

UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

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- Public Meeting -

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1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION

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4 BRIEFING ON
5 PROPOSED RULE ON DEGREED OPERATORS

6 ***

7 PUBLIC MEETING

8 ***

9 Nuclear Regulatory Commission
10 One White Flint North
11 Rockville, Maryland

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13 WEDNESDAY, SEPTEMBER 7, 1988
14

15 The Commission met in open session, pursuant to
16 notice, at 10:03 a.m., the Honorable LANDO W. ZECH, Chairman of
17 the Commission, presiding.

18 COMMISSIONERS PRESENT:

19 LANDO W. ZECH, Chairman of the Commission

20 THOMAS M. ROBERTS, Member of the Commission

21 KENNETH ROGERS, Member of the Commission
22
23
24
25

1 STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

2

3 S. Chilk V. Stello

4 Z. Rosztoczy W. Lahs

5 E. Beckjord T. Murley

6 M. Malsch

7

8 AUDIENCE SPEAKERS:

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10 J. Persenski

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P R O C E E D I N G S

[10:03 a.m.]

CHAIRMAN ZECH: Good morning, ladies and gentlemen. Mr. Carr is on travel and will not be with us this morning. Today we'll hear from the NRC staff concerning a proposed rule which would require future senior reactor operators licensed by the NRC to possess a Bachelor's degree. The proposed rule, the proposed degree rule and an alternative proposed by the NRC staff are described in SECY 88-245, which I understand is available as you enter the meeting room today.

In addition, I understand that copies of the handouts to be used during the briefing are also available. This meeting is an information briefing. Do any of my fellow Commissioners have any opening comments to make before we begin?

[No response.]

CHAIRMAN ZECH: If not, Mr. Stello, you may proceed.

MR. STELLO: Thank you, Mr. Chairman. In a moment, I'll turn to Zoltan Rosztoczy to do the briefing. But before I do, I thought I'd point out that this issue is an issue that's been before a number of commissions. In fact, the issue arose in July 1979 when none of the present Commissioners were even on the Commission at that time. It has a very, very long history. It has been with us for a very, very long time.

It's been my observation and the feedback that I get

1 from others as well, but from my visits to the plant, that this
2 continues to be an issue of major concern to operators. I
3 think the bottom line issue is the fact that it's not decided
4 and has not been decided for so long.

5 So I have a simple message. And that's just simply I
6 think we ought to everything we can to get the issue decided as
7 soon as we can. I think the lack of bringing this issue to
8 closure is more of a concern to me than whatever the closure
9 might be. So I think I would urge that we find a way to
10 finally bring the issue to some decision making, get a decision
11 made, and get on with it. I think that whatever that decision
12 will be will cause considerable settling in the industry.

13 With that, let me turn to Dr. Rosztoczy to begin the
14 briefing.

15 MR. ROSZTOCZY: I will be using the briefing handout
16 and I will be referring to the pages of the handout as we go
17 on. The first page of the handout is the outline of the
18 presentation. I will be outlining the purpose of today's
19 briefing and I will provide you with background information on
20 the proposed rule. I will describe the proposed rule in some
21 detail, what will it require. I will mention the policy
22 statement that will be issued concurrent with the rule and give
23 you some idea about the impacts that the rule would have, both
24 the benefits and the potential drawbacks of the rule.

25 Finally, I would like to present the potential

1 alternative that you might want to consider. Turning now to
2 the second page, the purpose of today's briefing. Today's
3 briefing is basically -- the purpose is basically three-fold.
4 We would like to present to you, describe to you the rule and
5 present the background for the rule. We would like to offer a
6 potential alternate approach that you might consider. And then
7 we would like to obtain the Commission's decision regarding the
8 rule.

9 We have prepared the rule. It is in pretty much
10 finished form. So if you wish to proceed with the rule, it's
11 ready to go out for public comment. I am turning now to Page 3
12 of the background. As Mr. Stello mentioned, this rulemaking
13 has a long background. I am starting only from 1986, and more
14 recent even.

15 COMMISSIONER ROBERTS: That's correct. Because in
16 1982, the Commission had an advisory panel that strongly
17 recommended against the degree requirements and pointed out
18 some potentially negative aspects. And in 1984, the Commission
19 disapproved a proposed senior manager rule. So there is a lot
20 of background. I don't go back to '79, Vic, but that peer
21 panel in '82 could not have been more emphatic about their
22 disapproval of this notion. Excuse me. Continue.

23 MR. ROSZTOCZY: Following all of those events, in
24 1986 an advanced notice of proposed rulemaking was issued for
25 public comment. We have received 200 comments on the proposed

1 rulemaking and these were overwhelmingly negative in the sense
2 that they opposed a rule for degree requirement, but at the
3 same time, most the comments acknowledged the need for
4 additional training.

5 In SECY 87-101, 1987, we reported the results of the
6 public comments to the Commission and also offered three
7 options at that time. SECY 87-101 recommended that the
8 training issue be separated from the educational requirements
9 and presented the three options for consideration.

10 The Commission accepted the separation of the
11 training and the educational requirements and sent a staff
12 requirement memo to the staff in June of 1987 requesting that
13 the staff prepare a rule according to Option 1 of SECY 87-101.
14 The staff proceeded along these lines. In the meantime, we
15 have also discussed this issue with the ACRS and the ACRS
16 issued their report in August of 1987.

17 They also acknowledged that there is a need for
18 technical knowledge on shift, but they felt that the proposed
19 rule should be reconsidered due to the adverse affects.
20 Following --

21 COMMISSIONER ROBERTS: Well, now let's get it all
22 out. They strongly unanimously were opposed to degree
23 requirements for operators. Now, that's what they said and
24 that's what ought to be said in this meeting.

25 MR. ROSZTOCZY: Yes. They indicated that, that they

1 do not recommend to go ahead with the degree requirement rule,
2 but at the same time they emphasized that additional training
3 and additional knowledge on the shift would be beneficial.

4 COMMISSIONER ROBERTS: Okay. But let's say
5 everything and not be selective in what we omit or what we
6 volunteer.

7 MR. ROSZTOCZY: Following this, then we prepared the
8 rule, the actual rule to be issued and we presented the rule to
9 CRGR. CRGR reviewed it recently, in July of this year, and
10 they have issued their letter on it also.

11 COMMISSIONER ROBERTS: And what did that say?

12 MR. ROSZTOCZY: They said that while it is desirable
13 for SO's to have a degree, they do not see any evidence that
14 the rule requiring a degree is necessary. More recently, in
15 this month -- last month, August of 1988, we had the benefit of
16 a presentation from the industry. An industry group supported
17 by a number of utilities, conducted a survey of the operators
18 on the degree requirement and related questions. And they
19 documented the results in a report form which has been
20 submitted to the Commission recently.

21 The operator survey was conducted through the PROS
22 organization. This is the Professional Reactor Operators
23 Society. And their members were the ones who were surveyed.
24 The outcome of the survey indicated that they see some morale
25 problems in terms of reactor operators who do not have degree

1 advancement, and they see some problems in terms of senior
2 operators turnover because with having a degree and having the
3 opportunity to progress into other positions, they felt that
4 they would try to get out of shift work. Apparently the
5 operators, in general, prefer to get off from shift if the
6 opportunity shows up.

7 They also saw some negative impact on safety. These
8 findings from the PROS survey was very similar to the comments
9 that we have received from PROS during the comment period of
10 the advanced notice for rulemaking.

11 And turning now to Page 4 which describes the SECY
12 87-101 options. There are basically options offered. One of
13 them is the degree requirement which would require that after a
14 certain date, every senior operator, in order to receive a
15 senior operator license, would have to have a degree. The
16 result of this would be that eventually there would be two
17 senior operators on shift with degrees.

18 The second option was a rule on a senior manager with
19 degree. This option instead of requiring that the senior
20 operators possess a degree, would simply require that on each
21 site, there would be a senior manager who has both a degree and
22 an SO license on shift at every time.

23 And the third option which was described in SECY 87-
24 101 was the policy statement option. In that case, there would
25 be no rule issued at all. There would be only a policy

1 statement. In the first option, the degree requirement would
2 also have a policy statement with it. And then I will come
3 back to the alternate approach which is kind of an updating of
4 the second option. We are recommending that if that goes
5 forward, that that would have a policy statement going with it
6 also.

7 So all three of these options do include the policy
8 statement and it would be basically the same policy statement.

9 The purpose of the proposed rule is to upgrade
10 operating, engineering, and accident management expertise on
11 shift. It would require that a Bachelor's degree in
12 engineering, engineering technology, or physical sciences must
13 be possessed by anyone who wants to apply for a senior
14 operator's license.

15 It does not have an equivalency statement. Some of
16 our other regulations say that an engineering degree or
17 equivalent. This rule would not have that. It would also
18 require two years of nuclear power plant experience which is
19 the same as the present requirement, but it would be more
20 restrictive in one respect, that it would require at least one
21 year out of these two be spent as an operator at greater than
22 20 percent of power.

23 The current requirements for someone who already
24 possesses a degree do not specifically require operating
25 experience. So someone with a degree and the two years of

1 nuclear power plant experience, for example engineering
2 experience, could qualify. Under the new rule, hands-on
3 experience would be required for at least one year.

4 Current regulations also provide for some exceptions
5 to facilitate special cases, like new plants starting up or
6 plants which have been shut down for a relatively long period
7 of time, and we would carry those over so those exceptions
8 would apply in this case also. In connection with those SO's
9 who already have an SO license, there would be a grandfathering
10 clause which will permit them to retain their SO license for
11 their life, and it would also permit them to obtain a new SO
12 license if needed without possessing a degree.

13 So for example, if somebody has an SO license for a
14 pressurized water reactor today, and if he happens to change
15 jobs maybe ten years from now and moves to a boiling water
16 reactor and needs an SO license for that, he could apply for
17 the SO license even though he doesn't possess a degree. A
18 degree would not be required. The rule will go into effect
19 four years after the effective date of the rule. So anyone who
20 possesses a license at the effective date would be
21 grandfathered.

22 We expect that the actual rulemaking would take
23 approximately a year, so it would be approximately five years
24 from now, and then it would go into effect. And we certainly
25 feel that's sufficient time for those operators who intend to

1 get an SO license, but do not intend to possess a degree, they
2 should be able to do it, to do it in that time period.

3 The rule is written in such a way that it would not
4 apply to research and test reactors. It would apply only to
5 power reactors. And as I mentioned earlier, the equivalency
6 statement has been eliminated so there would be no action on
7 that. Let me turn now to Page 6 which is a table, and it
8 compares the current requirement to the proposed requirement.

9 The top row indicates that the educational
10 requirement obviously would change. Instead of a high school
11 diploma required, it would require a Bachelor's degree. In
12 terms of the experience required for those who do not possess a
13 degree, it would stay the same experience. The only additional
14 requirement now is that you must have your SO prior to the cut
15 off date. Otherwise, you could not progress into the senior
16 operator position.

17 In terms of the experience required with a degree,
18 there have been two main requirements in the past. Two years
19 of responsible nuclear power plant experience and six months of
20 this at the specific plant where the license is obtained. We
21 would retain those two requirements and then we would add the
22 third one, which would require one year as an actual operating
23 experience.

24 Let me turn now to Page 7, which indicates the
25 staffing requirement for a one-unit plant. We selected the

1 one-unit plant just for simplicity, but basically the same
2 things will apply for multi-unit plants also. At the present
3 time, in terms of reactor operators, the requirement is that
4 either five or four people be present. If none of the senior
5 operators possesses a degree, then an STA is required. And in
6 that case, five people are on the shift. If one of the senior
7 operators possesses a degree, that can double up as SO and STA
8 at the same time. And in that case, there are only four people
9 required on the shift. So it's either five or four.

10 Under the new rule, the staffing requirement would
11 basically say the same. If both of the operators are
12 grandfathered operators and therefore do not possess a degree,
13 then an STA will be required in the future also and that would
14 make an operating crew of five people. However, if one of the
15 senior operators or if both of the senior operators possess a
16 degree, then only four people would be required on shift. So
17 it's basically the same and the expectation is that with time
18 going by, the shift would toward one or both SO's having
19 degrees so the shift would be definitely in the order of having
20 only four people on the shift.

21 Let me turn now to Page 8 of the handout, the
22 concurrent policy statement. In addition to the rule, at the
23 same time that the rule is issued in final form, there would be
24 also a policy statement issued. The purpose of the policy
25 statement would be to encourage the utilities to have their

1 employees achieve degrees. They would be encouraged to set up
2 programs which permit -- which leads to degrees, so utility
3 employees could take advantage of this.

4 Employees or operators would also be encouraged to
5 take advantage of these programs and to obtain degrees. In
6 addition to this, the policy statement would also encourage the
7 utilities to provide opportunities for senior operators who
8 want to progress into other positions in the utility
9 organization, including utility management, including
10 engineering and so on.

11 So the policy statement would put all this forth,
12 lateral with the issuance of the rule which would simply spell
13 out the actual requirements. Let me turn now to Page 9, which
14 lists the potential advantages of the degree rule. The main
15 advantage that we can see is that it would enhance capability
16 on shift to handle unusual events, abnormal events. Events
17 that they are not trained for exactly, but events where they
18 have to make certain decisions, react on the spot.

19 Another benefit would be that it would provide
20 improved career opportunities for senior operators. It would
21 be easier for them to progress into other entire more
22 responsible positions in the utility organization. The third
23 benefit would be that by this process, there would be an
24 infusion of people with operating experience into other fields
25 within the utility organization as well as maybe in other

1 organizations also involved in the nuclear industry and even in
2 the regulations. So it would provide more movement of people
3 with operating experience.

4 We also expect that the new rule would represent
5 improvement in terms of attentiveness to controls and plant
6 accommodations, and in terms of quality of communications in
7 the control room and between the control room and others. So
8 those are basically the main benefits that we see from the
9 rule.

10 The next page, which is Page 10 of the handout,
11 discusses the possible negative impacts. We do foresee a
12 reduction in overall experience on shift. And we do see this
13 for two reasons, one of them that there would be greater
14 turnover of the senior operators. By having more opportunities
15 to progress into other positions, senior operator positions,
16 they probably will stay shorter in this position than they
17 presently are staying.

18 The other reason is the pool of applicants from whom
19 the senior operators will be picked. At the present time, many
20 of them are coming up on the operating side where they have
21 been operating the plants for many years before they become
22 senior operators. Under the new rule, some of them would be
23 coming up along those lines, some of them would be coming
24 through a different pool. They would be coming more from young
25 engineers who have just graduated and obviously they would have

1 less operating experience than the first group of people.

