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PDR 8/6/93

Certified by
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Certified Minutes
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JOINT MEETING OF THE ACRS SUBCOMMITTEE/ACNW WORKING GROUP ON REGULATORY GUIDES IMPLEMENTING 10 CFR PART 20 - MARCH 26, 1993

The Joint Advisory Committee on Reactor Safeguards (ACRS)/Advisory Committee on Nuclear Waste (ACNW) Subcommittee Meeting to Review Regulatory Guides Implementing the Revised 10 CFR Part 20 "Standards for Protection Against Radiation" was convened on March 26, 1993 at 7920 Norfolk Avenue, Bethesda, Maryland at 8:30 a.m. by Dr. J. Ernest Wilkins, Jr., who is the Chairman of the ACRS Subcommittee on Occupational and Environmental Protection Systems. The purpose of this meeting was to review three specific proposed final regulatory guides related to the implementation of 10 CFR Part 20. The entire meeting was open to the public. Giorgio Gnugnoli and Elpidio Igne were the designated Federal Officials for the meeting.

A list of meeting participants and attendees follows:

ACRS:

Dr. J. Ernest Wilkins, Jr., Co-Chairman of the Joint Subcommittee and Chairman, ACRS Subcommittee on Occupational and Environmental Protection Systems

ACNW:

Dr. D. W. Moeller, Co-Chairman of the Joint Subcommittee and Chairman of the ACNW

Dr. Paul W. Pomeroy, ACNW Member

ACRS/ACNW Consultants:

Dr. Melvin Carter
Dr. Richard Foster
Dr. Ronald Kathren
Dr. Jacob Shapiro

NRC Staff Attendees:

D. Cool, RES
C. Raddatz, RES
A. Roecklein, RES
R. Pedersen, NRR
H. Pastis, NRR
T. Taylor, RES
C. Jones, NMSS
M. Harvey, NMSS
M. Weber, NMSS

O&M-7(ACRS)
XO&M-7(ACNW)
XX-4-1 Pt 20 (Standards for Protection Against Radiation)

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Other Attendees:

J. Bland, RES Consultant
T. Meisenheimer, Bechtel\SERCH
S. Langhorst, ORISE/CIRRPC
P. Dunn, TRW
L. Hendricks, NUMARC
T. Jentz, NUS

Background

As part of the Advisory Committee on Reactor Safeguards' (ACRS') responsibilities, as stipulated in its charter, its Subcommittee on Occupational and Environmental Protection Systems has been reviewing the guidance that the NRC's Office of Nuclear Regulatory Research (RES) has been either developing or revising in the promulgation of the most recent revision of 10 CFR Part 20, "Standards for Protection Against Radiation" (56FR23360). Originally, twelve regulatory guides had been identified for such revision and/or development. With this Joint ACRS/ACNW meeting, nine of the twelve guides have been reviewed and approved by the Joint ACRS/ACNW Subcommittee. Three of the original twelve have been eliminated as unnecessary, and two additional guides on worker risks are in preparation.

A significant portion of this meeting focused on editorial changes, which would improve clarity, and correcting mistakes and potential misinterpretations. These editorial suggestions will not be explicitly detailed in these minutes. For these more detailed recommendations, the reader is directed to the meeting transcript, which is available in the NRC Public Document Room or from Ann Riley & Associates, Ltd., 1612 K Street, N.W., Suite 300, Washington, D.C. 20006 (202)293-3950.

Introduction

Dr. J. E. Wilkins, Jr., Co-Chairman of the Joint ACRS/ACNW Subcommittee, welcomed the participants and attendees of the Joint Subcommittee. Dr. Wilkins identified the three regulatory guides (RGs) which were the focus of this day's meeting:

- DG-8006 "Control of Access to High and Very High Radiation Areas in Nuclear Power Plants." RG 8.38
- DG-8009 "Interpretation of Bioassay Measurements." Title changed to "Acceptable Concepts, Models, Equations and Assumptions for a Bioassay Program." RG 8.9, Revision 1.

- DG-8013 "ALARA Radiation Programs for Effluents from Materials Facilities."[1]

RES Introduction

Dr. Cool noted that these three RGs had already been provided in draft form for ACRS and/or ACNW review and that public comments have been received and addressed. Each of the RGs has received NRC Office-level concurrence (NMSS, NRR, etc.) and each has been reviewed by the Committee to Review Generic Requirements (CRGR). Dr. Cool noted that some power plant and materials licensees are already implementing the revised 10 CFR Part 20. All other licensees (including Agreement State licensees) must be in compliance by January 1, 1994.

