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OSU

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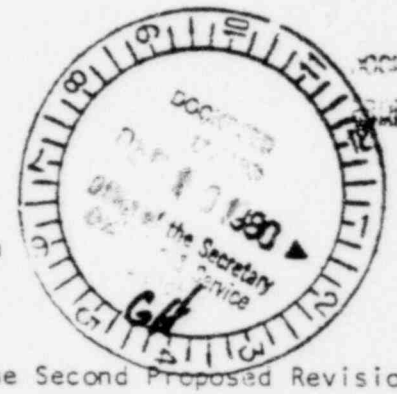
December 5, 1980



DOCKET NUMBER
PROPOSED RULE PR

mise re Reg Guide

Secretary of Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing and Service Branch

Gentlemen:

I have enclosed my comments on the Second Proposed Revision 2 to Regulatory Guide 1.8, entitled Personnel Qualification and Training. I thank you for consideration of my comments in your revision of this Regulatory Guide.

Sincerely,

Don W. Miller
Chairman

DWM:maa

cc: B.K. Hajek
A.C. DeVuono

Encl.

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COMMENTS ON DRAFT REGULATORY GUIDE 1.8

Personnel Qualification and Training

By

Don W. Miller, Professor and Chairman
Nuclear Engineering Program
Department of Mechanical Engineering
The Ohio State University
Columbus, Ohio

December 5, 1980

Regulatory Guide 1.8--Personnel Qualification and Training

Comments by Don W. Miller

1. I agree with the general philosophy of improving the training and education of nuclear power plant operational staff. The following comments are directed toward the university educational requirements delineated in Regulatory Guide 1.8.

2. I concur with your recommendation that a degreed engineer be assigned to the control room or be within timely access of the control room at all times. This objective can be achieved by either a degreed shift supervisor or a shift technical advisor (STA) with a B.S. Degree in Engineering.

3. I concur with your recommendation that a senior reactor operator (SRO) complete sixty semester hours of technical subjects rather than thirty semester hours as specified in the American Nuclear Society Standard 3.1. In my opinion, thirty semester hours cannot provide the desired university level depth in mathematics and thermal sciences. The thirty-hour requirement would only provide the student an opportunity to complete freshman engineering physics and mathematics through differential and integral calculus. The student would not have the opportunity to complete courses in thermal sciences which, in my opinion, are an absolute necessity for senior level plant operating personnel. (Re: p. 13, 1.4(c).)

4. I recommend that the Nuclear Regulatory Commission endorse the Institute of Nuclear Power Operations (INPO) Shift Technical Advisor (STA) Program in this Regulatory Guide. This recommendation is made despite my reservations concerning the depth in mathematics and thermal sciences which is specified in the INPO STA Program.

5. I recommend that approximately fifteen to twenty semester hours of non-technical courses in the areas of composition, speech, supervision, social sciences, etc. be added to the sixty-semester-hour technical requirement for the senior reactor operator and the shift supervisor. This recommendation is consistent with Alternative 3 in Appendix A. This recommendation is also consistent with the INPO STA requirement and, more importantly, could potentially qualify a student for a two- or three-year Associate Engineering Science Degree. In addition, if planned correctly, all the courses in this program would ultimately apply to an engineering degree, if the senior operator desires to become a shift supervisor.

6. As indicated above, I agree in principle with the ultimate objective of the B.S. Degree requirement for the shift supervisor, although I am concerned about the implementation date specified in Part D on Page 21. This concern is especially true for operating plants. As I am certain you are aware, a B.S. Degree is essentially a three-man-year commitment, a requirement to be completed in five calendar years. One would presume that the superior operators in an operating plant would pursue this program. This would occur when it appears we are facing a shortage of qualified operating personnel. I question the value of requiring operating personnel to spend this high a fraction of time in the classroom instead of in the control room. This, in my opinion, could lead to a short-term decline in reliability and safety at currently operating plants. I recommend that shift supervisors obtain the sixty-hour requirement by the recommended 1986 date and that the B.S. requirement be delayed until 1988 or 1989. I believe that with this delay the operating plants can implement the B.S. requirement with a minimum loss in operating time by available staff. This recommendation is made with the knowledge that the sixty-hour technical requirement includes what I believe are the most important technical courses in reactor physics, reactor engineering and the thermal sciences. Although the B.S. Degree indicates a level of commitment and attainment, the added benefit in understanding of the operation of the plant does not warrant removal of this fraction of personnel from the control room of operating plants.