2 The third disadvantage that we see is the
3 individual's morale and individual's potential for advancement
4 for the reactor operators. So these are reactor operators who
5 do not have degrees. They would be more restricted. They
6 would have to get into a degree program if they want to become
7 senior operators. They couldn't progress the way it's done
8 today.

9 Let me turn now to Page 11, which discusses some of
10 the cost involved. When the advanced notice of rulemaking was
11 issued, one of the questions that we asked was what would be
12 the associated costs. We have received different types of
13 estimates. Different people approaching it differently. Some
14 were calculating the total number of dollars which would be
15 spent. For example, if the sent all of the operators to
16 college for four years before they continue as senior operators
17 in the plant, and came up with a relatively large number.

18 I do not have all of those numbers here. What we
19 have here is a listing of the estimates of how much does it
20 cost to have an accredited program on site for the operators so
21 they can enter into a degree program. The estimates for this
22 type of a program varied from \$250,000 to \$480,000 per year.
23 These were sent in about a year ago, so they could be slightly
24 out-of-date, but they're probably very close to what it
25 actually costs.

1 We have also received a little bit more information
2 on one of the programs, which is the Grand Gulf program, which
3 actually costs \$250,000. They have approximately 60 people in
4 the program. It is an accredited program administered by the
5 American Technical Institute and it is set up in such a manner
6 that it accommodates the needs and timing schedules of people
7 working in the plant, independent of what shift they are
8 working on.

9 For example, they offer some of the classes more than
10 once and if you are unable to take it at one time period, then
11 you can go and take it at another time period.

12 COMMISSIONER ROGERS: What degree does that program
13 lead to or is there more than one degree that's possible?

14 MR. ROSZTOCZY: I do not know the answer to that. My
15 guess would be it's probably more than one. Bachelor's in
16 nuclear technology is the answer.

17 COMMISSIONER ROBERTS: Who is the accrediting
18 organization? You say the program is accredited by whom?

19 MR. ROSZTOCZY: The way that colleges are being
20 accredited in the country, there are regional accrediting
21 bodies, four or five of these for the United States and each
22 cover a certain region. They are the ones who are accrediting
23 all the universities and colleges. The same organization is
24 accrediting this program. So it's up to the same. If a
25 university wanted to apply for accreditation, it goes to the

1 same regional organization.

2 COMMISSIONER ROGERS: Excuse me. That's regional,
3 not ABET?

4 MR. ROSZTOCZY: I believe it's called Regional
5 Accrediting --

6 MR. PERSENSKI: I'm J. Persenski from the Office of
7 Research. I believe that's accredited by the Southeastern
8 Association of Colleges and Universities. That particular
9 program.

10 COMMISSIONER ROGERS: Is it accredited by the
11 Accreditation Board for Engineering and Technology?

12 MR. PERSENSKI: I do not believe that program is.

13 CHAIRMAN ZECH: Thank you. Let's proceed, please.

14 MR. ROSZTOCZY: I would like to turn now to Page 12
15 of the handout, which is the potential alternative. After
16 hearing some of the negative comments on the proposed rule, we
17 were trying to look at other possibilities, basically with the
18 purpose of trying to retain the advantages that everybody has
19 acknowledged in connection with the rule. And at the same
20 time, trying to minimize the negative aspect.

21 Trying to put this together, we arrived back to the
22 second alternative in the original proposal which is the senior
23 manager approach. But we would like to supplement this with a
24 policy statement if this option is selected. This would
25 require an engineering degree as well as a senior operator

1 license for the senior manager. The senior manager would have
2 to be on-shift. There would be one senior manager per shift.
3 So there are a number of plants on the site where there would
4 be only senior manager. And he would be responsible for
5 integrative management. There are a number of issues which
6 would have to be worked out. If you wish us to proceed along
7 these lines, we have not worked those out yet, but we could do
8 it.

9 Let me turn now to the last page, Page 13 --

10 COMMISSIONER ROGERS: Excuse me. I just want to make
11 sure I heard that correctly. That approach is that the senior
12 manager could be responsible for more than one plant on-site,
13 more than one reactor on-site?

14 MR. ROSZTOCZY: That's correct.

15 COMMISSIONER ROGERS: A site manager, then.

16 MR. STELLO: For multiple unit sites.

17 MR. ROSZTOCZY: In connection with the single unit
18 site, we would be still working on the details, whether he
19 would have to be an additional person or whether he could --
20 worked out in such a way that he would, at the same time, be
21 also the backup senior operator. That would be something that
22 we would have to work on more before any recommendation.

23 Let me turn then to Page 13, recommendations. We
24 would like to recommend that the Commission consider the
25 alternate approach which would establish a senior manager

1 position. Second recommendation is that if the Commission so
2 desires, then the staff would develop a rule and policy
3 statement for the alternate approach. And finally, the third
4 recommendation is that the Commission decide how to proceed
5 with the proposed rule, whether to proceed with the proposed
6 rule.

7 If you decide to proceed with it as is, then we will
8 be ready to issue it for public comment. If you have any
9 comments or recommendations that we ought to consider before we
10 issue it for public comment, we'd like to hear those. That
11 completes my presentation.

12 MR. STELLO: We're through.

13 CHAIRMAN ZECH: All right. Any comments from my
14 fellow Commissioners? Mr. Roberts?

15 COMMISSIONER ROBERTS: Well, I would like to quote
16 from the summary the attitude survey of nuclear power plant
17 operation personnel, Powell Associates, August 1988. This
18 attitude survey on operations personnel will be a bold faced
19 opposition of the degree requirement for the SRO license.
20 Those operators surveyed expressed a conviction that the degree
21 requirement would have a negative impact on safety and
22 efficiency of nuclear power production, citing increased
23 attrition rates, lower morale among non-degreed operators, and
24 substantial problems with the recruitment of degreed engineers
25 in the operation.

1 I'm not going to read this whole thing. I got two
2 more sentences. Perhaps most significant was not this finding
3 itself, but rather how widely spread the opposition to the
4 degree requirement was among all, underlined, ranks of
5 operations personnel, including those already possessing
6 technical degrees and those protected by the anticipated
7 grandfathering provisions of the proposed rule.

8 For example, among licensed operators with a
9 technical degree, now this is awkwardly said, three responded
10 that safety would decrease under the proposed rule for everyone
11 who felt it would increase. And even in your presentations,
12 you say, in proposing this rule, you make the positive
13 statement we're going to have a decrease in experience on
14 shift. I am obviously very much opposed to this notion. Thank
15 you.

16 CHAIRMAN ZECH: Mr. Rogers?

17 COMMISSIONER ROGERS: Well, I've given this matter a
18 lot of thought and it seems to me to come down to ultimately
19 the question of what is the relationship to safety, that that's
20 our business. We've been told by Congress that's our only
21 business and it certainly is our principal concern and starting
22 point for everything. And when I look at all the documentation
23 that has been submitted to me and talk to people in the field,
24 I have not been convinced that the degree requirement for
25 operators is required for safety.

1 As Commissioner Roberts has pointed out, there have
2 been statements that it could be negative, but I certainly have
3 seen it as required for safety. And I'm disinclined to
4 establish a rule on a basis that is not clearly founded in
5 safety. There are a number of good spinoffs and long term
6 effects that are positive, could be positive, but I don't see
7 it as bearing a direct relationship to operation safety at this
8 particular time in terms of a degree requirement for operators.

9 However, I do feel that there is a relationship
10 between the presence on shift of an individual with the kind of
11 educational background that would allow that person to
12 analyze very difficult and unusual situations that go beyond
13 any of the training procedures that are in place. I understand
14 that the STA position which was created to deal with that has
15 really not worked out entirely satisfactorily, and so that it
16 is important to look at other possibilities.

17 And in coming to my position on this, I have to say
18 that I can't support a degree requirement for SRO's across the
19 board, although I do see its advantages and I do see why we
20 should encourage it. But I cannot go so far as to see that it
21 should be established by rule. I do see, however, this gap
22 between the kind of analytical and systems thinking based on
23 fundamental principles that it's highly desirable to be
24 present on shift in the event of an unusual situation.
25 Therefore, I am inclined towards something like the alternative

1 that is suggested here.

2 However, I have to say that I'm concerned about just
3 the nature of those degrees that would qualify. The program
4 which was cited here as an example at Grand Gulf, if it is not
5 ABET accredited, and ABET stands for Accreditation Board for
6 Engineering and Technology, which is a national organization
7 which accredits all engineering and engineering technology
8 programs in the United States, in addition to accreditation of
9 institutions by regional accrediting organizations, and there's
10 quite a substantial difference between those two types of
11 accreditation.

12 And ABET accreditation has very specific requirements
13 with respect to the kinds of resources that must be provided in
14 the training programs and educational programs that are not
15 necessarily those of a regional accrediting commission. So
16 that I think that one should look not only at the question of a
17 degree, but what kind of a degree, what's involved in that, so
18 that the objective, the safety objective is met.

19 And therefore, I am not entirely comfortable with the
20 range of degrees that were cited in the proposed rule because I
21 think it's too broad. And I would tend to want to see specific
22 requirement of an engineering degree from an ABET accredited
23 program and not expanded beyond that if we were to talk about a
24 degree requirement for anyone in any way, or in some sense the
25 equivalent which would be, in my view, a professional

1 engineer's license, might serve that purpose.

2 However, I am not in favor of the degree requirement
3 for SRO's across the board, although I think we should
4 encourage in every way, through a policy statement, the
5 programs which could lead to SRO's being acquired by those
6 individuals that really want ultimately to move forward in
7 management. So where I come down is that I like the
8 alternative approach that staff has presented.

9 However, I do have a problem with what was in the
10 SECY in that it seems to require the creation of a new
11 management line within the organization and it would seem to me
12 that that doesn't seem to be necessary as long as the
13 individual, the management individual who has charge of those
14 persons on shift has the degree, I don't see that it's
15 necessary for us to impose a newly defined line of management
16 within each organization.

17 So I'd like to comment on that further if we happen
18 to go that way. I do think that the SECY 84-106, which I have
19 not only -- could just get my hands on recently, and haven't
20 studied in great detail, seems to provide a mechanism that
21 would satisfy me and I know that's re-treading old ground, but
22 we're re-treading so very old ground on the degree requirement.
23 And my position as of now is that I feel that I would like to
24 see a degreed individual on shift, on every shift, in a
25 position of responsibility, but not necessarily require that

1 individual to be an SRO.

2 CHAIRMAN ZECH: Thank you very much. I guess first
3 of all I'd like to ask how many at this table do not have a
4 degree?

5 [No response.]

6 CHAIRMAN ZECH: I guess we all do. I wonder how many
7 in the audience do not have a degree.

8 [No response.]

9 CHAIRMAN ZECH: I don't see any hands up. I guess
10 perhaps that would mean that if we had senior reactor operators
11 with 15-20 years of experience, they probably would not be here
12 today to lend their experience to what we're about.

13 Let me just say this. I think in the Regulatory
14 Commission, our primary responsibilities are to bring the
15 benefits of nuclear energy to the public with the reasonable
16 assurance that the public health and safety will be protected.
17 That's fundamental. Our primary responsibility is safety and
18 we know that.

19 The second point I'd like to make is that if there is
20 to be a future of nuclear energy in our country or throughout
21 the world, in my judgment, the primary responsibility we have
22 as far as power plants are concerned, is to keep those plants
23 operating safely.

24 The third point I'd like to make is that in my view,
25 education provides an incentive to enhance operator

1 understanding of engineering and technical aspects of the power
2 plant. I believe that education encourages curiosity. It
3 encourages the use of our imagination. It encourages an
4 understanding. It adds the confidence of our thought-making
5 process. It broadens our interests. These are intangible
6 benefits, I will submit. But I do believe that education does
7 permit us and encourages us and allows us to make better use of
8 our human abilities.

9 It is my view that the migration of qualified and
10 experienced reactor operators upward into plant management will
11 raise the level of professionalism of the utility and will
12 contribute to improved plant safety. I've heard the polls,
13 I've heard the surveys, I've heard the other arguments, and I'm
14 giving you my personal view. I believe that professionalism
15 will be increased and that improved plant safety will result
16 from raising the education level as well as the training of our
17 control room personnel. That's my personal view.

18 Therefore, from the operator's standpoint, it seems
19 to me we are limiting their career opportunities. We are
20 precluding them from participating at this table or in this
21 audience. It's an unwritten policy, I believe we can conclude,
22 that only degreed personnel, in general, are allowed in the
23 management of the utilities. I agree that there are some --
24 acknowledge that there are some exceptions, but not too many.

25 Not all operators would want the added

1 responsibilities of management, but I don't believe we should
2 preclude those from attaining those increased responsibilities
3 if they so desire. From the utility management viewpoint, if I
4 were a utility manager, I would want to bring about an infusion
5 of operating experience into my utility management. I would
6 think that would add strength to my organization.

7 I would personally believe that, although difficult
8 to measure and intangible, that safety would be improved by
9 adding to professionalism and education in my utility, if I
10 were a utility manager. I would attempt to eliminate the gulf
11 between the control room and the board room, which I believe
12 exists now. I would attempt to remove that gulf, or at least
13 partially remove that gulf by upgrading professionalism, by
14 increasing plant safety. I think they would both come about by
15 encouragement of educational process of my very fine and very
16 competent control room operators.

17 I would attempt then to have a greater integration
18 between the control room and management. If I were a utility
19 executive, I would be confident that I would be adding strength
20 to my organization. I would also be adding safety in my
21 personal view. Well, those are my thoughts. I am encouraged
22 by my plant visits to note that many utilities have already in
23 place some very fine programs whereby they are indeed allowing
24 the opportunity for their control room personnel to achieve
25 degrees.

1 I ask this at most every utility I visit and I must
2 say that in my most recent visits during this past year, I have
3 been encouraged, in general, by recognizing that the utilities
4 have indeed placed some of the excellent programs in place
5 whereby their operators can voluntarily, and many times paid
6 for completely by the utility, achieve a degree.

7 So I think it's happening in many utilities. I am
8 only discouraged by the fact that not all utilities have as
9 aggressive a program as many do. I think a rule would be
10 helpful. A rule and a degree doesn't necessarily make an
11 operator a better operator. I fully recognize that. But I do
12 think for the long haul, we should be increasing
13 professionalism, increasing safety, and as intangible as it
14 might be, I think that that's why the subject has been debated
15 for so many years.

16 I, too, want to bring it to closure. I hope we can
17 do that soon, at least for the time being. I can't help but
18 feel though that unless we put in place some program that
19 appears to be attempting to improve professionalism and improve
20 safety, that some other commission in the future will be
21 wrestling again with this same issue.

22 I have great respect for my colleagues and the
23 different viewpoints. I simply feel that putting some kind of
24 a program in place that would allow the operators themselves to
25 have more opportunities to advance, have their strength

1 capabilities to management, is the right thing to do. And
2 almost even moreso from the utilities standpoint, I feel
3 they're not taking advantage of the talent we have.