Dr. Moeller raised two concerns which have not been reflected in the revised regulations and guidance. These were:

- The National Council on Radiation Protection and Measurements' (NCRP's) lifetime cumulative dose limit.

- Quality Factors (QFs) instead of the International Committee for Radiation Protection's (ICRP's) radiation weighting factor terminology.

Dr. Cool indicated that ICRP-60 concepts and terminology and NCRP-91 lifetime cumulative dose limits were introduced after the revised 10 CFR Part 20 was published. It was thought that retaining the earlier terminology and concepts in the regulatory guidance would be less confusing, since 10 CFR Part 20 is the pertinent regulation. ICRP-60 and NCRP-91 concepts and recommendations will be considered in future revisions to Part 20.

DG-8006, "Control of Access to High and Very High Radiation Areas in Nuclear Power Plants"

C. Raddatz (RES) briefly discussed the contents of the RG. She highlighted:

- Control of Access to High Radiation Areas (HRAs) - This involved the requirement that licensees establish procedures for controlling possession of keys and erection of barriers.
- Control of Access to Very HRAs - In addition to key control, procedures would have to be established including electronic surveillance and interlocks.

[1]ALARA means "as low as reasonably achievable."

- Special precautions during diving operations would have to be established to limit exposure.

In response to subcommittee queries, the RES staff acknowledged that the RG did not stipulate the specific procedures, but did impose the responsibility that the licensee establish such procedures.

C. Raddatz summarized the public comments, which included:

- The RG was not needed; present programs at nuclear power plants are adequately protective.

- There were areas in the draft RG that needed clarification.

- Increased flexibility in the RG was requested.

C. Raddatz stated that the potential for overexposures and lethal doses is sufficient to require this additional guidance. She indicated that previous ACRS concerns over imprecise language and apparent contradictions were addressed, and examples have been provided to clarify guidance and implementation.

Recommendations and comment raised by the subcommittee members and consultants included:

1) The RG should more explicitly distinguish the meaning, use and context of barriers versus barricades. A glossary of terms and their usage would be helpful in the RG. RES staff agreed to consider this.

2) The language in the RG inappropriately described properties of certain control features, e.g., signs preventing access as opposed to inhibiting access. RES staff agreed to review the RG for such inappropriate terminology and descriptions.

3) Ambiguous criteria needed to be clarified. There is inconsistent use of dose level, radiation levels, dose rates, different dose units (e.g., 0.01 Sv in one hour versus 0.01 Sv/hr) and in confusing context (e.g., at distances of 30 cm; not clear if averages or maximums are involved). RES staff agreed to address this.

4) There is a concern over controls in areas which may change designation depending on the plant's operating mode. The guidance is not adequately specific nor explicit regarding licensee responsibilities to maintain worker protection, awareness, and caution for these hybrid areas. RES and NRR staff indicated that these suggestions would be addressed, but that workers' potential exposures needed to be balanced with work flow disruption (too many access control points, procedures and precautions could unnecessarily cripple NPP operations). RES and NRR staff agreed to clarify the RG's language.

5) Use of individual identification cards would be better control access keys than classic keys or magnetic key cards.

Ms. Lynnette Hendricks (NUMARC) asked to make an oral public comment. She indicated that the industry considered this RG to be well-done and beneficial. She also complimented the NRC staff on its cooperation and willingness to address industry comments.

DG-8009, "Interpretation of Bioassay Measurements."

C. Raddatz (RES) began by restating past ACRS/ACNW concerns which included:

- The technical bases for the RG required clarification. RES addressed this concern by expanding the explanations therein.

- The term "IRF" needed to be better delineated. The acronym designates both intake retention fraction and internal retention function. This confusion was remedied.

- Derived investigation levels should be included for action thresholds. Two such levels were added: An 0.02 annual limit on intake (ALI) requiring more than a single measurement (additional samples or air sample data) and an 0.1 ALI requiring daily measurements until a retention/excretion pattern is established.

Public comments covered a number of shortcomings:

- The RG imposed excessive conservatisms.
- The technical support document (NUREG/CR-4884) had not been peer-reviewed.
- More programmatic information was needed.
- Chronic versus acute intakes needed to be clarified.
- More statistical flexibility needed to be incorporated.

- Other integration methods should be permitted.
- Examples should be expanded.

RES staff addressed some of these concerns and comments by adding examples, by keying frequency and levels of bioassay to NCRP recommendations, by allowing other statistical and integration methods (accompanied by demonstrated justification) and clarifying acute versus chronic intakes.

Due to the number and extent of changes, the revised draft RG was reissued to NUMARC, national laboratories and other parties (it was placed in the PDR). Following these changes, the RG was again reissued. The resultant comments were primarily editorial.