7. Another concern in regard to implementation is the current shortage of engineering faculty. I have attached a recent article from Newsweek which describes the nature of this shortage. Since there will be a variety of courses taught on-site, this will be an additional load on available engineering faculty. In addition, one has to be aware that young faculty, in most cases, would not gain a significant career benefit through the on-site instruction of nuclear power plant personnel. The NRC is cautioned to carefully consider the circumstances for each individual power plant. Consideration should take into account location and engineering programs offered by nearby universitites. As you are aware, some plants are located where they do not have convenient access to universities that offer some of the more advanced coursework required in this Regulatory Guide. Therefore, a degree of judgment must be exercised by the NRC in enforcing the regulatory position specified by Regulatory Guide 1.8.

8. On Page 12, Item 1.3, there is an indication that the NRC may develop or approve special training programs to meet university level educational requirements. I am concerned that non-accredited special training programs will be considered adequate for meeting university educational requirements. This, in my opinion, would be inconsistent with the spirit of requiring university educated personnel on the operating staffs of nuclear power plants. This would also tend to mislead the public and, in the long run, would be a disservice to those people who complete the programs. In my opinion, there should be a long-range objective for senior reactor operators and shift supervisors to become career path positions. I believe that if operating personnel were to progress to engineering design staffs and corporate management positions, design of nuclear power plants and the management of their operations would improve. An accredited engineering degree would encourage career development.

In summary, I would rather see a delay in implementation of the university level education requirements rather than permit non-accredited university programs to be approved by the Nuclear Regulatory Commission.

9. Reference your discussion in Appendix A: As I indicated earlier, I agree that Alternative 5 is the preferred choice. However, one aspect in your logic in reaching this conclusion is questionnable. Completion of a degree after eighty semester hours may not be as easy as you imply. The eighty hours specified in Alternative 3 are, in general, courses that are more easily offered on the plant site, since there are fewer specialized laboratory courses. In the eighty semester hour requirement, there are laboratory courses in physics, chemistry and probably one in thermal science. With the exception of thermal science, these laboratory programs are available at many universities, including two-year community colleges. However, the typical B.S. Program in Engineering requires specialized laboratory courses at the junior and senior level. In Mechanical Engineering at Ohio State, for example, there are laboratory requirements in system dynamics, computer aided design and individualized design problems. All these courses utilize specialized equipment and unique laboratory facilities available only at universities with engineering degree programs. In most cases, they are not compatible with on-site offerings. Therefore, completion of the additional fifty semester hours may require a greater commitment to coursework at the university in lieu of completing courses at the plant site. This, in turn, would be a greater time commitment on the part of the student which would, of course, depend on the location of the university. Once again, I recommend that the NRC exercise judgment in implementing the B.S. Degree requirement and that you recognize the additional fifty semester hours may, in fact, be more challenging than the first eighty hours.

POOR ORIGINAL

Learning tools of the trade at Ohio State: It's not 'cost-effective' to be a professor

Help Wanted: Engineers

Accountants, step aside. The hottest new major on U.S. campuses is a mundane old trade, engineering. Undergraduate engineering enrollment has almost doubled in seven years. Job prospects are so dazzling that recruiters queue up in February to lure June graduates with some starting salaries nudging $24,000—the highest for any major in the class of 1980. There's one catch. By snapping up the 21-year-old engineers as fast as colleges can mint them, industry is discouraging them from attending graduate school. This has already created a critical shortage of faculty to train future engineers and, more alarming still, threatens what a new White House report calls "a loss of [America's] competitive edge."

Barely a decade ago the decline in defense and aerospace spending, notably Congressional cancellation of the SST, caused massive layoffs of engineers. Some mopped the floors of laboratories that they had once directed; others drove taxicabs or peddled hot dogs. Colleges cut back on courses and equipment.