4 I've been impressed by the operators that we have in
5 our plants. In general, I think they're excellent and I just -
6 - I simply don't feel that we're taking advantage of the talent
7 that we have. Well, those are my thoughts and I would ask for
8 any comments from colleagues.

9 COMMISSIONER ROGERS: Well, just that I think that
10 this is an issue that reasonable people coming to very
11 thoughtfully and carefully can come to somewhat different
12 conclusions on. It's not a very simple matter or it would have
13 been settled a long time ago. I certainly am not one who will
14 speak against education. It's been the better part of my life
15 for the last 30 years.

16 However, I think that we have to be clear on our
17 objectives and very clear on how we go about them using the
18 tools that are available to us as regulators. And I guess what
19 I really have trouble with is how we're using a rule to create
20 a situation that we think is a good situation, but we really
21 can't defend entirely on its direct relationship to immediate
22 safety concerns.

23 And I feel that NRC rules should be inviolable. They
24 shouldn't be subject to any discretion in a sense. And that to
25 create a rule which can't be directly connected with the safety

1 requirement, I feel weakness all NRC rules, and therefore, we
2 should try to avoid them.

3 So I think that the opportunities for education are
4 very, as the Chairman has stated, I agree really with
5 everything the Chairman has said in terms of the desirable
6 features of education programs and education opportunities.
7 But I stop short of agreeing that a rule is the proper tool to
8 use to help to encourage that kind of a situation.

9 It would require a certain procedure and I feel that
10 our requirements should be those that stand on a very, very
11 rock solid base, and that they should not be discretionary in
12 any way and, therefore, should not apply to situations in which
13 there is -- really there should be some room for discretion.

14 I believe that it's entirely appropriate for some
15 individuals to see the peak of their careers in the control
16 room. Degreed -- not degreed, but as reactor operators or
17 senior reactor operators, as the peak of their aspirations.
18 Because they have that kind of an interest and dedication and a
19 professional approach to that kind of activity. That does not
20 lead them to wish to go higher in the management chain of
21 command.

22 Management tends very often to become less technical,
23 less technically involved, and that individuals whose heart and
24 soul is in the technology of that particular plant, I could
25 envision feeling very, very contented and professionally

1 satisfied in an SRO position, without aspiring, in a sense, to
2 move up the management chain.

3 And therefore, I would see the control room
4 ultimately populated by people who wish to move ultimately into
5 management, and those who do not. And that both kinds of
6 individuals are important and can do a superb job in the
7 control room.

8 Therefore, I would want to provide opportunities for
9 those who ultimately want to move into management through the
10 acquisition of a degree as a very, very desirable and important
11 objective. But not necessarily one which we require to be the
12 case.

13 I also would like to see that experience in the
14 control room that comes from many years on the job. I think
15 retraining and refreshment is very important, so I think the
16 training programs are essential. But moving out of the control
17 room into management is not necessarily, in my view, what we
18 should expect for every person who has a professional attitude
19 in the control room. I don't necessarily equate aspirations
20 towards higher management with or against professionalism. I
21 think they're separate issues and that I can see a professional
22 class in the control room that ultimately might all have
23 degrees, but that might be just the way it eventually works
24 out. But I don't see the necessity of imposing that
25 requirement to achieve professionalism.

1 I would like to see us, in fact, think of other ways
2 to encourage professionalism in the control room and among the
3 operators rather than through a simple device of requiring a
4 degree. I think there's much more that we could do to
5 encourage that and I would be concerned that if, for example,
6 we passed a degree requirement rule, that we would then back
7 away from other possible ways of encouraging and developing
8 continued sense of professionalism in the control room.

9 So I think we've got hold of a difficult complex
10 problem. I've said I think somewhat my thoughts on it and I
11 respect the Chairman's opinions and statements because I think
12 they make a great deal of sense, but I would have to stop short
13 of a rule requiring a degree for all SRO's. I still would like
14 to pursue this alternative that is offered and explore that to
15 a further degree. I have some questions about that.

16 But I'd like to just raise one question with you as
17 to why in your proposal for a rule, why you did not include
18 research and test reactors in this because it would seem to me
19 that those are situations that even more require the
20 sophistication of the highest level of education in their
21 operation. And is there a reason why you felt that it was
22 inappropriate to extend your thinking of any kind of a
23 requirement in that direction, because it's automatically taken
24 care of by the situations in which they exist or whatever? I'm
25 just curious as to your thinking on that matter.

1 MR. ROSZTOCZY: I think basically the consideration
2 was that, in terms of public safety, they are less contributors
3 to the risk than the power reactors and maybe the requirement
4 wasn't needed. We can foresee in the university for research
5 reactor, senior operators who have been there operating a
6 certain plant for a long time without a degree, and we didn't
7 see the need for it.

8 COMMISSIONER ROGERS: I don't want to cloud the issue
9 by bringing that in. I think we have a problem in front of us
10 and I think we're talking about nuclear power plants and should
11 focus our attention on those. But I still have a concern about
12 how we handle the research and test reactor situations.

13 CHAIRMAN ZECH: Thank you very much. Well, as I
14 stated, my position really is in favor of a rule because I
15 really do believe that professionalism and safety would be
16 enhanced and I believe that a rule would increase safety and
17 increase professionalism. And although my colleagues have
18 differences, that's my position. But I would, first of all,
19 let me thank the staff for a very thoughtful presentation on a
20 very controversial and difficult subject and one that has been
21 discussed for a number of years.

22 I think you have done what we asked you to do. You
23 have additionally given us an option that I think is certainly
24 worth our consideration. I would ask my colleagues to
25 thoughtfully consider the paper before us. I do recognize the

1 importance of bringing to closure this issue. I would ask my
2 colleagues to, in their comments on the paper, perhaps to put
3 down any thoughts they may have that perhaps could attempt to
4 get some kind of a consensus on this, whether we go from one
5 extreme to the other. I recognize that perhaps a compromise of
6 some kind is necessary if we're going to make any progress at
7 all or really come to some kind of closure on this issue.

8 So I'd ask my colleagues to give their best thought
9 to it and perhaps in their comment could give their views that
10 might allow some kind of a consensus that would at least try to
11 bring this issue to closure without just doing nothing. In
12 other words, how best can we implement it, if we should at all.
13 I think the staff has given us what I consider are four
14 options.

15 One is the rule that they proposed with the SRO
16 requiring a degree in time, and along with that a policy
17 statement that would encourage education. The second would be
18 a rule regarding the senior manager. That is their alternative
19 approach, also with the policy statement. The third would be a
20 policy statement itself rather than a rule that would encourage
21 education. And the fourth I suppose, although not proposed,
22 but I suppose it's there, would be to do nothing. In other
23 words, the status quo.

24 So I'd ask my colleagues if they would give their
25 thought to what is the best way to come to closure on this

1 issue. What should we do to keep a focus on contributing to
2 safety. And what is the best way to resolve this issue. And I
3 hope we can come to closure on this in a reasonable length of
4 time, hopefully perhaps within the next week or so. So that's
5 what I would hope we can do. And again, I'd ask my colleagues
6 to give it their best thought and attention so that we perhaps
7 might accomplish this with the best result we possibly can for
8 this very difficult issue.

9 Are there any other comments from my fellow
10 Commissioners?

11 COMMISSIONER ROGERS: Well, just that I would ask
12 staff to think about this question of professionalism among
13 operators. Ways that we might approach that in addition to the
14 proposed way of the degree requirement. I think that there are
15 a number of things that might be done there and I would ask
16 staff to give some real thought to that question to look at the
17 operator group, to try to see if there aren't other ways that
18 we could encourage continued development of a sense of
19 professionalism among the operators to achieve the kind of
20 sense that they are deserving of recognition as professionals,
21 and what we might possibly do in that regard.

22 CHAIRMAN ZECH: I'd like to suggest though that that
23 may be a separate subject. I really would like to come to
24 closure on this.

25 COMMISSIONER ROGERS: No, absolutely. Not as a

1 condition for dealing with this, but just to take that on as a
2 separate matter.

3 CHAIRMAN ZECH: All right. Any other comments?

4 Thank you very much. We stand adjourned.

5 [Whereupon, at 11:05 a.m., the hearing was
6 adjourned.]

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CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events
of a meeting of the U.S. Nuclear Regulatory Commission
entitled:

TITLE OF MEETING: Briefing on Proposed Rule on Degreed Operators
Public Meeting
PLACE OF MEETING: Washington, D.C.

DATE OF MEETING: Wednesday, September 7, 1988

were transcribed by me. I further certify that said
transcription is accurate and complete, to the best
of my ability, and that the transcript is a true and
accurate record of the foregoing events.



Ann Riley & Associates, Ltd.

DEGREE REQUIREMENT FOR SENIOR REACTOR OPERATORS

PRESENTATION FOR THE COMMISSION

SEPTEMBER 7, 1988

ZOLTAN R. ROSZTOCZY, 49-23760

WILLIAM R. LAHS, 49-23774

OUTLINE OF PRESENTATION

- PURPOSE
- BACKGROUND
- PROPOSED RULEMAKING
- POLICY STATEMENT
- IMPACTS AND COSTS
- POTENTIAL ALTERNATIVE

PURPOSE

- ° PRESENT THE BACKGROUND AND BASIS FOR THE PROPOSED
PART 55 AMENDMENT
- ° OFFER A POTENTIAL ALTERNATE APPROACH
- ° OBTAIN A COMMISSION DECISION REGARDING PUBLICATION OF
PROPOSED RULE

BACKGROUND

- ° MAY 30, 1986 ADVANCED NOTICE OF PROPOSED RULEMAKING
- ° APRIL 16, 1987 SECY-87-101: ISSUES AND PROPOSED OPTIONS
 CONCERNING DEGREE REQUIREMENT FOR SENIOR
 OPERATOR
- ° JUNE 24, 1987 STAFF REQUIREMENTS MEMO
- ° AUGUST 12, 1987 ACRS COMMENTS
- ° JULY 14, 1988 CRGR MEETING
- ° AUGUST 4, 1988 OPERATOR SURVEY BY INDUSTRY

SECY-87 101 OPTIONS

- ° DEGREE REQUIREMENT FOR SOs, CONCURRENT POLICY STATEMENT
- ° RULE ON SENIOR MANAGER WITH DEGREE (SECY-84-106)
- ° AMEND POLICY STATEMENT ON ENGINEERING EXPERTISE ON SHIFT

PROPOSED RULEMAKING

- ° BACHELOR'S DEGREE IN ENGINEERING, ENGINEERING TECHNOLOGY, OR PHYSICAL SCIENCES REQUIRED FOR SOs.
- ° TWO YEARS OF NUCLEAR PLANT EXPERIENCE IS REQUIRED FOR SOs:
 - AT LEAST 6 MONTHS AT THE PLANT FOR WHICH LICENSE IS SOUGHT.
 - AT LEAST 1 YEAR AS A LICENSED RO AT GREATER THAN 20 PERCENT POWER.
 - EXCEPTIONS ALLOWED FOR APPLICANTS FROM PLANTS THAT CANNOT ACHIEVE 20 PERCENT POWER.
- ° EXISTING SOs (ON CUT-OFF DATE) WOULD BE GRANDFATHERED, FOR LIFE.
- ° TO GO INTO EFFECT 4 YEARS AFTER THE EFFECTIVE DATE OF RULE.

COMPARISON OF S.O. REQUIREMENTS

	CURRENT	PROPOSED
EDUCATION	H.S. DIPLOMA OR EQUIVALENT	BACHELOR'S DEGREE
EXPERIENCE	<ul style="list-style-type: none"> ° 4 YEARS RESPONSIBLE POWER PLANT EXPERIENCE INCLUDING 2 YEARS NUCLEAR PLANT EXPERIENCE 	<ul style="list-style-type: none"> ° SAME AS CURRENT REQUIREMENTS
REQUIRED	° 6 MONTHS AT THE SPECIFIC PLANT	
WITHOUT	FOR WHICH LICENSE IS SOUGHT	
DEGREE	° RO LICENSE FOR 1 YEAR	
		° MUST HAVE SO
		LICENSE ON
		CUT-OFF DATE
EXPERIENCE	° 2 YEARS RESPONSIBLE NUCLEAR POWER PLANT EXPERIENCE	° 2 YEARS RESPONSIBLE NUCLEAR POWER PLANT EXPERIENCE INCLUDING 1 YEAR AS RO AT GREATER THAN 20% POWER
REQUIRED	° 6 MONTHS AT THE SPECIFIC PLANT FOR WHICH LICENSE IS SOUGHT (NOT COUNTING TRAINING TIME)	° SAME AS CURRENT REQUIREMENT

MINIMUM REQUIREMENTS ON-SITE

STAFFING ONE UNIT

<u>CURRENT</u>	:	<u>FOUR YEARS AFTER FINAL RULE</u>
	:	
EITHER 2 SOs, 1 STA	:	EITHER 2 SOs (G), 1 STA
AND 2 ROs,	:	AND 2 ROs,
	:	
	:	
OR 1 SO/STA (D), 1 SO,	:	OR 1 SO (D), 1 SO (G)
AND 2 ROs	:	AND 2 ROs,
	:	
	:	
	:	OR 2 SOs (D),
	:	AND 2 ROs

NOTE: D = DEGREE
G = GRANDFATHERED

CONCURRENT POLICY STATEMENT WITH FINAL RULE

- ° ENCOURAGE LICENSED SOs TO GET DEGREES.
- ° ENCOURAGE UTILITIES TO PROVIDE PROGRAMS LEADING TO DEGREES FOR OPERATORS.
- ° ENCOURAGE UTILITIES TO OBTAIN COLLEGE CREDIT FOR TRAINING AND WORK EXPERIENCE OF OPERATORS THROUGH ARRANGEMENT WITH ACADEMIC SECTOR.
- ° ENCOURAGE UTILITIES TO ENHANCE OPPORTUNITIES FOR OPERATORS TO ASSUME MANAGEMENT POSITIONS.

POTENTIAL ADVANTAGES OF DEGREE RULE

- ENHANCES CAPABILITY TO RESPOND TO ABNORMAL EVENTS
- IMPROVES CAREER POTENTIAL FOR SOs
- INFUSES WHOLE PLANT ORGANIZATION WITH AN OPERATIONAL PERSPECTIVE.

