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

OFFICE OF THE SECRETARY

December 5, 1988

MEMORANDUM FOR: Janice Dunn-Lee
Maria Lopez-Otin
Margaret Federline
Gail Marcus
Joe Gray

FROM: Jack Guttmann

SUBJECT: COMMISSIONERS' ASSISTANTS MEETING RELATING TO SECY-88-315, " REVISION OF 10 CFR PART 20, "STANDARDS FOR PROTECTION AGAINST RADIATION" "

A Commissioners' Assistants meeting on the Subject SECY paper has been scheduled between 9:00-11:00 a.m. and 2:00-4:00 p.m., Thursday, December 22, 1988, at the 18th floor Executive Conference Room, One White Flint North.

An outline of the staff's presentation is as follows:

I. General Overview:

- o Necessity for overhauling Part 20.
- o Major impacts of the Final Rule.
- o Views of various groups on impacts.
- o Staff's response to positions taken by groups.
- o Anticipated cost/benefit results.
- o Implementation :
  - Number of Reg Guides
  - Other documents
  - Resource allocation

II. Committed and Annual Dose Approaches: H-6

- o Detailed but simplified explanation of annual and committed dose.
- o Discussion of how dose commitment is incorporated in the present Part 20 for controlling internal doses (Ref.: pgs. 34-35 of Enclosure 3).
- o Example of a scenario demonstrating the differences between the application of annual and committed dose.

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AA38-2

- Discussion of risk to workers under the concept of committed dose equivalent versus allowing an exemption from the use of committed dose equivalent for long-lived radionuclides as envisioned under 20.205.

- Discussion/explanation of ICRP recommendations regarding 20.205 (Copy of ICRP 84 to be included).

- Discussion of the sensitivities and limitations of lung counting and other measuring techniques for determining intakes.

- Discussion of the change in threshold for monitoring internal doses and measurement difficulties (Ref.: Page 56 of Enclosure 3).

III. Impact on Safety:

- Safety benefits of the proposed Part 20 revisions.

- Discussion of changes in annual intake limits, correlated with safety benefits.

- Backfit issues - impact on Part 50 Licensees

  OGC will discuss the options and provide a recommendation regarding the backfit issue for Part 20.

IV. Views of Interested Parties:

- Interpretation and response to concerns raised by the Nuclear Information and Resource Service as well as by the Nuclear Industry (e.g., NUMARC, GE, CE, and others).

- Clarification by EPA as to whether the proposal by GE to adopt a system using committed dose for design and daily control of the work place and annual dose to assess and manage the actual dose to workers conforms with the President's Federal guidance.

V. Miscellaneous:

- Discussions as to how the 3 basic assumptions listed on page 4 of Enclosure 3 relate to the rule. (Explanation of the assumptions in greater detail.)

- Effect on the industry of going to 1 cm^2 effective area for skin dose evaluation and likelihood that this new requirement would be impacted by a subsequent resolution of the hot particle issue.

AA38-2

- Discussions of possible ramifications of summing internal and external doses (e.g., difficulties, assumptions (10%), etc.).

- Discussion of the impact of lowering airborne concentration limits for radionuclides such as thorium and uranium. Implications for fuel fabrication licensees in terms of risk and cost.

- Definition of ALARA for other than reactor licensees (Ref.: page 21 of Enclosure 3).

- Discussion of the basis for changes in 20.1003, disposal by release into sanitary sewage, and comparison with other allowed liquid effluent releases (Ref.: page 73 of Enclosure 3).

- Likelihood that the BEIR V report will require additional amendments to 10 CFR Part 20. (Staff's expectation and knowledge of the content of the upcoming BEIR V report).

- List of countries which have adopted the ICRP recommendations on radiation protection.

- Detailed plans and resource allocation for developing 9 regulatory guides, 3 major changes and 55 minor changes (total of 12,700 staff-hours) prior to the effective date of the revised Part 20.

- Reason for changing the effective date from that recommended in the proposed rule and that in the final rule. Discussion of industry's concerns.

- Assurances of correct implementation and interpretation of Part 20 by licensees in light of staff's "permission granting licensees to make handwritten changes to their licenses in order to conform them to the revised 10 CRF Part 20 sections" (Ref.: Page 13 of Enclosure 3).