Pacesetters: Today universities must deal not only with the flood of students but with a broader curriculum as well. New interest in synfuels and coal conversion techniques has spurred students toward "energy engineering"—mechanical, electrical and chemical. The pacesetting schools, among them MIT, Stanford, Carnegie-Mellon and Ohio State University, are increasing their concentration on computer sciences. Some fundamentalists, such as California Institute of Technology's Roy Gould, believe that engineering education should be sufficiently broad based to prepare students for a variety of future jobs, but he understands the immediate demand. "Industry is moving heavily into computer-aided design and drafting," Gould says. "Schools must follow, and we are wrestling with it now."

This fall's freshman class contains more than 100,000 aspiring engineers. Yet as Karl Willenbrock, a member of the National Science Foundation and Department of Education task force that issued the White House report, points out: "If we could double the number on my campus [Southern Methodist University], industry would love us." Even as things stand, colleges can hardly cope with today's enrollment tide. Professors complain of lecture classes numbering 400 students where 50 should be the maximum, and of twenty students in labs that were designed to accommodate three. Laboratory equipment is frequently obsolete; it could take as much as $1 billion to modernize it at every school. To institutions like Clemson University in South Carolina, the dilemma appears virtually insoluble: operating labs in shifts eight hours a day wears out equipment faster still, but a 7 per cent budget cut ordered by the state legislature crushes hope of replacing it.

By far the greatest problem is a lack of instructors. There are presently 2,000 faculty vacancies nationwide, according to one study. "It's not cost-effective to go on for a Ph.D.," says Eric Holstege, a Caltech senior in computer science. His salary as a teaching assistant during the four to five years necessary to obtain a doctorate would be a niggardly $7,000, compared with a minimum of $23,000 in business. Many universities are turning to foreign doctoral candidates to help flesh out threadbare teaching staffs, but undergraduates sometimes find it difficult to learn from these teaching assistants because of language and cultural barriers. (Foreign students collect one-third of all advanced engineering degrees awarded in the United States and often take their skills back home with them.) Most dismaying of all, warns Dr. George Ansell, dean of engineering at Rensselaer Polytechnic Institute in Troy, N.Y., the teacher gap could force schools to lower standards. "All Ph.D.'s are bright," Ansell says. "The challenge is not to hire garbage in a shortage."

Faculties might be leaner still were it not for the intangible perks of university life: freedom and scholarship. Loren Platzman, an MIT graduate, left Bell Laboratories to teach at the University of Michigan—absorbing an $8,000 salary cut en route. "I didn't really like the life at Bell—it was sort of regimented," says Platzman, now an assistant professor at Georgia Institute of Technology. "Here I can pick my own research problems." To survive financially, Platzman plans to spend summers working as a consultant, as do many of his colleagues. In fact, mixing industry with academia turns out to be quite yeasty. Full-time engineers enlisted to teach part time add a new dimension to student experience, report officials at Georgia Tech. Ohio State—where nearly two-thirds of last spring's total job offers went to engineers—has been aggressively recruiting faculty from local industry.

Appetite: "We simply cannot afford to wait for the slow workings of the marketplace," concludes the White House report, which recommends increased Federal support to engineering schools, fellowships for graduate students and tax incentives to encourage donation of equipment by industry. Industry has taken a few gingerly steps toward assuaging its appetite for engineers. San Francisco's Bechtel Group, which foresees industry-wide openings for 80,000 synfuels engineers alone by 1990, is financing scholarships totaling nearly $300,000. General Electric, General Motors and Boeing recently launched a new productivity center at RPI with financial commitments of $1 million. Its goal: to give talented students experience in solving real industry problems—and, by no coincidence, to render concrete results to their benefactors. Outside Boston, Dr. An Wang, president of Wang Laboratories, has founded a graduate school of his own to train "people who can lead a team of software developers." The rebuilding process has begun, and perhaps in time it will counter U.S. industry's predilection for what one engineering professional ruefully calls "eating its seed corn."

ELIZABETH PEER with LUCY HOWARD in Washington and bureau reports