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SEP 2

Mr. Samuel J. Chilk, Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Attn. Docketing and Service Branch

SUSQUEHANNA STEAM ELECTRIC STATION
COMMENTS ON PROPOSED SENIOR
OPERATOR DEGREE REQUIREMENTS
PLA-2726 FILE R41-2/A17-11

Docket Nos. 50-387
50-388

Dear Mr. Chilk:

Pennsylvania Power and Light Company has the following comments on the advance notice of proposed rulemaking (ANPRM) for 10CFR50 and 55 related to degree requirement for senior operators at nuclear power plants. This letter includes comments which address the questions/concerns identified in the ANPRM and those of Commissioners Thomas M. Roberts and James K. Asselstine.

GENERAL COMMENTS

PP&L opposes this advance notice of proposed rulemaking. It is our opinion that rulemaking which imposes formal educational requirements on senior operators would have a net negative impact on the safe operation of a nuclear power plant. This is based on the belief that, if promulgated, this rulemaking would eventually result in a less experienced operator at all levels (both licensed and non-licensed) since capable and experienced operators would leave the operations department due to a lack of viable career path; nor could highly motivated individuals be recruited for the operator positions. Additionally, degreed engineers would probably use the senior operator position as a "stepping stone" to enhance their career opportunities, thus making the senior operator position a transient one.

Although the ANPRM states a consensus (of NRC sponsored studies following the TMI accident) indicated that greater technical and academic knowledge for operators would be beneficial; PP&L believes this is being achieved through the STA program. We see no benefit in removing the STA position and replacing it with the degreed SO position.

If a degreed senior operator position on shift is to be required, PP&L suggests an alternative be considered where a shift management position is created that would oversee operational activities associated with all units on a site. This position would be in addition to the existing shift organization and would be filled by a degreed individual who holds a senior operators certification. All other senior operators on shift would not be required to

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hold a degree. We believe this alternative would satisfy the Commission's concerns, while preserving the existing shift structure. It also allows a non-degreed operator the opportunity to progress to the senior level thus maintaining a highly competent contingent of operators on shift. The shift management position has an added advantage in that a degreed individual would, in an emergency situation on a backshift, immediately assume the highest emergency plan position. In addition to having a degreed individual in charge, this would maintain the integrity of a highly experienced shift operating staff.

Comments to the specific questions identified in the ANPRM are addressed below.

ANPRM QUESTIONS

1. Is January 1, 1991, a feasible deadline for requiring senior operators to be degreed and licensed, and if not, what should the deadline be?

   Comment

   January 1, 1991 is not a feasible date. Any implementation date would have to be tied to the effective date of the regulation, otherwise utilities will be forced to implement the ANPRM immediately (i.e. degreed RO candidates would be required for the next RO training class) in order to meet the proposed effective date of January 1, 1991. As proposed this ANPRM will immediately eliminate current non-licensed operators (presently non-degreed) from consideration for the SO position. A more reasonable date for implementation would be seven years following the effective date of rulemaking. This will allow any current licensed and non licensed operators the opportunity for advancement to the SO position without a baccalaureate degree. See comment to question 3 regarding the ability of an RO/SO obtaining a degree by January 1, 1991.

2. What the implementation and operation costs of the contemplated rule to utilities would be?

   Comment

   Operational Costs - If this rulemaking is promulgated, it can be expected that utilities will afford RO's the opportunity to obtain a baccalaureate degree. This being the case, the utility would have to replace the RO obtaining an education for approximately two to three years. This replacement cost in terms of experience and knowledge of plant can be expensive. Also, newly degreed people, if used, traditionally have a high turnover rate from their first few jobs. This will result in a decrease in operator experience and an increase in operator training expenses.

Implementation Cost - The actual costs associated with a baccalaureate degree to the utility can be substantial. Expenses borne by the utility for each degree include: tuition costs, salary, living expenses, and miscellaneous costs (i.e. books, lab fees) as well as the costs associated with a replacement RO. An estimated annual cost to obtain a degree for one SO is $100,000. If this rulemaking is promulgated, PP&L expects to have four SO's in school per year for the duration of our license. The total cost to PP&L as the result of this rulemaking could exceed $14 million.

3. Assuming regular shift rotation, could the typical SO obtain an engineering or technical degree prior to January 1, 1991?

Comment

No. A typical Senior Operator would require a minimum of ten (10) years to obtain an engineering or technical degree. Logistics of obtaining degrees for current SO's would be difficult. Degreed courses are not normally readily available to SO's. Although a few lower level degreed courses are available at the utilities' nuclear training center, most upper level degreed courses are not available nor are these courses normally available by correspondence. Additionally, shift work would make attendance at college courses difficult. January 1, 1991 would not provide sufficient lead time.

