develop and convey well and that forms the basis of an academic degree program in a technical discipline. A program of scientific and engineering studies should provide plant operating personnel an enhanced capacity for reasoning and judgement, as well as enhanced confidence, to perform better during both normal and off-normal

<sup>4</sup> The term "professionals" is being used to refer to persons who have demonstrated competence to operate a nuclear power plant and who adhere to the highest technical and ethical standards for reactor operations. These persons may or may not hold an academic degree.

operation, but particularly in the stressful and complex environment surrounding reactor transients and accidents which may arise in the course of reactor operations. Individuals with such education can utilize their in-depth knowledge when called upon to assess the causes of a novel incident and determine the appropriate responses.

The Commission further believes that programs which encourage experienced nuclear professionals to obtain college degrees and personnel with degrees to obtain a senior operator license and hands-on operating experience create an important source of management talent for the industry. Such individuals are more likely to be selected for management positions and, because of their understanding of the unique operational problems associated with nuclear power plant operation, are in a better position to enhance nuclear safety by fostering a strong safety culture within their organization.

For these reasons, the Commission endorses the INPO "Principles for Enhancing Professionalism of Nuclear Personnel" dated March 1, 1989, for implementation at each nuclear utility.

Specifically, the Commission encourages nuclear plant licensees to continue to develop and implement programs that permit operating personnel to obtain college degrees from accredited institutions. Those persons with ability and desire should be given every opportunity to further their education in order to best serve the interest of nuclear safety.

Additionally, the Commission encourages nuclear plant licensees to hire college graduates for positions on the operating staff. Licensees should actively work to make operating staff positions, including the plant specific training and development programs, attractive to college graduates with technical or science degrees in relevant disciplines from accredited institutions. The Commission particularly encourages the recruitment of graduates with physical science, engineering, or engineering technology degrees from accredited institutions which have accredited programs.

Utilities should continue to develop reactor operators and senior operators who have a significant amount of hands-on operational experience. It is desirable to have senior operators on shift who have progressed through the typical experience path, including the auxiliary operator and reactor operator positions.

The Commission recognizes the necessity for licensees to provide operators on shift with a strong

background of plant-specific, hands-on experience, regardless of whether those individuals have obtained college degrees. At the same time, the Commission believes that it is desirable for licensees to ensure that they have in the control room individuals with academic training as well. Ideally, licensees should strive to have in the control room individuals with a mix of education, training, and experience in plant operations. This should be the goal during the coming years.

The Commission encourages nuclear plant licensees to provide opportunities for licensed operators and others with nuclear power plant operating experience to assume positions of increased management responsibility. In the same vein, policies and programs which provide principal and cooperate nuclear managers with meaningful knowledge and experience in nuclear plant operations, including sufficient training and operational experience to qualify for and pass the NRC examination for a senior operator license, are valuable and should be encouraged.

The shift supervisor occupies a unique position. Besides interacting directly with the operating staff, the shift supervisor must also interact with upper management, and every effort should be made to ensure that the shift supervisor is an effective member of the facility management team. The Commission believes that the highest priority should be given to assuring that shift supervisors, and other individuals with similar decision-making authority on each shift, have appropriate levels of education in technical fundamentals, training on the particular systems, and operating experience. The Commission encourages INPO to complete the effort to review the adequacy of training and education requirements for the shift supervisor position in a timely manner. The Commission understands that this effort is being coordinated with the industry accreditation program and the National Academy for Nuclear Training and supports this concept. The Commission intends to follow this effort closely and will participate as appropriate to ensure successful closure of this issue.

The Commission reaffirms its position, set forth in the Policy Statement on Engineering Expertise on Shift (50 FR 43621), that it is important to have engineering and accident assessment expertise available to the operating crew at all nuclear power plants. The STA has proven to be a worthwhile addition to the operating staff by providing an independent engineering

and accident assessment capability, and we support continuation of this position. However, the Commission wishes to reemphasize its preference for the STA to have a senior operator license, in order to enhance the STA's operational knowledge and experience and to provide him or her greater credibility with the other members of the operating staff. It remains the Commission's preference that all licensees continue to move toward the dual role (SO/STA) position. For those licensees who continue to use the STA as a "stand-alone" position, the Commission reemphasizes its position that this individual should assume an active role in shift activities. The STA should maintain a continuing awareness of plant configuration and changes in plant status and be an integral part of the operating shift.

The licensed reactor operator, senior operator, and shift supervisor positions are very important to the safe and reliable operation of nuclear power plants. Therefore, utilities should continue their efforts to sustain and increase, where appropriate, the professionalism of these positions. These positions should be filled with individuals of the highest caliber and should command respect and status both inside and outside the operational organization.

Dated at Rockville, Maryland this 9th day of August, 1989.

For the Nuclear Regulatory Commission,  
Samuel J. Chilk,  
*Secretary of the Commission.*