POSSIBLE NEGATIVE IMPACTS

- ° REDUCTION IN OVERALL EXPERIENCE LEVEL ON SHIFT
 - GREATER TURNOVER OF SOs
 - REDUCED POOL OF POTENTIAL APPLICANTS

- ° REDUCED MORALE OF ROs WITHOUT DEGREES

COST

- ° COST ESTIMATES FOR ON-SITE TRAINING PROGRAM FOR ENGINEERING DEGREE VARIED FROM \$250K TO \$480K PER YEAR

- ° CURRENT PROGRAM AT GRAND GULF:
 - ACTUAL COST OF \$250K YEAR

 - SIXTY PEOPLE IN PROGRAM

 - AMERICAN TECHNICAL INSTITUTE RUNS PROGRAM

 - PROGRAM IS ACCREDITED

POTENTIAL ALTERNATIVE

- ° RETAIN ADVANTAGES, MINIMIZE NEGATIVE ASPECTS

- ° SENIOR MANAGER APPROACH OF SECY 84-106
 - ENGINEERING DEGREE AND SO LICENSE REQUIRED

 - SUPERVISOR TO WHOM OPERATING CREW RESPONSIBLE

 - RESPONSIBLE FOR INTEGRATED MANAGEMENT OF SHIFT OPERATIONS

RECOMMENDATIONS

- ° COMMISSION CONSIDER THE ALTERNATE APPROACH WHICH WOULD ESTABLISH A SENIOR MANAGER POSITION.
- ° IF DESIRED, STAFF WILL DEVELOP RULE AND POLICY STATEMENT FOR ALTERNATE APPROACH.
- ° IF COMMISSION DECIDES TO PROCEED WITH PROPOSED RULE, WHICH WOULD REQUIRE A BACHELOR'S DEGREE FOR SOs, APPROVE PUBLICATION OF PROPOSED AMENDMENT FOR PUBLIC COMMENT.



RULEMAKING ISSUE

(Notation Vote)

August 31, 1988

SECY-88-245

For: The Commissioners

From: Victor Stello, Jr., Executive Director for Operations

Subject: PROPOSED REVISION OF 10 CFR PART 55 TO REQUIRE DEGREES FOR SENIOR REACTOR OPERATORS

Purpose: To obtain a Commission decision on whether to publish a notice of proposed rulemaking that revises § 55.31 of 10 CFR Part 55 to require that each senior reactor operator (SO) hold a bachelor's degree from an accredited college or university.

Category: This paper covers a major policy matter. Resource estimates are Category 1.

Issue: Whether sufficient justification exists to revise 10 CFR 55 to require that SOs have bachelor's degrees from an accredited college or university.

Background: An Advance Notice of Proposed Rulemaking (ANPRM) was published on May 30, 1986 (51 FR 19561) that described a proposed rule to require a bachelor's degree in engineering or the physical sciences from an accredited institution for each applicant for a senior operator's license (Enclosure A). The staff prepared a summary and analysis of the comments in SECY 87-101, dated April 16, 1987, which presented several options for consideration by the Commission, and requested Commission guidance on which option should be developed. The options considered were:

1. Proceed with the contemplated degree rule and concurrent policy statement as proposed in the ANPRM. The policy statement would encourage utilities to develop a program to allow current ROs and SOs to obtain a bachelor's degree. This option would in the long term result in two Senior Operators on shift who have bachelor's degrees.
2. Propose a rule to require an individual on shift with a degree, similar to a Senior Manager as described in SECY-84-106, "Proposed Rulemaking Concerning Requirements for Senior Managers."

Contact:
M. Fleishman, RES
492-3794

3. Amend the Policy Statement on Engineering Expertise on Shift (50 FR 43621) to explicitly encourage licensees to develop programs leading to degrees, to utilize the combined SO/STA option, and to phase out use of a separate STA.

The Advisory Committee on Reactor Safeguards (ACRS) also considered the proposed requirement and discussed it at several meetings in 1986 and 1987. The ACRS strongly supported the concept of having engineering expertise on each shift (Enclosure B). They did not agree that requiring a degree for senior operators was the best approach though they agreed that specific technical knowledge should be required. They believed that, because of the concern about adverse effects raised by many knowledgeable individuals, the proposed rule should be reconsidered.

On June 24, 1987, in a staff requirements memorandum (Enclosure C), the staff was informed that the Commission had agreed to proceed with the contemplated degree rule and concurrent policy statement as proposed under Option 1 in SECY 87-101. The staff was directed to prepare and forward the proposed rule to the Commission for review and approval.

Discussion:

The staff has prepared a Federal Register notice (Enclosure D), that we believe is responsive to the Commission's directive. The CRGR reviewed the Federal Register notice and stated that while it is desirable for SOs to have a degree, there is no compelling evidence to indicate that a rule requiring a degree is necessary and it may be detrimental to safety. They recommended that the rule not go forward at this time.

The staff has considered comments from the Commission, ACRS, CRGR, and the public. The basic concept as described in the ANPRM, requiring a bachelor's degree for SOs and grandfathering current SOs, was retained; however, the following changes were made.

1. The rule is limited to applicants for nuclear power reactor SO licenses and does not apply to SOs for non-power reactors such as research and test reactors.
2. The option of accepting bachelor's degrees in other than engineering, engineering technology or the physical sciences, on a case-by-case basis with appropriate utility certification was eliminated. This option is still available via the exemption route as prescribed in § 55.11, Specific exemptions.

3. As requested by the Commission and various commenters, the cut-off date is specified as 4 years following the effective date of the rule rather than January 1, 1991.
4. The rule now clearly states that the one year of "hot" operating experience must be as a licensed operator. This was only implied in the ANPRM.
5. Since the 4-year period is specified and approximately an additional year would be required to accommodate the rulemaking process, it was felt that it would not be necessary to include the one reexamination feature for applicants without degrees who apply just before the cut-off date. The feeling is that there exists sufficient time for all applicants to apply for and receive their S0 licenses. Thus, only persons who have an S0 license on the cut-off date would be exempt from the degree requirement.

Finally, it should be noted, as indicated in the Federal Register notice (Enclosure D) and the Regulatory Analysis (Enclosure E), that regulatory guidance provided in Regulatory Guide 1.8 and NUREG-1021 would require revision if the proposed rule went into effect.

Current guidance in position C.1.e of Regulatory Guide 1.8, Revision 2, April 1987, "Qualification and Training of Personnel for Nuclear Power Plants," allows an applicant for a S0 license with a degree to have only 2 years of responsible power plant experience, none of which needs to be as a reactor operator. This would have to be revised if the proposed rule went into effect since the proposed rule would require a S0 applicant with a degree to serve as a R0 at greater than 20 percent power for at least 1 year. Furthermore, the current guidance indicates that a R0 applicant must have a minimum of 3 years of power plant experience of which at least 1 year shall be nuclear power experience. This would also have to be revised since it is inconsistent with the proposed rule which implies that an applicant for a R0 with a degree must only have 1 year of related nuclear power plant experience. Position C.1.d of this Regulatory Guide, on educational criteria, would also need to be revised to reflect the rule.

Also, because of the "grandfathering" provision and until all S0s have degrees, the current policy, as described in the Policy Statement on Engineering Expertise on Shift (50 FR 43621), would have to remain in effect to ensure that at least one person on each shift has a degree.

Although this paper has been generated in anticipation that the proposed rule will be published, the staff has continued

to search for an alternative proposal that retains the advantages of the proposed rule, while avoiding its possible negative aspects. We believe the benefits derived from implementation of the proposed rule, include: (1) vesting individuals who have the authority to direct operator response to off normal events with enhanced capability to analyze and understand events, thereby improving their capacity to lead shift operators in restoration of the plant to a safe and stable condition; (2) improving career potentials for shift supervisors by enabling growth both within and outside the Operations Department line organization, to positions historically reserved for individuals with technical degrees, thereby avoiding staff stagnation and deterioration; (3) enhanced professionalism in the control room, including attentiveness to controls, the condition of the plant and the quality of communications, spawned by individuals who see themselves in important, upwardly mobile careers; and, (4) serving to infuse the whole organization with an operational perspective. Some possible negative aspects of the proposed rule include: (1) reduction in the overall experience level on shift as the pool of potential applicants is reduced and the SOs with degrees move to more desirable work, and (2) reduced morale for ROs without degrees who cannot advance along the natural career path to the SO level.

The staff, in reviewing past initiatives against these advantages and negative aspects, believes that an approach similar to the one identified in SECY 84-106 has considerable merit and may deserve reconsideration by the Commission prior to the decision to issue the enclosed proposed rule. The SECY 84-106 approach proposed the establishment of a senior manager position which would require an engineering degree and an SO license, but with supervisory responsibilities such that the operating crew is accountable to this single manager. Regarding the senior management position SECY 84-106 states in part:

"The proposed rule was developed to combine technical and analytical expertise with operating experience in a senior manager responsible for integrated management of plant shift operations (e.g., supervising chemistry, health physics, maintenance, operations, security, etc.). The senior manager would be responsible for integrated management of shift operations and would be required to: (1) hold a bachelor's degree in engineering or a related physical science from an accredited institution, (2) hold

a senior operator's license for all units on site,¹ and (3) have five years of nuclear power plant experience, two of which have been as a licensed operator at a similar (same NSSS vendor) operating commercial facility. At least one year of the commercial licensed operating experience must have been at the senior operator level.

"As the individual responsible for integrated plant operations, the senior manager would be in a position of primary authority on shift and would be responsible for coordination of all plant shift activities. This responsibility would include managerial direction of all plant functions including chemistry, health physics, maintenance, operations, security, and technical services. Also, the senior manager would be responsible for providing the shift supervisor with the engineering and technical direction necessary to ensure that a nuclear power unit is in a safe and stable condition in the event of an off-normal situation."

The staff recognizes that this alternative could also achieve an increase in technical knowledge and staff professionalism on shift but would require updating SECY 84-106 to incorporate additional knowledge gained since its initial publication and to deal with actions, such as issuance of the policy statement on Engineering Expertise on Shift, which have occurred in the interim. The updating of SECY 84-106 would include revision of the proposed requirements and regulatory analysis, preparation of a backfit analysis that was not required when SECY 84-106 was originally written, and would incorporate a supplemental policy statement to encourage utilities to develop a program to allow current ROs and SOs to obtain a bachelor's degree.

Resource
Estimates:

It is anticipated that there will be relatively minor impact on NRC staff resources as a result of implementing the proposed rule. There may be some increase in the number of applications to process and tests to administer, due to the attempts of current ROs to become SOs prior to the cut-off date, but this should not cause a significant impact on the NRC staff. No new resource requirements are expected.

The Office of General Counsel has reviewed this paper and has no legal objection.

¹ In the event the person does not hold a license on all units, additional senior operators with degrees are required for those units for which the person does not hold a license.

Recommendations: That the Commission:

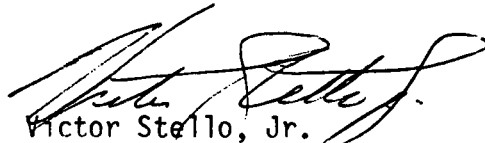
1. Consider the approach, as described, which would establish a senior manager position, in lieu of proceeding with the subject proposed rule. If desired, the staff will develop the required paper and a supplemental policy statement to encourage utilities to develop a program to allow current ROs and SOs to obtain a bachelor's degree.
2. If it decides to proceed with the subject proposed rule, approve the publication of a proposed amendment, as set forth in Enclosure D, which would require each applicant for a senior operator license to operate a nuclear power reactor to have a bachelor's degree in engineering, engineering technology, or the physical sciences from a accredited university or college. Those persons holding a SO license at the cut-off date, which is four years after the effective date of the rule, would be exempt from the bachelor's degree requirement.
3. Note that:
 - a. The notice of proposed rulemaking in Enclosure D will be published in the Federal Register, allowing 60 days for public comment.
 - b. Pursuant to § 51.22(c)(1) of 10 CFR Part 51 of the Commission's regulations, neither an environmental impact statement nor an environmental assessment has been prepared.
 - c. Pursuant to the Regulatory Flexibility Act of 1980, the proposed rule contains a statement that the Commission certifies that the rule will not, if promulgated, have a significant economic impact upon a substantial number of small entities and a copy of this certification will be forwarded to the Chief Counsel for Advocacy, SBA by the division of Rules and Records, ARM;
 - d. The Subcommittee on Nuclear Regulation of the Senate Committee on Environment and Public Works, the Subcommittee on Energy and the Environment of the House Committee on Interior and Insular Affairs, and the Subcommittee on Energy and Power of the House Committee on Energy and Commerce, will be informed.
 - e. A Regulatory Analysis is attached as Enclosure E;
 - f. Copies of the Notice of Proposed Rulemaking will be distributed by the Office of Administration and Resources Management, Division of Publication

Services to each affected utility licensee, and other interested parties.

- g. The ACRS has been regularly consulted concerning this proposed rule change and has separately provided formal comments.

Scheduling:

No specific circumstance is known to the staff which would require Commission action by any particular date in the near term.



Victor Stello, Jr.
Executive Director for Operations

Enclosures:

- A - Advance Notice of Proposed Rulemaking, 05/30/86
- B - Letter from W. Kerr to L.W. Zech, Jr. dated 08/12/87
- C - Memo from S. Chilk to V. Stello, Jr. dated 06/24/87
- D - Notice of Proposed Rulemaking
- E - Regulatory Analysis

Commissioners' comments or consent should be provided directly to the Office of the Secretary by c.o.b. Friday, September 16, 1988.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT Friday, September 9, 1988, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional time for analytical review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

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ENCLOSURE A

conduct all or a portion of the other duties that need to be performed at a federal animal quarantine station.

This document requests comments concerning whether the Department should take action to contract with private firms to conduct such activities.

Done at Washington, DC, this 27th day of May 1986.

J.K. Atwell,

Deputy Administrator, Veterinary Services.

[FR Doc. 86-12119 Filed 5-29-86; 8:45 am]

BILLING CODE 3410-34-M

NUCLEAR REGULATORY COMMISSION

10 CFR Parts 50 and 55

Degree Requirement for Senior Operators at Nuclear Power Plants

AGENCY: Nuclear Regulatory Commission.

ACTION: Advance notice of proposed rulemaking.

SUMMARY: The Commission is considering an amendment to its regulations to require, after January 1, 1991, that applicants for licenses as a Senior Operator of a nuclear power plant hold a baccalaureate degree in engineering or the physical sciences from an accredited institution. Other baccalaureate degrees from an accredited institution may be accepted on a case-by-case basis. This contemplated rulemaking action is due to a Commission decision to enhance the levels of engineering and accident management expertise on shift. The current requirement, for candidates with a baccalaureate degree, of two years of responsible nuclear power plant operating experience, would be amended to require at least one of the two years of operating experience be with a similar commercial nuclear reactor operating at greater than twenty percent power.

DATE: Comment period expires July 29, 1986.

Comments received after this date will be considered if it is practical to do so, but assurance of consideration cannot be given except as to comments received on or before this date.