4. What type of engineering degree would be appropriate, e.g., nuclear, electrical, mechanical, industrial, etc.?

Comment

If a degree is required for the SO position an engineering degree while preferred is not mandatory. Individuals in this position would still be required to complete Senior Reactor training programs and NRC examinations. Therefore, an acceptable individual with any baccalaureate degree who satisfactorily completes the required utility training programs would be an acceptable RO/SO candidate. This individual would also possess those characteristics obtained from the educational process.

The attributes that define a "good" operator are evaluated during the already established rigorous licensing program. These attributes; interpersonnel relationships, leadership, dexterity, performance under stress, etc. are not/can not be correlated to a specific type of degree (ie: the making of a "good" operator is not degree dependent). Successful completion of PP&L's licensing program adequately prepares the individual to hold an SO license at the Susquehanna SES; consequently, the requirement of a specific degree is not necessary.

5. What has been the industry's experience in securing college-equivalent credit for nuclear power plant training and/or work experience?

Comment

Approximately fifteen (15) industry organizations, both utility and vendor/suppliers, have gained college credit for some of their nuclear power plant training courses. Typically 20% to 30% of the technical courses in a degree could be completed through industry courses with equivalent credit recommendations. However, this credit is normally limited to lower level degreed courses. Courses available at PP&L that can be applied to a baccalaureate degree include in part, the licensed operator science and plant systems courses, the STA courses and the plant simulator courses. PP&L's training center at the Susquehanna SES has obtained 66 hours of college credit. Of this, approximately 46 hours would be awarded to an individual completing our SO program.

6. Should there be similar (operating) experience requirements for one-of-a-kind advanced reactors?

Comment

Yes. Advanced reactors will require experienced managers and operators just as much as the current nuclear generating facilities. Experience requirements should be enforced. The proper staffing of a one-of-a kind advanced reactor is of paramount importance. PP&L recommends obtaining the best qualified people available and subjecting them to a rigorous training program.

7. What are the combined impacts of requiring two years of responsible nuclear power plant experience, the degree requirements, and one year "hot" operating requirement for the position of SO?

Comment

The combination of these requirements will greatly decrease the available pool of manpower for senior reactor operator positions. Regrettably many good and competent operators may choose to leave or be forced out of the operator progression line due to degree requirements. The experience requirements are very important and should be maintained. The degree requirements are arbitrary and not supported by research data.

As a practical matter, for those units in extended outages of 6 months or greater, requiring "hot" experience will exacerbate the ability to add people to shift and frustrate an individual who is ready to receive the SO license but lacks experience.

8. Should the contemplated degree requirement for senior operators be supplemented with or replaced by intensive focused training requirements in severe accidents for nuclear power plant operators?

Comment

Comprehensive training programs focused on severe accident prevention and mitigation should replace the degree requirements for SO's. PP&L's RO and SO training and retraining programs already include such severe accident scenarios as station blackout events, ATWS events, multiple core damage transients, etc. and are structured such that additional severe accidents, as they are identified, are incorporated into these training programs. This training is known to increase reactor safety where as the addition of a baccalaureate degree has not. These programs and training are being continuously improved by additional industry initiatives such as revising the IDCOR individual plant evaluation (IPE's) methodology and upgrading the EPG's to Revision 4.

9. What are the appropriate criteria for assessing a utility's certification that an individual with a baccalaureate degree in other than engineering or the physical sciences has "demonstrated high potential" for the SO position?

Comment

An individuals potential for the SO position should not be based on any baccalaureate degree but rather on job performance and aptitude. Utility nuclear training programs include four distinct categories: nuclear theory, plant systems, operations (to include simulator training and plant transients) and in-plant training activities. Based on acceptable performance of these criteria no degree is necessary for the SO position. However, in response to the specific question, an individual with any baccalaureate degree would be an acceptable RO/SO candidate. Completion of PP&L's INPO accredited program would certify his ability to hold a SO license.

10. What are the implications of this contemplated rulemaking on decisions concerning future reactor designs?

Comment

If promulgated, this ANPRM would have to be waived for future reactor designs. As proposed the requirement for "one of the two years of operating experience be with a similar commercial nuclear reactor..." is not possible.

11. Should the NRC require specialized training in severe reactor accidents beyond inadequate core cooling and/or require extension of emergency operating procedures into the realm of more severe accidents instead of or

in addition to baccalaureate degrees? What are the implications of the work by IDCOR for the qualifications, training, and emergency operating procedures for licensed reactor operators and senior operators?