The staff's presentation will follow a brief outline in layman terms.

Representing the staff will be:

Bill Morris	(RES)
Harold Peterson	(RES)
Richard Cunningham	(NMSS)
Other	(NMSS)

Representing OGC will be:

Martin Malsch	(OGC)
Other	(OGC)

cc: W. Parler
J. Blaha
L. Roche ✓
RES (Bill Morris, Harold Peterson)
NMSS (Richard Cunningham)
ACNW

AA93P-2

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U.S. NUCLEAR REGULATORY COMMISSION

ROUTING SLIP

ORGANIZATION

TO ("X" as appropriate)	NAME	MAIL STOP	TO	NAME	MAIL STOP
X	T. Murley, D/NRR		X	Lida K.	
X	H. Thompson, D/NMSS				
X	E. Beckjord, D/RES				
	E. Jordan, D/AEOD				
	W. McDonald, D/ARM				
	J. Partlow, D/OSP				
	B. Hayes, D/OI				
	J. Lieberman, D/OE				
	P. Bird, D/OP				
	W. Kerr, D/SDBU/CR				
	M. Springer, D/CON				

REMARKS

- RES lead
- NMSS participate
- NRR as appropriate
- Give Jack Guttman staff contact by Dec 9 -
- Note VG's requested.

AS REQUESTED	FILE	FOR CONCURRENCE
APPROVAL SIGNATURE	INFORMATION	SEE ME
COMMENT/CONCURRENCE	NECESSARY ACTION	SIGNATURE OF
CORRECTION	NOTE AND DESTROY	
ANSWER ACKNOWLEDGE FOR	NOTE AND RETURN TO	

FROM (Name)	OFFICE	PHONE
James L. Blaha, AO	OEDO	21703
		DATE

AA38-2

DRAFT

ANNOTATED RESPONSE TO CONCERNS RAISED FOR STAFF BRIEFING OF TECHNICAL ASSISTANTS ON 10 CFR PART 20

I. General Overview:

o Necessity for overhauling Part 20.

- Conformance with 1987 Federal Guidance (and agreement of NRC regulations with guidance implemented by other Federal agencies which are also NRC licensees)

- No major complete revision of Part 20 since 1957 but over 90 piecemeal revisions.

- Update the philosophical and scientific bases for radiation protection that have evolved since 1957 and are reflected in the current recommendations of national and international scientific advisory groups, such as the International Commission on Radiological Protection (ICRP) and the National Council on Radiation Protection and Measurements (NCRP).

- Update the metabolic and dosimetric models and parameters used to derive concentration and intake limits.

- Provide agreement with international standards adopted by international agencies and other major Western nuclear countries in order to facilitate trade and transport of radioactive materials.

- Improve organization and clarity of Part 20.

o Major impacts of the Final Rule.

- Changes in procedures and recordkeeping systems to accomodate the new approaches (such as effective doses and summation of external and internal doses).

- At facilities such as fuel fabrication facilities, modifications to procedures, exposure times, and/or processes may be required because of lowered concentration limits for airborne uranium. These lower limits were necessitated by changes in the metabolic and dosimetric models and parameters used to calculate dose from intakes. This has a major cost impact of around $42 million. (See Regulatory Analysis, Enclosure 7 (pp. 3.3 - 3.12, esp. pp. 3.11 and 3.12).

AA38-2

II. Committed and Annual Dose Approaches:

o Detailed but simplified explanation of annual and committed dose dose, including the analytical methods.

Response: Provided separately. However, the analytical methods used for measuring the body burden or intake are the same regardless of whether annual dose or committed dose is used. The revised Part 20 (§20.204) permits licensees to use either air concentrations, body burdens, excretion measurements or any combination of techniques to determine the intake (as did the proposed Part 20 §20.204). Consequently, unlike the industry comments indicate, the methods of determining intakes do not vary appreciably whether a committed dose approach or an annual dose approach are used. The industry comments indicating that the annual dose approach allows the use of better measurement techniques are specious. (See the discussion in the Statement, Enclosure 3, pp. 33-37, comments on NUMARC Appendix A in Enclosure 9 and § 20.204 of the revised rule in Enclosure 4, pp 26-27.)

o Discussion of how dose commitment is incorporated in the present for controlling doses (Ref. 34-35 of Enclosure 3).