ADDRESSES: Send written comments or suggestions on the proposed rulemaking to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Service Branch. Copies of the comments received may be examined at the NRC Public Document

Room at 1717 H Street NW., Washington, DC.

FOR FURTHER INFORMATION CONTACT: F. H. Rowsome, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Telephone: (301) 492-4813.

SUPPLEMENTARY INFORMATION:

Background

The issue of academic requirements for reactor operators has long been a concern of the Nuclear Regulatory Commission (NRC). In July 1979, "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations," (NUREG-0578)¹ made 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 licensees of the short-term STA requirements, i.e., that STAs should be on shift by January 1980, and that they should be fully trained by January 1981. In November 1980, "Clarification of TMI Action Plan Requirements," (NUREG-0737), provided further details to licensees regarding implementation of the STA position.

The qualifications of operators were also addressed by the 1979, "Lessons Learned Task Force," (NUREG-0585), the 1980 Rogovin report, "Three Mile Island: A Report to the Commissioners and to the Public," (NUREG/CR-1240), and the 1982, "Report of the Peer Advisory Panel and the Nuclear Regulatory Commission on Operator Qualifications," (SECY-82-162).² The consensus among these was that greater technical and academic knowledge among shift operating personnel 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. Option 1 of the Policy Statement allows an individual to serve in the combined Senior Operator/Shift Technical Advisor (SO/STA) role holding either a

baccalaureate degree in engineering, engineering technology, physical science, or a professional engineer's license. Option 2 permits continuation of the separate STA who rotates with the shift and holds a baccalaureate degree or equivalent and meets the criteria as stated in, "Clarification of TMI Action Plan Requirements," (NUREG-0737). The Commission also encourages the shift supervisor to serve in the dual-role position, and the STA to take an active role in shift activities.

The current advanced notice of proposed rulemaking is intended to extend the current level of engineering expertise on shift, as described in the Commission's Policy Statement on Engineering Expertise on Shift (50 FR 43621) and to ensure senior operators have operating experience on a commercial nuclear reactor operating at greater than twenty percent power, e.g., "hot" operating experience (Generic Letter 84-16). This Advance Notice of Proposed Rulemaking is the result of a Commission decision to consider an amendment to its regulations (Parts 50 and 55) and to obtain comments on the contemplated action to upgrade the levels of operating, engineering, and accident management expertise on shift.

Concurrent Policy Statement

The Commission also intends to prepare a concurrent policy statement which will encourage nuclear power plant licensees, i.e., owner-operators, to:

1. Implement personnel policies that emphasize the opportunities for licensed operators to assume positions of increased management responsibility;
2. Develop programs that would enable currently licensed senior operators and reactor operators to obtain college degrees; and
3. Obtain college credit for appropriate nuclear power plant training and work experience through arrangements with the academic sector.

Discussion

The purpose of the contemplated rulemaking is to upgrade the operating, engineering, and accident management expertise provided on shift by combining both engineering expertise and operating experience in the senior operator function. This is being done to further ensure the protection of the health and safety of the public by having personnel on shift with enhanced qualifications.

The NRC is concerned that operator qualifications to deal with accidents beyond design basis conditions warrant improvement. Operator training programs and related emergency

¹ 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 and/or copying for a fee in the NRC Public Document Room, 1717 H Street, NW., Washington, DC.

² SECY-82-162 and Generic Letter 84-16 are available at the NRC Public Document Room at 1717 H Street, NW., Washington, DC.

operating procedures, generally do not consider accident conditions beyond inadequate core cooling. There is general consensus that well qualified operators can substantially mitigate the effects of severe accidents. The Industry Degraded Core Rulemaking Program (IDCOR) industry group for example, has developed arguments that operators could substantially reduce the risk proposed by these conditions. The NRC is considering the need for more extensive severe accident training and emergency operating procedures as well as engineering qualifications for senior operators.

The policy statement on engineering expertise on shift (October 28, 1985; 50 FR 43621) provided an interim way of achieving more engineering capability on shift. Essentially the NRC is moving from interim requirements which provide engineering capability for accident conditions (the STA), to requiring engineering capability, and nuclear power plant operating experience in the same individual (the SO).

The contemplated rulemaking action would require that all applicants for a Senior Operator (SO) license after January 1, 1991, must have a baccalaureate degree in engineering, engineering technology or the physical sciences from an accredited university or college. Other baccalaureate degrees from an accredited institution may be accepted on a case-by-case basis. Degree equivalency will no longer be accepted. A baccalaureate degree in another subject area would be acceptable if the utility (licensee) certifies that the applicant has demonstrated high potential for the SO position.

The contemplated rule would apply only to the SO. Licensed SOs or otherwise fully qualified applicants prior to January 1, 1991, would be exempt from the degree requirement. Licensed reactor operators (ROs) would not be required to have a degree.

Current senior operators and senior operator applications accepted by the NRC prior to January 1, 1991, would be "grandfathered" with regard to the contemplated rule. It is recognized that "grandfathering" current SOs could result in undegreed SOs for an extended period of time.

The proposed concurrent policy statement will encourage previously licensed SOs to obtain degrees. It is the intent of the present advance notice of proposed rulemaking to specify that senior operator license applications received after January 1, 1991, would not be accepted by the Commission unless the license application holds a

baccalaureate degree from an accredited college or university.

In the past the NRC has accepted "equivalents" to the baccalaureate degree. The equivalents were based upon specialized utility training or other work experience. For the contemplated rule, equivalency would not be acceptable to the NRC in lieu of a degree. Because the Commission is not in a position to evaluate the academic equivalency of utility training, it encourages academic institutions to allow course credit for such equivalency based upon work experience or specialized training. Thus the proposed concurrent policy statement would encourage efforts to have the training accepted by the colleges for partial credit toward fulfilling the requirement of an accredited degree.

The degree requirement would not apply to licensed reactor operators (ROs). However, the proposed concurrent policy statement would encourage degrees for ROs. The Commission believes a degree requirement on shift, along with the concurrent proposed policy statement will not only enhance public health and safety, but will also provide a route for promotion by SOs.

The cut off date of January 1, 1991, for application for an SO license by individuals who are not degreed is chosen for three reasons. First, it will allow operators now in training sufficient time and notice to complete a degree before application. Second, it should not cause undue hardship on operators who are now in the process of preparing and training for the senior operator license. Third, licensees are encouraged by the Policy Statement on Engineering Expertise on Shift (Option 1) to move toward a dual-role SO/STA position. Furthermore, operators who are licensed as SOs prior to January 1, 1991, would be "grandfathered." The proposed rule would only allow one re-examination for SO applicants who apply for a license just prior to January 1, 1991. This would prevent essentially unqualified individuals (without degrees) from applying just to "beat" the deadline.

The contemplated rule also requires one year of "hot" operating experience for a degreed SO after January 1, 1991. This is simply a continuation of current NRC established policy to provide engineering and accident expertise on shift. It is essential that the SO know and understand plant operations as well as the theoretical, academic, and accident management aspects of the position.

The concurrent policy statement is planned as a way of encouraging

licensees (utilities) and the nuclear industry to provide incentives and management opportunities for SOs as well as improving the engineering capabilities of the on-shift crew. The SO with a degree and shift operating experience can become a valuable personnel resource for the utility, one who combines shift operational management experience with the potential for greater management responsibility. The policy statement will encourage licensees to provide that career path.

A regulatory analysis and a backfit assessment will be developed after the comments are received and evaluated, prior to notice of the proposed rulemaking and concurrent policy statement.

Invitation to Comment

Comments regarding the proposed rule are encouraged. Comments on the contemplated rule are solicited in regard to:

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?
2. What the implementation and operation costs of the contemplated rule to utilities would be?
3. Assuming regular shift rotation, could the typical SO obtain an engineering or technical degree prior to January 1, 1991?
4. What type of engineering degree would be appropriate, e.g., nuclear, electrical, mechanical, industrial, etc?
5. What has been the industry's experience in securing college-equivalent credit for nuclear power plant training and/or work experience?
6. Should there be similar experience requirements for one-of-a-kind advanced reactors?
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?
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?
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?
10. What are the implications of this contemplated rulemaking on decisions concerning future reactor designs?

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?

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?

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?"

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

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?

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?

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?

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?

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?

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

BILLING CODE 7590-01-M

TABLE 1
SECY-86-70
ONE UNIT⁽¹⁾

ONE CONTROL ROOM

I	II	III	IV	V
PRE-TMI	NUREG-0737	SECY 84-355	ANPRM	
			NOW TO 1991	1991 AND AFTER ⁽²⁾
1 SO 2 RO's	2 SO's 2 RO's 1 STA(E) ⁽⁵⁾	2 SO's 2 RO's 1 STA(E) ⁽⁵⁾ --OR-- 1 SO/STA(D) ⁽³⁾ 1 SO 2 RO's	2 SO's 2 RO's 1 STA(E) ⁽⁵⁾ --OR-- 1 SO/STA(D) ⁽³⁾ 1 SO 2 RO's	2 SO's ⁽⁴⁾ 2 RO's 1 STA(E) ⁽⁵⁾ --OR-- 1 SO(D) ⁽³⁾ 1 SO ⁽⁴⁾ 2 RO's, --OR-- 2 SO's(D) ⁽³⁾ 2 RO's
TIME				

1979

1979

1985

NOW

1991

(1) 10 CFR 50.54(M)(2).

(2) AS NON-DEGREED GRANDFATHERED SO'S RETIRE, OR OTHERWISE LEAVE THE INDUSTRY, CONTROL ROOM STAFFING WILL EVOLVE TO 2 SO's(D) AND 2 RO's.

(3) D = BACCALAUREATE DEGREE IN ENGINEERING OR RELATED SCIENCE (NO EQUIVALENCY).

(4) GRANDFATHERED.

(5) E = B.S. OR EQUIVALENCY.

Additional Comments of Commissioner Roberts

The additional comments of Commissioner Thomas M. Roberts on this ANPRM follow:

"Although I continue to believe that well-trained and qualified operators are important in assuring safe and reliable operation of nuclear plants, I am concerned that this rulemaking will negatively affect the level of experience and expertise of senior operators (the potential for negative implications was raised in the 1982 report of the Commission's Peer Advisory Panel on Operator Qualifications). I will be specifically interested in public comments on: (1) The extent that a formal degree requirement for senior operators is related to job performance, (2) whether requiring a baccalaureate degree for senior operators will enhance public health and safety, and (3) what negative safety implications may result from this proposal."

Additional Views of Commissioner Asselstine

The additional views of Commissioner James K. Asselstine on this ANPRM also follow:

"I have approved this advance notice of proposed rulemaking for the purpose of obtaining public and industry comment on the various options for upgrading the level of operating, engineering and accident management expertise on shift at operating nuclear powerplants. I agree entirely with the conclusion expressed in this advance notice that operator qualifications to deal with accidents beyond the design basis for the plants warrant improvement. Qualified operators can play a potentially significant role in mitigating the consequences of severe accidents. However, in order to carry out this role, operators must have sufficient knowledge of engineering and reactor theory to understand plant behavior under severe accident conditions."

"Although considerable progress has been made in recent years in improving operator training programs and plant emergency operating procedures, these training programs and procedures generally do not consider accident conditions beyond inadequate core cooling. Moreover, despite the improvements in reactor operator training, recent experience with NRC-administered reactor operator requalifications examinations indicates that some operators are having difficulty in retaining the level of knowledge of engineering and reactor theory needed to deal effectively with design basis events. These indications of weakness in operator knowledge of engineering and reactor theory, the absence of emergency procedures to deal with beyond design basis events, and the reliance on operator actions as one means of mitigating the effects of severe accidents all point to the need for more extensive knowledge of engineering and reactor theory on the part of plant operators, and particularly those operators holding senior

reactor operator (SRO) licenses and serving in the position of shift supervisor.

"Although I believe that additional engineering knowledge is needed by licensed senior reactor operators, I am not satisfied either with the approach recommended by the NRC staff or with the position adopted by the Commission in this advance notice of proposed rulemaking. The NRC staff proposed that after January 1, 1991, all applicants for a senior reactor operator license hold a baccalaureate degree in engineering or a related science from an accredited institution. In addition, the staff proposed a requirement that after January 1, 1991, at least one SRO per shift at a nuclear powerplant (the SRO serving as the shift manager) meet the degree requirement. For purposes of this advance notice, the Commission accepted the staff's first recommendation but not the second. The practical effect of the Commission's position is to exempt forever from the degree requirement any person holding an SRO license on January 1, 1991."

"While the staff and the Commission proposals would bring about some improvement in the engineering knowledge of some licensed reactor operators, both of the proposals suffer from a number of disadvantages. First, it is not clear that requiring a baccalaureate degree in engineering provides the best means for assuring that senior reactor operators have the knowledge needed to carry out their responsibilities. Some courses required for an engineering degree may well be irrelevant to an understanding of reactor behavior during accident conditions. At the same time, some engineering knowledge and reactor theory needed to understand and cope with beyond design basis accident situations will not be covered by the courses needed to obtain a baccalaureate engineering degree. Second, imposing a degree requirement for SRO's is likely to result in the loss of some experienced and skilled reactor operators. After 1991, experienced reactor operators (RO's) will not be permitted to become SRO's without obtaining a degree, and the SRO's without a degree will not be able to advance to the position of shift manager or supervisor. Third, by focusing on degree requirements for SRO's, these proposals will require literally years before engineering knowledge on shift is substantially upgraded. In the case of the staff proposal, some SRO's will have upgraded engineering expertise (applicants for SRO licenses after January 1, 1991, and pre-1991 SRO's serving as shift managers) while others need not upgrade their engineering knowledge at all (pre-1991 SRO's not serving as the shift manager). In the case of the Commission proposal, large numbers of licensed SRO's could be exempt from any upgrading of their engineering knowledge because the degree requirement would only apply to new SRO applicants after January 1, 1991. To avoid the requirement, a utility could simply obtain SRO licenses for all its reactor operators prior to 1991."

"In view of the disadvantages of the NRC staff and Commission proposals, I would appreciate comments on an alternative method for upgrading the engineering

knowledge and understanding of reactor theory needed by licensed senior reactor operators. This method would include the following steps:

"1. Establish a working group, with NRC, academic and industry participants, with the responsibility to define the engineering knowledge and understanding of reactor theory needed for reactor operators to deal effectively with design basis events and severe accidents."

"2. Establish a training curriculum for each nuclear utility operator training program that will provide all senior reactor operators with the knowledge and understanding defined by step 1. This curriculum would establish milestones in individual subject areas to be achieved by new SRO candidates and previously licensed SRO's and would lead to satisfactory completion of the curriculum not later than January 1, 1991. These curriculums would be reviewed and accredited by NRC or by an appropriate industry or third party organization."