Comment

NRC should consider increased training for certain EOF/TSC personnel in severely degraded core accident scenario's.

Subsequent to TMI, emergency operating procedures (EOP's) were revised to reduce their complexity and number, plus incorporate certain minimum strategies. Requiring additional procedures for such low probability events will negate these gains and culminate in a condition adverse to safety. Utilizing IDCOR at individual plants, IPE's are being developed that define plant specific characteristics/actions that can be utilized in training EOF/TSC and operations personnel to mitigate the effect and reduce the probability of these type accidents.

12. What is an appropriate cut-off date for allowing only one re-examination for those SO applicants without a degree who apply for a license just prior to January 1, 1991?

Comment

An acceptable cut-off date for allowing one re-examination would be six years after implementation of any rulemaking. Because the NRC presently limits the number of operator licensing examinations given to each plant per year, utility scheduling required for an SO re-examination, based on present NRC examination scheduling, is approximately two years.

13. The proposed rule would require an SO applicant to have a baccalaureate degree in engineering or the physical sciences from an accredited university or college. What should be the appropriate definition (e.g., Department of Education, ABET, etc.) for "an accredited university or college?"

Comment

If a baccalaureate degree is required it should be from a regionally accredited university or college such as the Middle States or southern States accrediting agencies or from the Accrediting Board for Engineering and Technology (ABET). However, ABET accreditation is not required. The best candidate to be "degreed SRO' is an operator with experience as an RO or SRO. The selected college program should allow the operator to earn his degree while working whenever possible or during brief sabbaticals from his normal job. College degree programs that are flexible enough to accommodate a working adult must be developed and accepted. University and college

programs with ABET accreditation are developed for full-time undergraduate students on campus. Thus the requirement of ABET accreditation could provide an insurmountable obstacle to the best candidates for this "degreed SRO" position.

14. What immediate impact will the contemplated rule have on operator morale?

Comment

This rule will be devastating to all current licensed and non-licensed operators' morale. Operators are competent people who feel the imposition of a degree requirement after they have proven their ability to safely operate the plant is a challenge to their competency. This rulemaking will be viewed as an additional "paper" qualification requirement which will block the advancement pathway to a SO license. As a result competent operators will leave the operations department for positions with better advancement opportunities. It can also be expected that remaining operators will harbor some animosity towards those operators that have obtained degrees. This will definitely affect operators "esprit de corps" and result in a less effective operator.

15. (Chairman Palladino believes) that the attached Table (1) correctly identifies the present control room staff as well as that envisioned by the ANPRM by 1991 and after 1991. Should other alternative control room staffing requirements be considered?

Comment

Yes. The Commission should consider an alternative staffing concept which would require only one degreed SO on a shift. This concept would establish a senior shift manager (management position) who is responsible for operational issues on both units. All other existing SO positions on shift would remain non-degreed (see general comments). Another option the Commission should consider would maintain the current STA program, as is. This program now provides additional technical expertise on shift.

16. TMI improvements in control room capabilities and staffing have been undertaken by the industry, i.e., STA's have been added, detailed control design reviews have been undertaken, safety parameter display systems have been installed, emergency operating procedures have been improved, and the combined SO/STA position has been approved by policy. To what extent have these improvements been effective?

Comment

The current system of Shift Technical Advisors provide expertise on shift that assists in the decision-making process. Because the STA does not have direct operational control of the plant, he is better

able to evaluate plant concerns from a technical perspective than is the SO who's primary responsibility is the safe operation of the plant. At PP&L, one degreed STA is integrated into each shift. He rotates with that shift, participates in shift turnover activities, reviews plant logs, maintain an awareness of plant configuration including operating conditions and planned activities. The STA also participates in shift retraining activities as part of normal shift rotation.

The post TMI EOP's are simple symptom based procedures that define a minimum strategy to follow for accident mitigation. They incorporate basic engineering which provides the best estimate response versus FSAR DBA response of the plant and operation. With the new EOP's operators are much better prepared than before TMI. Additionally, EOP's have had extensive peer review and therefore benefit from wide expertise and experience. SPDS has become a very effective emergency management tool because of its ability to reduce the amount of information available to a few specific parameters, plus its trending ability.

17. Requiring SO's in the control room to have a technical college degree will have an impact on RO's and AO's, especially with regard to a career path for these personnel. To what extent will the SO requirement drive out capable operators, and result in high personnel turnover and instability in the workforce?

