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The Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

ATTN: Docketing and Service Branch

COMMENTS ON PROPOSED RULE 10CFR50 AND 55,  
EDUCATION AND EXPERIENCE REQUIREMENTS FOR SENIOR REACTOR  
OPERATORS AND SUPERVISORS AT NUCLEAR POWER PLANTS

This letter provides my personal comments on the proposed rule, 10CFR50 and 55, regarding education and experience requirements for licensed operators. This letter will undoubtedly be unique, since I hold a B.S. in Nuclear Engineering and am a registered Professional Engineer in the state of Missouri, and I do not support either alternative as stated. Neither do I agree with the conclusions of this proposed rule.

I disagree with the justification given for the proposed rule, even though I may benefit from either of the two alternatives, since I am currently an Operating Supervisor, and am scheduled to begin SRO License Training in August, 1989. The reasons for my disagreement with the conclusions and associated analysis for this proposed rule are provided on the attachment.

Since The Commission obviously values the characteristics/abilities of degreed engineers, I hope the attached analysis may also serve to provide The Commission with some viable alternatives to achieve the desired goal of enhancing public health and safety. I would welcome the opportunity to discuss any questions you may have regarding my response.



Respectfully Submitted,

*Clark H. Fuhlage*

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ATTACHMENT 1  
CLARK H. FUHLAGE RESPONSE TO  
PROPOSED RULE REGARDING DEGREED SENIOR REACTOR OPERATORS

QUESTION 1: Which alternative is preferable assuming one will be selected?

RESPONSE: Alternative 2. This response is predicated upon the given assumption that "one will be selected". However, my response does not support the underlying assumption that the best possible solution to the NRC concern has been provided within one of the two alternatives.

No engineer should be satisfied to simply answer such a question with only two alternatives. This is contrary to all accepted design/analysis practices, whereby the problem is first clearly stated, and then potential solutions are proposed. Each solution is then analyzed to determine the optimum solution.

Stating the proposed alternatives without first clearly stating the problem can easily lead to a faulty solution to any problem. If the problem is a lack of technical expertise, existing training programs could be augmented to provide necessary training. If the problem is a public perception that degreed operators are more qualified to be in charge, then the operator licensing exams could be revised to prove qualifications comparable to those required by state licensing boards or University courses.

The problem or problems which suggest that this rule is required should be clearly stated before the proper solution can be chosen.

QUESTION 2: What are the potential impacts of each of the alternatives on licensee staffing?

RESPONSE: Alternative 1: This alternative would have a negative impact upon operator incentives to pursue a career as a reactor operator, since promotional opportunities would not exist. Furthermore, due to the already stressful nature of the training and shift-work, it will probably further reduce the number of applicants for future job openings.



As evidence to support this assessment of a negative impact upon operator morale and performance, refer to the article in Nuclear News, February 1989, pp 100-101. The French operators staged a 10-week power-cut protest which was partly due to a lack of promotional opportunity for highly skilled mid-level technicians (technical school graduates without university degrees), who see no possibility of career advancement.

Alternative 2: This alternative would serve to also restrict the career paths of the Senior Reactor Operators who hope to become Shift Supervisors. Either they would have to begin the difficult task of earning a college degree on their own, or work additional shifts to allow co-workers to attend college courses.

If a grandfathering clause were provided, current Shift Supervisors could remain on shift, which would have a minimum impact upon other personnel. However, current SRO's with more years of experience and training could be bypassed simply due to lack of an engineering degree. This would lead to less experienced upper plant management, contrary to one of the stated objectives of this proposal.

QUESTION 3: Regarding implementation of the alternatives, would there be a more appropriate transition period for each alternative than the one proposed?

RESPONSE: Yes. Compliance with either alternative within 4 years will lead to all of the following short term detrimental effects:

- 1) Increased overtime for other licensed operators,
- 2) Reduced experience on-shift while current SRO's are sent to training,
- 3) Attrition of experienced personnel who leave the nuclear power plant environment for jobs which do not require a college degree.

A minimum of 8 years should be proposed to allow time for the existing industry initiatives to demonstrate improvement in operator qualifications.

QUESTION 4: Alternative 2 provides for three different methods for demonstrating technical expertise with educational credentials. Would some other method be desirable for this purpose? Are there other alternative ways to demonstrate knowledge of appropriate engineering fundamentals for people who may be ineligible to take the EIT examination?