"3. Develop and administer new NRC senior reactor operator licensing examinations and NRC and licensee SRO requalification examinations that will test achievement by operators at each of the milestones defined under Step 2, leading to a comprehensive examination not later than 1991 for all new and previously-licensed senior reactor operators. A passing grade on this examination would be required to obtain or retain an SRO license after January 1, 1991."

List of Subjects

10 CFR Part 50

Antitrust, Classified information, Fire protection, Incorporation by reference, Intergovernmental relations, Nuclear power plants and reactors, Penalty, Radiation protection, Reactor siting criteria, Reporting and recordkeeping requirements.

10 CFR Part 55

Manpower training programs, Nuclear power plants and reactors, Penalty, Reporting and recordkeeping requirements.

Authority Citation

The authority for this advanced notice of proposed rulemaking is:

Authority: Sec. 161, Pub. L. 83-703, 68 Stat. 948, as amended (42 U.S.C. 2201).

Dated at Washington, DC, this 27th day of May 1986.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,

Secretary of the Commission.

[FR Doc. 86-12153 Filed 5-29-86; 8:45 am]

BILLING CODE 7590-01-M

ENCLOSURE B



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

August 12, 1987

The Honorable Lando W. Zech, Jr.
Chairman
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: ACRS COMMENTS ON THE ADVANCE NOTICE OF PROPOSED RULEMAKING:
DEGREE REQUIREMENTS FOR SENIOR OPERATORS

During the 328th meeting of the ACRS, August 6-8, 1987, and our 327th meeting, July 9-11, 1987, we discussed SECY-87-101, "Issues and Proposed Options Concerning Degree Requirements for Senior Operators," which was prepared in response to public comments on the proposed rule. Meetings of our Subcommittee on Human Factors were also held on July 15, 1986 and June 24, 1987 to discuss this issue with the NRC Staff. During these meetings, we had the benefit of presentations by the NRC Staff as well as representatives of the Westinghouse Electric, KMC, and Delian corporations. We also had the benefit of the documents referenced.

On May 31, 1986 the NRC published an Advance Notice of Proposed Rulemaking (ANPRM) to require all applicants for a Senior Reactor Operator (SRO) license to possess a baccalaureate degree in engineering or physical science after January 1, 1991. Two hundred letters of public comment were received in response to the ANPRM of which approximately 98% indicated opposition to the NRC's proposal.

The nuclear utility industry and the NRC have endorsed a systems approach to performance based training. At the heart of performance based training is a detailed Job and Task Analysis (JTA) which analyzes the many tasks that must be performed to carry out the various jobs of personnel filling positions in nuclear power plants, including the position of SRO. The tasks are further analyzed to determine the various knowledges, skills, and abilities (KSAs) that one must possess to perform the tasks. The analysis continues further to determine whether the KSAs should be obtained through formal education or through specific training in the classroom, in the laboratory, at a simulator, or by self-study.

A number of JTAs have been performed by licensees as part of the conversion to performance based training; analysis of these JTAs has not shown that a college degree is necessary for Senior Reactor Operators to

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perform the tasks of their jobs to ensure safety of plant operations. A Peer Advisory Panel appointed by the Commission came to the same conclusion in 1982 and recommended against a degree requirement for SROs. We have not been informed of any technical rationale for requiring a degree for SROs at nuclear power plants; we conclude, therefore, that a degree requirement for all SROs is primarily a policy issue.

We strongly support the concept of having engineering expertise on each shift. The Commission's requirement of a Shift Technical Advisor (STA) was a step in that direction. Further, the Commission's provision of the option to combine the STA function with one of the SRO positions was a step to encourage greater integration of the resulting engineering expertise into shift operations. The Committee endorsed both of these actions. The NRC Staff indicates that the percentage of SROs with a baccalaureate degree in engineering or physical science has increased from 17% in 1980 to 28% in 1987.

We are informed that the primary reasons for considering requiring all SROs in the future to have degrees is to enhance professionalism in reactor operations and to make it more likely that the higher management positions in nuclear utilities will be filled by individuals with plant operations experience. We endorse these purported goals but question whether they will be realized through the proposed indirect approach of requiring degrees of all SROs. We believe there is a more direct approach to achieving these goals than through the proposed rulemaking.

We recommend that the Commission formulate more specifically its concerns and the goals it desires to achieve. The Commission then should meet with appropriate licensee representatives (e.g., NUMARC) to convey the need for increased attention to the areas of concern. The NRC Staff and the licensees should then work to develop solutions, programs, and schedules for implementation of any changes from current practice deemed necessary. We realize that proposed rulemaking is one method to generate sufficient attention to encourage licensee initiative; however, we believe a more direct and less adversarial approach is preferable when the proposed action is not driven by clearly identified public safety concerns.

In summary, although the purported goals of the proposed rulemaking are laudable, we think that the depth of the concern about adverse effects of the proposed rule should be reconsidered; many of the comments were received from individuals who are knowledgeable about personnel considerations in the work place. We recommend a more direct approach to identifying and addressing the Commission's concerns.

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Additional comments by ACRS member Glenn A. Reed are presented below.

Sincerely,



William Kerr
Chairman

Additional Comments by ACRS Member Glenn A. Reed

I applaud the ACRS letter and wish to add further support to it. As a person who earned a university engineering degree and one who held an NRC SRO license, I am opposed to the degree requirement for SROs, as in my opinion it is not needed from a job task analysis viewpoint, is not in the interest of licensed personnel morale, is not needed in the interest of best safety of operations, and would lessen the experience qualifications of SRO personnel. I have found that a college degree in engineering or applicable science will probably ensure that an SRO candidate will have an acceptable enough intelligence quotient to be able to take on-site training. However, there is no assurance from the college degree achievement that the SRO candidate will have the even more important qualifications of mechanical comprehension, logical reasoning, and appropriate personality.

My thirty plus years of hiring and working with licensed operators has convinced me that acceptable performance in a battery of aptitude tests (IQ, mechanical comprehension, logical reasoning, and personality traits), coupled with appropriate experience and training, will provide the best SRO performers and people in overall shift charge. My experience also has convinced me that the Shift Technical Advisor concept that was endorsed some years ago by the NRC can provide the best engineering support, and the best future promotional cross-fertilization into utility top management, and into the vendor design field.

References:

1. SECY-87-101, April 16, 1987, Issues and Proposed Options Concerning Degree Requirements for Senior Operators.
2. Federal Register, Vol. 51, No. 104, Page 19561, Friday, May 30, 1987, Advance Notice of Proposed Rulemaking, 10 CFR Parts 50 and 55, Degree Requirements for Senior Operators at Nuclear Power Plants.
3. Comments pertaining to the Advance Notice of Proposed Rulemaking - Degree Requirements for Senior Operators, KMC, Inc., September 29, 1986.

ENCLOSURE B

ENCLOSURE C



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

June 24, 1987

OFFICE OF THE
SECRETARY

MEMORANDUM FOR: Victor Stello, Jr. Executive Director
for Operations

FROM: *2.13.87* Samuel J. Chilk, Secretary

SUBJECT: SECY-87-101 - ISSUES AND PROPOSED
OPTIONS CONCERNING DEGREE REQUIREMENT
FOR SENIOR OPERATORS

This is to advise you that the Commission (with all Commissioners agreeing) has approved the staff's recommendation to separate the training and educational issues discussed in the SECY paper. While agreeing to separate the training and education issues, Commissioner Asselstine believes that additional engineering knowledge is needed by all licensed operators and that each utility should be required to develop and implement programs for all licensed operators which would provide knowledge equivalent to a two year Associate Degree program.

The Commission (with Chairman Zech and Commissioners Carr and Bernthal approving) has also agreed that the staff should proceed with the contemplated degree rule and concurrent policy statement as proposed in the ANPM (Option 1). This option will result in all newly licensed SRO's having college degrees, four years after the effective date of the rule. All individuals holding Senior Reactor Licenses prior to that date will be "grandfathered" so as to assure that no SRO loses his/her job and that valuable experience is not lost. Commissioner Asselstine approved a rule which would require all shift supervisors to hold a Baccalaureate degree no later than five years after the effective date of the rule. Commissioner Roberts disapproved degree requirements for licensed operators and provided comments.

All Commissioners provided comments on the SECY paper proposal. Copies of their comments have previously been provided to you with their vote sheets.

The proposed rule should be prepared and forwarded for Commission review and approval.

cc: Chairman Zech
Commissioner Roberts
Commissioner Asselstine
Commissioner Bernthal
Commissioner Carr
OGC
GPA
ACRS

Rec'd Off. EDO

Date 6-25-87
Time 8:30 A

ENCLOSURE C

ENCLOSURE D

NUCLEAR REGULATORY COMMISSION

10 CFR Part 55

Degree Requirement for Senior Reactor Operators
at Nuclear Power Plants

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The Nuclear Regulatory Commission is proposing to amend its regulations to require that each applicant for a senior operator license to operate a nuclear power reactor must have a bachelor's degree in engineering, engineering technology, or the physical sciences from an accredited university or college. This proposed action will upgrade the operating, engineering, and accident management expertise provided on shift by combining engineering expertise and operating experience in the senior operator position.

The Commission believes that the requirement of a bachelor's degree for the senior operator position would further ensure the protection of the health and safety of the public by enhancing the capability to analyze and respond to complex transients and accidents and restore the reactor to a safe and stable condition.

DATES: Comment period expires (60 days following publication in the Federal Register). Comments received after this date will be considered if it is practical to do so, but the Commission is able to assure consideration only for comments received on or before this date.

ADDRESSES: Mail comments to: The Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555, ATTENTION: Docketing and Service Branch.

Deliver comments to: One White Flint North, 11555 Rockville Pike, Rockville, Maryland, between 7:30 a.m. and 4:15 p.m. Comments may also be delivered to the NRC Public Document Room, 2120 L Street, N.W, Washington, DC between 7:30 a.m. and 4:15 p.m.

Examine comments received, the environmental assessment and finding of no significant impact, and the regulatory analysis at the NRC Public Document Room, 2120 L Street, NW, Washington, DC.

Obtain single copies of the environmental assessment and finding of no significant impact and the regulatory analysis from M. R. Fleishman, Office of Nuclear Regulatory Research, Washington, DC 20555, telephone (301) 492-3794.

FOR FURTHER INFORMATION CONTACT: M. R. Fleishman, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone (301) 492-3794.

SUPPLEMENTARY INFORMATION:

Background

Since the Three Mile Island Unit 2 (TMI-2) accident on March 28, 1979, in which human error, among other factors, contributed to the consequences of the accident, the issue of academic requirements for reactor operators has been a major concern of the Nuclear Regulatory Commission (NRC). In July 1979, "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations,"

(NUREG-0578)¹ made 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 licensees of the short-term STA requirements, i.e., that STAs should be on shift by January 1980, and that they should be fully trained by January 1981. In November 1980, "Clarification of TMI Action Plan Requirements," (NUREG-0737), provided further details to licensees regarding implementation of the STA position.

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

¹ Copies of all NUREGS referenced may be purchased through the U.S. Government Printing Office by calling (202) 275-2060 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 and/or copying for a fee in the NRC Public Document Room, 1717 H Street, NW, Washington, DC.

² SECY 82-162, SECY 84-106, SECY 87-101, and Generic Letter 84-16 are available at the NRC Public Document Room at 1717 H Street NW, Washington, DC.

On October 28, 1985, the NRC published in the Federal Register (50 FR 43621) a final policy statement on engineering expertise on shift to allow an alternate means of 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, engineering technology, physical science, or a professional engineer's license. Option 2 permits continuation of the separate STA who rotates with the shift and holds a bachelor's degree or equivalent and meets the criteria as stated in, "Clarification of TMI Action Plan Requirements," (NUREG-0737). The Commission also encourages 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 (ANPRM) (51 FR 19561). The purpose of the ANPRM was to extend the current level of engineering expertise on shift, as described in the Commission's Policy Statement on Engineering Expertise on Shift (50 FR 43621) and to ensure that senior operators have operating experience on a commercial nuclear reactor operating at greater than twenty percent power, e.g., "hot" operating experience (Generic Letter 84-16)². The ANPRM was the result of a Commission decision to consider an amendment to its regulations (Parts 50 and 55) and to obtain comments on the contemplated action to upgrade the levels of operating, engineering, and accident management expertise on shift.

In addition to describing the proposed rule in general, the ANPRM presented a list of twenty questions concerning various aspects and implications of the proposed rule. Two hundred letters were received in response to the ANPRM. A summary and analysis of the comments are included in SECY-87-101² dated April 16, 1987. The NRC has reviewed, in detail, all the comments made on the ANPRM as well as comments received since that time. In general, except for five commenters, the preponderance of commenters were opposed to a degree requirement for senior operators. The proposed rule in this notice reflects in detail many of the comments and responses to the questions posed. Apart from the detailed comments on the proposed contents of the rule, a number of general, adverse comments were raised. The possible disadvantages of the proposed rule, raised by both the public comments as well as NRC staff review, can be categorized as follows:

1. The proposed rule is not necessary.
2. Experience is more important than a bachelor's degree.
3. The proposed rule will have a negative impact on safety.
4. The proposed rule will result in a greater operator turnover rate.
5. The proposed rule will basically block the career path of reactor operators resulting in lower morale.
6. There will be less overall experience on shift due to the promotion of SOs into management positions.

The Advisory Committee on Reactor Safeguards (ACRS) also considered the proposed requirement and discussed it at several meetings in 1986 and 1987. The ACRS strongly supported the concept of having engineering expertise on each shift. They did not agree that requiring a degree for senior operators was the best approach though they agreed that specific technical knowledge should be required. They believed that, because of the concern about adverse effects raised by many knowledgeable individuals, the proposed rule should be reconsidered.

The Commission has carefully considered the numerous comments received on the ANPRM as well as the recommendations of the ACRS. During its deliberations subsequent to the ANPRM the Commission considered the following three options regarding improving engineering expertise on shift:

1. Proceed with the contemplated degree rule and concurrent policy statement as proposed in the ANPRM. This option would in the long term result in two Senior Operators on shift who have bachelor's degrees.
2. Propose a rule to require a degreed individual on shift similar to a Senior Manager, as described in SECY-84-106, "Proposed Rulemaking Concerning Requirements for Senior Managers."²
3. Amend the Policy Statement on Engineering Expertise on Shift (50 FR 43621) to explicitly encourage licensees to develop programs leading to degrees, to utilize the combined SO/STA option and to phase out use of a separate STA.

In spite of the generally unfavorable reaction to the ANPRM, the Commission believes that it would be beneficial to have a full public airing of views by publication of a notice of proposed rulemaking and decided to proceed with Option 1.