    Comment

    At many nuclear plants the operations workforce already exhibit a high turnover rate. This is often caused by rotating shift work and the necessity to work weekends and holidays. The imposition of this rule will cause greater dissatisfaction on the part operations personnel. Many good and competent operators may choose to leave or be forced out of the operator progression line due to degree requirements.

    Elimination of the non-degreed SO will foreclose the operator's progression to management. Consequently, long term career advancement would be limited for present licensed and non-licensed operators. This will result in operators bidding out of operations to other plant organizations (maintenance, chemistry, health physics) so that they may eventually advance to management positions.

18. Presently one degreed engineer is required to be within 10 minutes of the control room or a member of the control room staff, the STA or the combined SRO/STA, respectively. While requiring a second control room operator to have a technical degree may enhance operator organizational status, professionalism and esprit de corps. will a second degreed engineer significantly improve operator performance beyond the STA or combined SRO/STA improvements? Will these improvements become apparent in the short term or the long term?

Comment

A degreed SO will not improve operator performance markedly. There is no correlation between a formal education (degree) and a licensed operators performance. Since the licensed SO has already been well trained in nuclear plant operations and has years of experience, it is unlikely that an SO would utilize his formal education (degree) experience. The SO needs to be an individual who has many years of nuclear plant operating experience, has developed superior leadership abilities and has the respect from RO's he supervises. These are not necessarily the attributes required for an individual required to evaluate technical issues. In response to TMI, utilities were required to add an STA position and have an SRO in the control room at all times. To date there is no substantiated evidence indicating this action has increased operational performance. However, evidence is available which indicates that enhanced training does improve operator performance. If this rulemaking is promulgated, the STA program, functions and technical expertise will be eliminated.

The operation of two large boiling water reactors requires years of experience. Normally a unit operates on-line in a steady state condition or is in a shutdown configuration. During these periods a SO needs years of experience to properly fulfill the demands of the position. It is doubtful that a degreed individual would remain in the position long enough to obtain this experience. This individual would find that the long duration between challenging events would be unchallenging and routine. Imposing an additional degreed inexperienced position will not result in the safe efficient generation of electricity.

19. What is the industry view about availability of new college graduates who can be trained in nuclear power plant operation or about the feasibility of having present plant operators pursue and obtain a technical college degree?

Comment

College graduates could probably be recruited and trained for operations work; however, they would not be satisfied with shift work. Obtaining nuclear plant experience for a RO/SO license would be difficult for a new college graduate. If promulgated, this rulemaking can be expected to eventually lead to a "less experienced" licensed operator. Years of operating experience can not be taught; therefore, the college graduate is not the best licensed operator candidate. Finally, many would use the SO position as a stepping stone to better career opportunities.

20. Should there be a numerical limit on the total number of "grandfathered" SO's at any particular plant"

Comment

There should be no limit on the total number of SO's grandfathered.

COMMISSIONERS QUESTIONS

The following comments are submitted per the request of Commissioners Thomas M. Roberts and James K. Asselstine.

Commissioner Thomas M. Roberts Questions

1. The extent that a formal degree requirement for senior operators is related to job performance.

Comment

There is no anticipated correlation between a baccalaureate degree for SO's and job performance. Experience, comprehensive utility training and proven competence at the AO and RO position are much more important.

2. Will requiring a baccalaureate degree for senior operators enhance public health and safety?

Comment

PP&L believes a reduction in quality operatious personnel can be anticipated if this rulemaking is promulgated (see comment to question 17) which may result in a net decrease in public health and safety.

3. What negative safety implications may result from this proposal.

Comment

If implemented, this ANPRM will probably result in a loss of experienced SO's and a decline in morale and quality at both the AO and RO positions. This will result in a lower overall experience level on shift.

Commissioner James K. Asselstine Questions

Comment on an alternative method for upgrading the engineering knowledge and understanding of reactor theory needed by licensed senior reactor operators...

Comment

PP&L believes the concept is sound; however, an industry standard of this type would require development by an industry organization such as INPO at utility management direction. PP&L understands the INPO accreditation program has evaluated methods to upgrade operator engineering knowledge which has addressed some of Commissioner Asselstine's concerns. A schedule for implementation of any additional programs that would be developed could not be estimated at this time.

In conclusion PP&L opposes this ANPRM because it will negatively affect operator morale at all levels, be very expensive in terms of manpower and implementation cost, will not enhance operator performance, and could conceivably have a negative affect on the public's health and safety.

We appreciate this opportunity to comment on the advanced notice of proposed rulemaking.

Very truly yours,

H. W. Keiser
Vice President-Nuclear Operations

cc: M. J. Campagnone NRC Bethesda
L. R. Plisco NRC Senior Resident