Recommendations and comments raised by the meeting participants included:

1) Although the equations were still difficult to follow, the examples clarified the procedures effectively. Equation 5 on intake lacked a reference. RES agreed to add it.

2) In determining the frequency of bioassay, participants suggested adding chemical form and route-of-entry to considerations of retention and excretion characteristics of the radionuclides. RES indicated that they would reconsider including these characteristics in the guide.

3) It was suggested that the RG be modified to indicate that a single bioassay measurement is adequate to estimate intake for very small intake episodes. Although this may be adequate for fission products, that would not be the case for heavy metals such as plutonium, americium and uranium. RES agreed to revise the guidance.

4) Concern was expressed that, in contrast to conservative solubility assumptions recommended in estimating intake, the assumption of using the midpoint of the time period since the last bioassay (instead of using the whole time period) appeared to be an adjustment to the degree of stringency. RES staff indicated that the midpoint was selected to be consistent with NCRP recommendations.

5) The RG should be more emphatic that the equivalent dose is the primary standard. Although the ALI is a convenient and appropriate way of implementing the regulation, it is, at best, a secondary standard. Since bioassay measurements are nearly always a much better index of the dose (the primary standard) than air sampling results, the bioassay measurements

should be given much greater weight in arriving at an estimated ALI value than air concentrations. RES staff agreed that the dose is primary, but wanted to be realistic because there can be significant differences in bioassay and air sampling results. RES staff indicated that another Part 20 RG deals with converting intake to dose. RES staff agreed to consider such a clarification. It was also pointed out that the ALI provides relief from the committed dose problem of annual dose determination.

6) It was pointed out that derived air concentrations (DACs) can be exceeded under normal operational conditions for short periods of time. A possible scenario would be having a worker burdened by respiratory protection being so encumbered that he would receive a lesser exposure by quickly entering and exiting an affected area to perform a needed function. RES staff indicated that this is consistent with the ALARA philosophy. This provides flexibility in operations, without unduly exposing workers.

7) There was some confusion regarding the fact that the tritium ALIs and DACs in Part 20 already incorporate skin absorption for occupational inhalation exposures. RES staff agreed to clarify the language.

8) There was some ambiguity over estimation of accumulated urine or feces over a 24-hour period or over a number of days. Using equation 2 and 3 based on spot samples, RES staff indicated that the equations can be used for one 24-hour period or to accumulate over days by summation. RES staff agreed to consider clarifying this flexibility in the RG.

DG-8013, "ALARA Radiation Programs for Effluents from Materials Facilities."

Dr. Moeller noted that the title of the RG was incongruous with those of RGs 8.10, 8.18, and 8.31, since ALARA is a governing principle, not a specific set of explicit numerical standards. The RES staff agreed to consider this suggestion.

C. Raddatz discussed the public comments received; these included:

- The 10-20% ALARA goal cited in the RG was criticized as potentially being treated as a "de facto" prescribed limit. Several NRC Commissioners had the same concern. RES defended this goal, since explicit text was included in the guide to condition the use of the goal. RES staff also pointed out that the RG serves to justify EPA's rescission of Clean Air

Act regulations as they apply to NRC materials facilities. Without such a rescission, the reporting, recording and other duplicative activities imposed by 40 CFR Part 61 would constitute an undue and unnecessary burden on NRC-licensed materials facilities. This RG constitutes one vehicle by which NRC can demonstrate to EPA that the rescission can be justified. EPA still has concerns with NRC's license-by-license approach to demonstrate that additional 40 CFR Part 61 compliance responsibilities are not needed. Removal of the numerical 10-20% goal will likely force EPA to withhold rescission.

A parallel effort, involving NMSS and RES, is considering strengthening the RG to impose a 10-mrem (0.1-mSv) limit on material licensees. Although materials licensees under present license controls would likely meet this criterion, depending on what models one uses, 14 to 33 facilities could exceed the 0.1-mSv limit. Presently, RES staff is expecting to strengthen the discussion sections of the RG, but not the regulatory position section.

2) Other public comments questioned the concern for such "small exposures," and suggested that few medical procedures involved any potential doses to the public. The RES staff disagreed with these comments, since there are problems with medical misadministration and with the potential for serious exposure to the public from effluents.

C. Raddatz noted that Commissioners Curtiss and Remick indicated concern with the 10-20% ALARA goal being explicitly stated. Furthermore, the Commissioners took issue over inclusion of the EPA/NRC Memorandum of Understanding (relative to rescission of 40 CFR Part 61 requirements on NRC licensees) as an explicit reference in the RG. RES staff addressed these concerns in the subsequent revisions of the RG.