Concurrent Policy Statement

The Commission will publish concurrently with the final rule a policy statement which encourages nuclear power plant licensees, working with the nuclear industry, to:

1. Implement personnel policies that emphasize the opportunities for licensed operators to assume positions of increased management responsibility;
2. Develop programs that would enable currently licensed senior operators and reactor operators to obtain college degrees; and
3. Obtain college credit for appropriate nuclear power plant training and work experience through arrangements with the academic sector.

Discussion

The purpose of this proposed rule is to upgrade the operating, engineering, and accident management expertise provided on shift by combining both engineering expertise and operating experience in the senior operator function. The NRC believes this will enhance the capability of the operating staff to analyze and respond to complex transients and accidents and thereby further ensure the protection of the health and safety of the public.

The NRC is concerned that operator qualifications to deal with accidents beyond design basis conditions warrant improvement. Operator training programs and related emergency operating procedures generally do not consider accident conditions beyond inadequate core cooling. There is a general consensus that well qualified operators can substantially mitigate the effects of severe accidents. The Industry Degraded Core Rulemaking Program (IDCOR) industry group, for example, has developed arguments that operators could substantially reduce the risk posed by these conditions. The NRC is considering the need for more extensive severe accident training and emergency operating procedures as well as engineering qualifications for senior operators.

The policy statement on engineering expertise on shift published in the Federal Register on October 28, 1985 (50 FR 43621) provided an interim method of achieving more engineering capability on shift. Essentially the NRC is moving from interim requirements which provide engineering capability for accident conditions (the STA), to requiring engineering capability, and nuclear power plant operating experience, in the same individual (the SO).

This proposed rule would require each applicant for a Senior Operator (SO) license to operate a nuclear power reactor, after [4 years following the effective date of the rule], to have a bachelor's degree in engineering, engineering technology, or the physical sciences from an accredited university or college. Degree equivalency will no longer be accepted. An accredited university or college is defined as an educational institution in the United States which has been approved by a regional accrediting body.

The proposed rule would apply only to applicants for a SO to operate a nuclear power reactor. People who held SO licenses on [4 years following the effective date of the rule] would be exempt from the degree requirement. Furthermore, the proposed rule would not apply to SO applicants for non-power nuclear reactors such as research and test reactors. Licensed reactor operators (ROs) would not be required to have a degree. Thus, those persons who are senior operators on [4 years following the effective date of the rule], would be "grandfathered" (i.e., a lifetime exemption) by the proposed rule. Even if they were to lose their SO license in the future, e.g. due to a change in jobs or plants, they could still reapply for a new SO license without satisfying the degree requirement. It is recognized that "grandfathering" current SOs could result in SOs without degrees for an extended period of time. Since the Commissions' intent is to maintain at least the same degree of engineering expertise on shift as currently exists, the STA policy described under options 1 and 2 in the October 28, 1985 policy statement (50 FR 43621) would continue in effect. Thus, if two "grandfathered" SOs are used on shift, the facility licensee would be required to have a separate individual on shift who has the STA education and experience described in NUREG-0737. If one of the SOs has a degree and one is "grandfathered," Option 1 of the policy statement would be satisfied. When all SOs have degrees, the policy statement would no longer be needed.

The concurrent policy statement will encourage previously licensed SOs to obtain degrees. In the past the NRC has accepted "equivalents" to the bachelor's degree for a separate STA. The equivalents were based upon

specialized utility training or other work experiences. For the proposed rule, however, equivalency would not be acceptable to the NRC in lieu of a degree. Because the Commission is not in a position to evaluate the academic equivalency of utility training, it encourages utilities to seek out academic institutions who will evaluate the training programs and grant course credit for such equivalency based upon work experience or specialized training. Thus the concurrent policy statement will encourage efforts to have the training accepted by the colleges for partial credit toward fulfilling the requirements of an accredited degree.

The degree requirement would not apply to licensed reactor operators (ROs). However, the concurrent policy statement will encourage ROs to obtain degrees so that they can progress to the SO position and to other utility positions. The Commission believes a degree requirement for SOs on shift, along with the concurrent policy statement will not only enhance public health and safety, but will also provide a route for promoting SOs.

The cutoff date of four years following the effective date of the rule for application for a SO license by individuals who do not have degrees is chosen for three reasons. First, it will allow operators now in training sufficient time and notice to complete a degree before application. Second, it should not cause undue hardship on operators who are now in the process of preparing and training for the senior operator license, and third, licensees have been encouraged by the Policy Statement on Engineering Expertise on Shift (Option 1) to move toward a dual-role SO/STA position. Furthermore, those operators who are licensed as SOs on the cutoff date would be "grandfathered."

The proposed rule would also require one year of "hot" and at least 2 years total operating experience for each applicant for a S0 license. A R0 license is required in order to get "hot" control room operating experience; thus, the proposed rule expands the current NRC policy, described in Regulatory Guide 1.8, Revision 2, dated April 1987, "Qualification and Training of Personnel for Nuclear Power Plants," to ensure that degreed S0s have sufficient operating experience. Regulatory Guide 1.8, in position C.1.e., allows an applicant for a S0 license with a degree to have only 2 years of responsible power plant experience, none of which needs to be as a reactor operator. Thus, Regulatory Guide 1.8 will be revised if the proposed rule is adopted. The proposed rule would require the S0 applicant with a degree to serve as a R0 at greater than 20% power for at least 1 year. This does not mean that the reactor must be at power 100% of the time during the year, however, the 1 year time period should not include periods of significant down time for maintenance or refueling (i.e., periods that exceed 6 weeks duration). Special provisions are proposed in order to accommodate those applicants from facilities that are unable to operate above twenty percent power due either to (a) the facilities not having completed their initial startup program and being licensed to run at power, or (b) the facilities being in an extended shutdown mode. In the case of the facilities not yet licensed to run at power, alternative approaches to meet the twenty percent power requirement may be approved by the Commission. In the case of facilities in extended shutdown, the Commission may process the application and administer the written and operating tests but would defer issuance of the senior operating license until the twenty percent power requirement is fulfilled.

This proposed requirement for a S0 applicant with a degree also implies that an applicant for a R0 with a degree must only have 1 year of related nuclear power plant experience. This is a change to the guidance in Regulatory Guide 1.8 which indicates that a R0 applicant must have a minimum of 3 years of power plant experience of which at least 1 year shall be nuclear power experience. If the proposed rule is adopted it would supersede the guidance in Regulatory Guide 1.8 and necessitate its revision in accord with the rule. Also, position C.1.d of Regulatory Guide 1.8, on educational criteria, would have to be revised to reflect this rule. The above requirement is proposed because it is essential that the S0 know and understand plant operations as well as the theoretical, engineering, and accident management aspects of the position.

The concurrent policy statement is intended to encourage licensees (utilities) and the nuclear industry to provide incentives and management opportunities for S0s as well as to improve the engineering capabilities of the on shift crew. The S0 with a degree and shift operating experience can become a valuable personnel resource for the utility, one who combines shift operational management experience with the potential for greater management responsibility. The policy statement, among other things, will encourage licensees to provide that career path.

The Commission believes that requiring a degree will contribute to the goal of having S0s who have operational experience, technical and academic knowledge, and educational credentials that should improve their performance as operators and possibly open career paths from which they may have been excluded in the

past. The SOs with a degree should be able to respond better to off normal incidents. While there will be increased training to cover accident conditions, training alone is not sufficient. It is impossible to cover every eventuality during training. The operators must have sufficient understanding of basic engineering principles, and detailed knowledge of nuclear design and operation to appropriately respond to situations that have not been previously covered in training sessions. In addition, SOs with degrees will have greater opportunity for professional growth since they will have the qualifications needed to advance to managerial positions. With the chance for personal growth should come greater job satisfaction. The validity of these beliefs has been reenforced by the experiences of licensed operators participating in an ongoing utility sponsored program similar to what is being proposed herein. The Commission also believes that migration of SOs upward into plant management will contribute to improved plant safety.

Although the Commission believes there is a net benefit of the proposed rule in enhancing public health and safety, it acknowledges that this judgement is based on a qualitative assessment of the relative contributions of various factors, some with potential positive impacts and others with potential negative impacts. The most significant positive factor is the enhanced capability of the shift operating staff to effectively manage accidents. Increased operating experience of plant management is also an anticipated longer term benefit. However, there are possible disadvantages including 1) the potential for lower morale among reactor operators without degrees whose natural career paths, promotion to the SO level, are blocked, and 2) the potential reduction of overall operating experience on shift as SOs with degrees move to other work.

Upon consideration of these and other factors, such as those identified by the public comment process on the ANPRM, the Commission concludes, at this time, that the overall effect of the proposed rule would be beneficial and would result in greater plant safety. This benefit will be achieved over time by improved quality of the operational personnel and by plant management that has a better understanding of the unique operational problems associated with nuclear power reactor operations.

Environmental Impact--Categorical Exclusion

The NRC has determined that this proposed regulation is the type of action described in categorical exclusion 10 CFR 51.22(c)(1). Therefore neither an environmental impact statement nor an environmental assessment has been prepared for this proposed regulation.

Paperwork Reduction Act Statement

This proposed rule contains no information collection requirements and therefore is not subject to the requirements of the Paperwork Reduction Act of 1980 (44 U.S.C 3501 et seq.).

Regulatory Analysis

The Commission has prepared a draft regulatory analysis for this proposed regulation. The analysis examines the costs and benefits of the alternatives considered by the Commission. The draft regulatory analysis is available for

inspection and copying for a fee at the NRC Public Document Room, 1717 H Street NW, Washington, DC. Single copies of the analysis may be obtained from M. R. Fleishman, Office of Nuclear Regulatory Research, Washington, DC 20555, telephone (301)492-3794.

The Commission requests public comment on the draft analysis. Comments on the draft analysis may be submitted to the NRC as indicated under the ADDRESSES heading.

Regulatory Flexibility Certification

As required by the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission certifies that this rule, if adopted, will not have a significant economic impact upon a substantial number of small entities. This proposed rule affects only the licensing and operation of nuclear power plants. It also affects individuals licensed as operators at these plants. The companies that own these plants and the individual plant employees licensed to operate them do not fall within the scope of the definition of "small entities" set forth in the Regulatory Flexibility Act or the Small Business Size Standards set out in regulations issued by the Small Business Administration in 13 CFR Part 121. Since these companies are dominant in their service areas, this proposed rule does not fall within the purview of the Act.

However, because there may be now or in the future small entities which will provide licensed operators to nuclear power plants on a contractual basis, the NRC is specifically seeking comment as to how the regulation will affect them and how the regulation may be tiered or otherwise modified to impose less stringent requirements on them while still adequately protecting the public health and safety. Those small entities which offer comments on how the regulation could be modified to take into account the differing needs of small entities should specifically discuss the following items:

- (a) The size of their business and how the proposed regulation would result in a significant economic burden upon them as compared to larger organizations in the same business community.
- (b) How the proposed regulation could be modified to take into account their differing needs or capabilities.
- (c) The benefits that would accrue, or the detriments that would be avoided, if the proposed regulation was modified as suggested by the commenter.
- (d) How the proposed regulation, as modified, would more closely equalize the impact of NRC regulations or create more equal access to the benefits of Federal programs as opposed to providing special advantages to any individuals or groups.
- (e) How the proposed regulation, as modified, would still adequately protect the public health and safety.

The comments should be sent to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attn: Docketing and Service Branch.

The proposed rule would apply only to applicants for a S0 to operate a nuclear power reactor. People who held S0 licenses on [4 years following the effective date of the rule] would be exempt from the degree requirement. Furthermore, the proposed rule would not apply to S0 applicants for non-power nuclear reactors such as research and test reactors. Licensed reactor operators (ROs) would not be required to have a degree. Thus, those persons who are senior operators on [4 years following the effective date of the rule] would be "grandfathered" by the proposed rule. The proposed rule would also require one year of "hot" (i.e. as an RO at greater than 20% power) and at least 2 years total operating experience for each applicant for a S0 license. Special provisions would be proposed to accommodate those applicants from facilities that are unable to operate above 20% power.

The proposed requirements would only apply to power reactor licensees indirectly. There would be no modification of or addition to the organization, i.e. administrative and functional structure, required to operate a nuclear power reactor as a result of this proposed rule because:

- i. the person to whom the S0s report would not change;
- ii. the number of S0s per shift would not change;
- iii. the total number of operators per shift would not change;
- iv. the training requirements, written examinations and operating tests for a S0 would not change; and
- v. the tasks performed by a S0 would not change.

Backfit Analysis

As required by 10 CFR 50.109, the Commission has completed a backfit analysis for the proposed rule. The Commission has determined, based on this analysis, that backfitting to comply with the requirements of this proposed rule will provide a substantial increase in protection to public health and safety or the common defense and security at a cost which is justified by the substantial increase. The backfit analysis on which this determination is based reads as follows:

1. Statement of the specific objectives that the proposed backfit is designed to achieve.

The objective of the proposed rule is to upgrade the operating, engineering, and accident management expertise provided on shift by combining both engineering expertise and operating experience in the senior operator function.

2. General description of the activity that would be required by the licensee or applicant in order to complete the backfit.

This proposed rule would require each applicant for a Senior Operator (SO) license to operate a nuclear power reactor, after [4 years following the effective date of the rule], to have a bachelor's degree in engineering, engineering technology, or the physical sciences from an accredited university or college. Degree equivalency will no longer be accepted. An accredited university or college is defined as an educational institution in the United States which has been approved by a regional accrediting body.

However, the power reactor licenses would have to get new SOs from a group of individuals who already have appropriate degrees or else provide the educational opportunity for their own employees to obtain a degree.

3. Potential change in the risk to the public from the accidental off-site release of radioactive material.

It is not feasible to quantitatively evaluate the change in risk to the public as a result of the proposed rule. That is, the effect of the SO on the probability and consequences of an accident, and the change in the probability and consequences of an accident as a result of requiring the SO to have a bachelor's degree is unknown. The Commission believes that requiring a degree will contribute to the goal of having SOs who have operational experience, technical and academic knowledge, and educational credentials that should improve their performance as operators and possibly open career paths from which they may have been excluded in the past. The SOs with a degree should be able to respond better to off normal incidents. While there will be increased training to cover accident conditions, training alone is not sufficient. It is impossible to cover every eventuality during training. The operators must have sufficient understanding of basic engineering principles, and detailed knowledge of nuclear design and operation to appropriately respond to situations that have not been previously covered in training sessions. In addition, SOs with degrees will have greater opportunity for professional

growth since they will have the qualifications needed to advance to managerial positions. The Commission believes that there will also be an improvement in plant safety as SOs migrate upward into plant management although this improvement could be counter balanced, in part, by a potential reduction in overall operating experience on shift as SOs with degrees move to other work.