RESPONSE: The only other method which should be seriously considered is the NRC License Examination. The E.I.T. and P.E. exams serve to prove that an individual possesses the skills needed to perform engineering analyses and evaluations.

They do not demonstrate the ability of an individual to interpret the symptoms of any transient to determine the severity or recovery method for any such transient. I distinctly remember that there were no questions which even remotely applied to the safe, legal, or efficient operation of a nuclear power plant on the E.I.T. or P.E. exams which I have taken.

The ability to perform fundamental engineering calculations does not indicate that an individual can perform well under stress, determine the appropriate response to a transient, or supervise people in charge of a nuclear power plant.

Engineers are judged to be proficient by Licensing Boards composed of Engineers; Doctors are judged to be proficient by panels composed of Doctors; Nuclear Power Plant Operators should be judged to be proficient by the Nuclear Regulatory Commission.

The Commission should use exams which demonstrate the proficiency of the operators, based upon clearly specified job requirements.

The use of any other testing technique does not demonstrate that an individual has the abilities to perform the required job of protecting the health and safety of the public.

QUESTION 5: Should a requirement be imposed requiring all senior operators to pass an Engineer In Training (EIT) or equivalent examination as a measure of basic technical expertise in addition to, or instead of, the two proposals in this notice? If such a requirement were in place, would it be necessary to require enhanced educational credentials for Shift Supervisors?

RESPONSE: The initial license examinations combined with the regualification examinations are adequate to ensure protection of the health and safety of the public. Very few states (if any) require regualification examinations to remain registered as a professional Engineer. The current license requirements appear to be far more beneficial than the passage of a one-time examination.

QUESTION 6: Independent of a degree requirement, is there a need for the experience requirements to be increased for the Shift Supervisor position? Are the proposed requirements called for in the two alternatives sufficient?

RESPONSE: No. The current requirements are adequate. No. The proposed requirements called for in the two alternatives do not demonstrate the abilities of any individual to safely be in charge of the operations of a commercial nuclear power plant.

Does the design engineer of a commercial jet airplane have the capabilities to safely fly such a plane? No! Not unless he/she has demonstrated the ability to do so by passing the required pilot's licensing examinations! So it should be for the operators of a nuclear power plant. All required knowledge should be demonstrated on the initial and/or regualification exams.



### SUMMARY AND GENERAL COMMENTS

The conclusion provided with the issuance of this proposed rule says " the overall effect of the proposed amendments would be beneficial and would result in greater plant safety." If the increase in plant safety and protection of the general public is indeed the goal of this proposed rule, several other alternatives should be re-considered. The proposed rule may indeed eventually lead to an increased level of safety; however, it will do so at the expense of several years of reduced levels of safety.

As an engineer who has performed numerous Nuclear Safety Evaluations in accordance with the criteria of 10CFR50.59, I can not sanction the issuance of this proposed rule. It is not the best way to achieve the goal of enhanced operational safety. Nor does it even assure that better qualified individuals will become senior operators, since the proposed criteria do not directly apply to nuclear plant operations.

The requirements for obtaining an ABET Accredited College Degree include many credit-hours of totally unrelated studies such as Philosophy, History, etc. The E.I.T. and P.E. exams demonstrate only that an individual has, at one point in time, been capable of performing fundamental engineering calculations. These criteria are irrelevant with regards to the safe, legal and efficient operation of a nuclear power plant. These criteria do not indicate any specific ability which would ensure an individual can perform well under stress, determine the appropriate response to a transient, or supervise people in charge of a nuclear power plant.

I hope the Commission will seriously evaluate these comments. I have provided them because I honestly believe that the proposed rule may sacrifice the short-term safety of commercial nuclear power plants. It may only marginally increase the long-term safety, since the proposed rule will not necessarily lead to any useful improvement in the technical expertise of senior operators. Any reduction in the level of power plant safety for any period of time should not be approved.

Enhanced safety could be achieved by requiring an upgrade of training and requalification programs which define any specific enhancements to the senior operator job requirements. These upgraded programs could be implemented with no reduction in the level of safety provided by plant personnel, and with minimal impact upon the morale and performance of individual operators.