C. Raddatz reviewed some of the ACNW's early comments for the benefit of the Joint ACRS/ACNW Subcommittee participants:

- The ACNW encouraged endorsement of the ICRP's critical group concept. RES modified the discussion section accordingly.

- The ACNW also cautioned the potential misuse of the 10-20% ALARA goal as a de facto limit. Likewise, RES staff introduced explicit language warning that this was a goal, not a de facto precedent.

After viewing the presentation slides for this RG, the Joint Subcommittee members and consultants pointed out errors, typographical errors and some areas needing clarification. The more significant observations follow:

- There were still some problems with terminology such as indicating whether a dose was a dose rate, collective dose, etc.

- There was some concern over the use of the $1000 per man-rem criterion for ALARA judgments. Although this criterion is almost 20 years old, it was so conservative at the time that, even with inflation and other considerations, the figure is still applicable. There was also concern in implementing and applying the $1000 per man-rem figure; specifically in populated areas. There is an effort underway in NRC to reassess its applicability.

- There was some concern over the 30% cutoff criteria for unmonitored releases. RES staff indicated that it is stated in 10 CFR Part 20, which stipulates that so long as the mixture of a group of radionuclides does not exceed 30% of the total estimated release, then any radionuclide which is less than 10% of the expected release from that group can be ignored. RES staff agreed to explicitly reference 10CFR20.1204(g)(3).

- In response to a concern that the RG's language may give the impression that 10 CFR Part 20 limits may be exceeded by an ALARA approach, RES staff agreed to attempt to clarify the language.

- Another misinterpretation was identified. The RG seems to indicate that ALARA goals are only tied to dose limitations. RES staff agreed to address the issue.

- Questions were raised regarding the implementation of the 10-20% ALARA goal guidance; specifically, in an urban and populated environment. Some participants recommended using only the 20% figure. The range of collective dose in a populated area -- which would correspond to a 10%-20% range of release -- could be seen as alarming. RES staff indicated that the 10-20% choice reflects the two methods permitted for demonstrating compliance with public dose limits (e.g., using the total effective dose equivalent [TEDE] approach, a 10% ALARA goal release corresponds to 10 mrem [0.1 mSv]).

RES staff reminded the participants that if the 10-20% ALARA goal is met, the $1000 per man-rem collective dose concept does not apply. If the licensee cannot achieve effluent radionuclide concentrations at less than 20% of Appendix B of 10 CFR Part 20, then the licensee needs to perform a $1000 per man-rem collective dose analysis.

With the end of the formal presentations, the RES staff was encouraged to review the meeting transcripts and their notes for more specific corrections, errors and suggested revisions. After thanking the RES and NRR staff, Dr. Moeller adjourned the meeting at 11:58 a.m.

Attachment:
Annotated Agenda

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NOTE: A transcript of the meeting is available at the NRC Public Document Room, Gelman Building, 2120 "L" Street, N.W., Washington, D.C. [Telephone (202) 634-3383] or can be purchased from Ann Riley & Associates, Ltd., 1612 K St., N.W., Suite 300, Washington, D.C. 20006 [Telephone (202) 293-3950].

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

SCHEDULE AND OUTLINE FOR DISCUSSION
JOINT ACNW/ACRS WORKING GROUP SUBCOMMITTEE MEETING
ON REGULATORY GUIDES TO IMPLEMENT 10 CFR PART 20
MARCH 26, ~~1983~~ 1993
(OPEN MEETING)

Friday, March 26, 1993, Room P-110, 7920 Norfolk Ave., Bethesda, Maryland

1) 8:30 - 8:50 a.m. — Opening Remarks by Working Group Co-Chairmen (Open) (DWM/JEW/GNG/EGI)

2) 8:50 - 9:10 a.m. — Introduction and Comments by NRC/RES Staff (Open) (DWM/JEW/GNG/EGI)

3) 9:10 - 9:56 a.m. — DG-8006, Control of Access to High and Very High Radiation Areas in Nuclear Power Plants (Open) (JEW/EGI)

9:56 -10:10 a.m. — ******** BREAK *********

4) 10:10-~~10:55~~ 11:05 a.m. — DG-8009, Interpretation of Bioassay Measurements (Open) (DWM/GNG)

5) ~~10:55~~ 11:05-~~11:40~~ 11:55 a.m. — DG-8013, ALARA Radiation Programs for Effluents from Materials Facilities (Open) (DWM/GNG)

6) 11:~~40~~ 55-~~12:30~~ 11:57 a.m. — Round Table Discussion (Open) (DWM/JEW/GNG/EGI)

~~12:30~~ 11:57 a.m. — ******* ADJOURN *******

[= Transcribed portions.