4. Potential impact on radiological exposure of facility employees.

There is not expected to be any significant change in the radiological exposure of facility employees due to the proposed rule except for the unquantifiable reduction in the probability and consequences of an accident and the subsequent reduction in exposure.

5. Installation and continuing costs associated with the backfit, including the cost of facility downtime or the cost of construction delay.

One of the questions posed in the May 30, 1986 ANPRM concerned what the implementation and operation costs of the proposed rule to the utilities would be. The cost estimates received ranged from negligible to prohibitive. Various scenarios for achieving the desired staffing level of SOs with degrees were assumed. These varied from hiring individuals with degrees and passing them thru the normal utility training programs to taking ROs and sending them to college while either paying them at overtime rates or hiring replacement ROs. A utility could also implement

an onsite college degree program for its operators, for example, a program currently being run for an operating plant costs \$250,000 per year to train 60 people. The range of costs of such an onsite program are estimated to vary from \$250,000 to \$480,000 per year.

It is clear that there are numerous methods that can be used to implement the proposed rule with an extreme range of costs depending on the method adopted. It would be a utility's choice as to which method to adopt, taking into account the various cost and personnel considerations.

6. The potential safety impact of changes in plant or operational complexity, including the effect on other proposed and existing regulatory requirements.

There would be no changes in the plant or operational complexity and hence, no potential safety impact related to them. However, there would be an effect on the guidance provided in Regulatory Guide 1.8. Current guidance in Regulatory Guide 1.8, Revision 2, April 1987, "Qualification and Training of Personnel for Nuclear Power Plants," allows a degreed applicant for a SO license to have only 2 years of responsible power plant experience, none of which needs to be as a reactor operator. This would have to be revised if the proposed rule went into effect since the proposed rule would require a SO applicant with a degree to serve as a RO at greater than 20% power for at least 1 year. Furthermore, the guidance indicates that a RO applicant must have a minimum of 3 years of power plant experience of which at least 1 year shall be nuclear power experience.

This would have to be revised since it is inconsistent with the proposed rule which implies that an applicant for a RO with a degree must only have 1 year of related nuclear power plant experience. Finally, position C.1.d of the Regulatory Guide would have to be revised to indicate that a bachelor's degree is the minimum educational requirement for a SO candidate rather than a high school diploma.

7. The estimated resource burden in the NRC associated with the proposed backfit and the availability of such resources.

It is anticipated that there will be relatively minor impact on NRC staff resources as a result of implementing the proposed rule. There may be some increase in the number of applications to process and tests to administer, due to the attempts of current ROs to become SOs prior to the cut-off date, but this should not cause a significant impact on the NRC staff. No new resource requirements are expected.

8. The potential impact of differences in facility type, design or age on the relevancy and practicality of the proposed backfit.

The proposed rule only applies to SO applicants for operation of a nuclear power reactor. It does not apply to SO applicants for non-power nuclear reactors such as research and test reactors. The facility type, design or age should have no relevancy to the impact or practicality of the proposed backfit. Of more significance would be the degree to which each utility licensee has already implemented an educational program. Those facilities which have implemented such a program will clearly be less affected by the proposed backfit than would those facilities that have not.

9. Whether the proposed backfit is interim or final and, if interim, the justification for imposing the proposed backfit on an interim basis.

The proposed rule, when made effective, would be done so in final form and not on an interim basis.

List of Subjects in 10 CFR Part 55

Manpower training programs, nuclear power plants and reactors, penalty, reporting and recordkeeping requirements.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and 5 U.S.C 553, the NRC is proposing to adopt the following amendments to 10 CFR Part 55.

PART 55 - OPERATORS' LICENSES

1. The authority citation for Part 55 continues to read as follows:

AUTHORITY: Secs. 107, 161, 182, 68 Stat. 939, 948, 953, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2137, 2201, 2232, 2282); secs. 201, as amended, 202, 88 Stat. 1242, as amended, 1244 (42 U.S.C. 5841, 5842).

Sections 55.41, 55.43, 55.45, and 55.59 also issued under sec. 306, Pub. L. 97-425, 96 Stat. 2262 (42 U.S.C. 10226). Section 55.61 also issued under secs. 186, 187, 68 Stat. 955 (42 U.S.C. 2236, 2237).

For the purposes of sec. 223, 68 Stat. 958, as amended (42 U.S.C. 2273);
___ 55.3, 55.21, 55.49, and 55.53 are issued under sec. 161i, 68 Stat. 949,
as amended (42 U.S.C. 2201(i)); and 55.9, 55.23, 55.25, and 55.53(f) are
issued under sec. 161o, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

2. In §55.4, a new definition is added in alphabetical order to read as follows:

§55.4 Definitions.

* * * * *

"Accredited university or college" means an educational institution in the United States which has been approved by a regional accrediting body.

* * * * *

3. In §55.31, a new paragraph (e) is added to read as follows:

§55.31 How to apply.

* * * * *

(e)Each applicant for a senior operator license to operate a nuclear power

reactor, after [4 years following the effective date of the rule], must have a bachelor's degree in engineering, engineering technology, or the physical sciences from an accredited university or college. In addition, except as noted in paragraphs (e)(1) and (e)(2) of this section, after [4 years following the effective date of the rule], each applicant for a senior operator license must have at least two years of operating experience at a nuclear power plant, of which one years' experience must be as a licensed control room operator for a nuclear power reactor operating at greater than twenty percent power. At least six months of the nuclear power plant experience must be at the plant for which the applicant seeks the license. An authorized representative of the facility licensee will verify that the requirements of this paragraph have been met as a part of certifying the applicant's qualifications pursuant to paragraph (a)(4) of this section. Any person holding a senior operator license on [4 years following the effective date of the rule] is exempt from the requirement to have a bachelor's degree.

(1) For each applicant from a facility that has not completed preoperational testing and an initial startup test program as described in its Final Safety Analysis Report, as amended and approved by the Commission, and has not yet been licensed to operate at power, the Commission may approve alternatives that provide experience equivalent to operation at twenty percent power.

(2) For each applicant from a facility that has (i) completed preoperational testing as described in its Final Safety Analysis Report, as amended and approved by the Commission, and (ii) is in an extended shutdown which precludes

operation at greater than twenty percent power, the Commission may process the application and may administer the written examination and operating test required by §55.43 and §55.45 of this part, but may not issue the license until the required evidence of operation at greater than twenty percent power is supplied.

Dated at Rockville, MD this _____ day of _____, 1988.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,

Secretary of the Commission.

ENCLOSURE E

Regulatory Analysis
for
Degree Requirement for Senior Reactor Operators

1. Statement for the Problem

1.1 Background

Since the Three Mile Island Unit (TMI-2) accident on March 28, 1979, in which human error, among other factors, contributed to the consequences of the accident, the issue of academic requirements for reactor operators has been a major concern of the Nuclear Regulatory Commission (NRC). In July 1979, "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations," (NUREG-0578) made 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 licensees of the short-term STA requirements, i.e., that STAs should be on shift by January 1980, and that they should be fully trained by January 1981. In November 1980, "Clarification of TMI Action Plan Requirements," (NUREG-0737), provided further details to licensees regarding implementation of the STA position.

The qualifications of operators were also addressed by the 1979, "Lessons Learned Task Force," (NUREG-0585), the 1980 Rogovin report, "Three Mile Island: A Report to the Commissioners and to the Public," (NUREG/CR-1240), and the 1982, "Report of the Peer Advisory Panel and the Nuclear Regulatory Commission on Operator Qualifications," (SECY 82-162). The consensus among these reports was that greater technical and academic knowledge among shift operating personnel 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. 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, engineering technology, physical science, or a professional engineer's license. Option 2 permits continuation of the separate STA who rotates with the shift and holds a bachelor's degree or equivalent and meets the criteria as stated in, "Clarification of TMI Action Plan Requirements," (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 (ANPRM) (51 FR 19561). The purpose of the ANPRM was to extend the current level of engineering expertise on shift, as described in the Commission's Policy Statement on Engineering Expertise on Shift

(50 FR 43621) and to ensure that senior operators have operating experience on a commercial nuclear reactor operating at greater than twenty percent power, e.g., "hot" operating experience (Generic Letter 84-16). The ANPRM was the result of a Commission decision to consider an amendment to its regulations (Parts 50 and 55) and to obtain comments on the contemplated action to upgrade the levels of operating, engineering, and accident management expertise on shift.

The Commission has carefully considered the numerous comments received on the ANPRM as well as the recommendations of the Advisory Committee on Reactor Safeguards. The Commission believes that it would be beneficial to have a full public airing of views by publication of a notice of proposed rulemaking.

1.2 Discussion of Proposed Rulemaking

This proposed rule would require each applicant for a Senior Operator (SO) license to operate a nuclear power reactor, after [4 years following the effective date of the rule], to have a bachelor's degree in engineering, engineering technology, or the physical sciences from an accredited university or college. Degree equivalency will no longer be accepted. An accredited university or college is defined as an educational institution in the United States which has been approved by a regional accrediting body.

The proposed rule would apply only to applicants for a SO to operate a nuclear power reactor. People who held SO licenses on [4 years following the effective date of the rule] would be exempt from the degree requirement. Furthermore, the proposed rule would not apply to SO applicants for non-power nuclear reactors such as research and test reactors. Licensed reactor operators (ROs) would not be required to have a degree. Thus, those persons who are senior operators on [4 years following the effective date of the rule] would be "grandfathered" by the proposed rule. The proposed rule would also require one year of "hot" and at least 2 years total operating experience for each applicant for a SO license. Table 1 presents a comparison of the current education and experience requirements for a SO with those that would be in effect if the proposed rule was enacted.

2.0 Objectives

The objective of the proposed rule is to upgrade the operating, engineering, and accident management expertise provided on shift by combining both engineering expertise and operating experience in the senior operator function. The NRC believes that having personnel on shift with enhanced qualifications further ensures the protection of the health and safety of the public.

TABLE 1. COMPARISON OF SO REQUIREMENTS

	<u>Current</u>	<u>Proposed</u>
<u>Education</u>	H.S. Diploma or Equivalent	Bachelor's Degree
<u>Experience</u> w/o degree	<ul style="list-style-type: none"> - 4 years responsible power plant experience including 2 years nuclear plant experience. - 6 months at specific plant for license - RO license for 1 year 	Must have SO license on cut-off date
w/degree	<ul style="list-style-type: none"> - 2 years responsible nuclear power plant experience - 6 months at specific plant for license (not counting training time) 	<p>2 years responsible nuclear power plant experience including 1 year as RO* at greater than 20% power</p> <p>6 months at specific plant for license (not counting training time)</p>

*Note: These requirements imply that a person with a degree may become a RO with only 1 year of responsible nuclear power plant experience plus the necessary training time.

3. Alternatives

Three alternative approaches were considered by the Commission during its deliberations on the proposed rule following publication of the ANPRM. The Commission decided to proceed with the contemplated degree rule and concurrent policy statement as proposed in the ANPRM. This would in the long term result in two Senior Operators on shift who have bachelor's degrees.

4. Consequences

4.1 Benefits

It is not feasible to quantitatively evaluate the consequences of the proposed rule. That is, the effect of the S0 on the probability and consequences of an accident, and the change in the probability and consequences of an accident as a result of requiring the S0 to have a bachelor's degree is unknown. The Commission believes that requiring a degree will contribute to the goal of having S0s who have operational experience, technical and academic knowledge, and educational credentials that should improve their performance as operators and possibly open career paths from which they may have been excluded in the past. The S0s should be able to respond better to off normal incidents. While there will be increased training to cover accident conditions, training alone is not sufficient. It is impossible to cover every eventuality during training. The operators must have sufficient understanding of basic

engineering principles, and detailed knowledge of nuclear design and operation to appropriately respond to situations that have not been previously covered in training sessions. In addition, S0s with degrees will have greater opportunity for professional growth since they will have the qualifications needed to advance to managerial positions. With the chance for personal growth should come greater job satisfaction. The validity of these beliefs has been re-enforced by the experiences of licensed operators participating in an ongoing utility sponsored program similar to what is being proposed herein. The Commission also believes that there will be a net improvement in plant safety if S0s migrate upward into plant management although this improvement could be counter balanced, in part, by a potential reduction in overall operating experience on shift as S0s with degrees move to other work. Requiring S0s with degrees may result in fewer people in the control room, since a separate STA would not be needed, with a concomitant cost saving.

4.2 Costs

One of the questions posed in the ANPRM concerned what the implementation and operation costs of the proposed rule to the utilities would be. The cost estimates received ranged from negligible to prohibitive. Various scenarios for achieving the desired staffing level of S0s with degrees were assumed. These varied from hiring individuals with degrees and passing them thru the normal utility training programs to taking R0s and sending them to college while either paying them at overtime rates or hiring replacement R0s. A utility could also implement an onsite college

degree program for its operators, for example, a program currently being run for an operating plant costs \$250,00 per year to train 60 people. The range of costs of such an onsite program are estimated to vary from \$250,000 to \$480,000 per year.

It is clear that there are numerous methods that can be used to implement the proposed rule with an extreme range of costs depending on the method adopted. It would be a utility's choice as to which method to adopt, taking into account the various cost and personnel considerations. For purposes of this regulatory analysis, a representative cost to a utility is estimated to be about \$500,000 per year.

5. Decision Rationale

While the benefits of the proposed rule cannot be directly quantified, the Commission believes that the degree program should result in greater plant safety. This benefit will be achieved over time by improved quality of the operational personnel and by plant management that has a better understanding of the unique operational problems associated with nuclear power reactor operations.

6. Implementation

6.1 Schedule

No implementation problems are now anticipated in view of the fact that the date for which the program would start has been changed to 4 years

after the effective date of the final published rule (i.e., usually 30 days after publication in the Federal Register). This should be ample time for all affected parties to either decide upon and implement their upgrade program or obtain an appropriate degree.

6.2 Relationship to other Existing or Proposed Requirements

Current guidance in Regulatory Guide 1.8, Revision 2, April 1987, "Qualification and Training of Personnel for Nuclear Power Plants," allows an applicant for a S0 license with a degree to have only 2 years of responsible power plant experience, none of which needs to be as a reactor operator. This would have to be revised if the proposed rule went into effect since the proposed rule would require a S0 applicant with a degree to serve as a RO at greater than 20% power for a least 1 year. Furthermore, the guidance indicates that a RO applicant must have a minimum of 3 years of power plant experience of which at least 1 year shall be nuclear power experience. This would have to be revised since it is inconsistent with the proposed rule which implies that an applicant for a RO with a degree must only have 1 year of related nuclear power plant experience. Finally, position C.1.d of the Regulatory Guide would have to be revised to indicate that a bachelor's degree is the minimum educational requirement for a S0 candidate rather than a high school diploma.