Response: The concentration limits in Appendix B of both the present and revised Part 20 are based upon the use of committed dose equivalent. The concentration limits represent concentrations which, when taken in continuously over a 50-year intake period, would produce a dose at the dose limit for the critical (highest exposed) organ.

The current rule allows records to be based on fraction of body burden or DAC-hours (time integrated air concentration) without requiring a dose to be recorded as the revised rule requires; consequently, the present rule does not require a committed dose equivalent to be recorded.

o Example of scenario demonstrating the differences between the application of the annual and committed dose.

Response: Provided separately.

- Discussion of risk to workers under the concepts of committed dose equivalent versus allowing an exemption from the use of the committed dose equivalent for long-lived radionuclides as envisioned under § 20.205.

  Response: This is covered in detail in the staff responses to the NUMARC comments in Appendix A of Enclosure 9. As stated in these comments there is little difference in the long-term risk between the two methods of control. The staff's preference for continuing to control using committed dose equivalents is based upon ensuring the future employability of the worker, reducing the burden on any future employer of having to do internal dose monitoring because of a pre-existing body burden, and ensuring that the dose associated with the intake is attributed to the licensee that caused the intake to occur rather than ignoring the future dose that will eventually occur unless the worker dies first.

- Discussion/explanation of NCRP recommendations regarding §20.205.

  Response: The NCRP Report No.84 did not address §20.205 directly, but did address the issue of annual versus committed dose in both NCRP reports No. 84 and 91. The discussion of annual dose in Report No. 84 is similar to the discussion in the later Report No. 91 which is the NCRP's latest recommendations on radiation protection.
  The sections relevant to committed dose are quoted on pages 2-3 of Enclosure 9. Report No. 91 also has a statement that the committed dose equivalent represents the risk associated with a particular intake. (See the second quote on page 3 of Enclosure 9).

- Discussion of the sensitivities and limitations of lung counting and other measuring techniques for determining intakes.

  Response: This issue together with sensitivities is discussed on pages 3.3 - 3.8 of the Regulatory Analysis, Enclosure 7. However, monitoring techniques are not an issue with regard to the incorporation of the proposed § 20.205 as both lung counting (in vivo) and air sampling measurements are allowed in the revised rule (See §20.204, p.26 of Enclosure 4 and pages 1 and the first and last responses to NUMARC Appendix A in Enclosure 9.) Thus the type of monitoring allowed or required does not depend upon whether the committed dose or annual dose approaches are adopted.

AA38-2

o Discussion of the change in threshold for monitoring internal doses and measurement difficulties (Ref.: Page 56 of Enclosure 3).

Response:

A438-2

III. Impact on Safety:

o Safety benefits of the proposed Part 20 revisions.

Response: The benefits from Part 20 are primarily improved public health protection rather than improved safety as Part 20 applies to normal operations and not accident risk reduction. The primary quantitative benefits are shown in Table 8.6, page 8.9 of the Regulatory Analysis, Enclosure 7:

Benefit	Present Value $Millions
Reduced effective dose	$ 4.6
Reduced doses to unborn	26.0
Improved respiratory protection	5.4
Reduced operating costs	7.6
	$43.6

Additional qualitative benefits such as consistency with national and international standards, benefits of improved monitoring for liability defenses, development of a worker registry and data base for possible epidemiological studies, and other non-quantifiable benefits are discussed in detail in Chapter 7 of the Regulatory Analysis, Enclosure 7.

o Discussion of changes in annual intake limits, correlated with safety benefits.

Response: (See pages 3.11 - 3.12 of the Regulatory Analysis, Enclosure 7 for a discussion of the costs and pages 3.13 and 3.14 of Enclosure 7 for a discussion of the dose reductions. The quantitative benefits of the changes in the air concentration limits (there are no intake limits per se in the present rule) are represented by the first line ($4.6 million) in the above table.

o Backfit issues - impact on Part 50 licenses.

Response: The options for dealing with the backfit issue have been separately provided to the Commissioners by the General Counsel's memorandum of November 22, 1988 to Commissioner Curtiss.

IV. Views of Interested Parties

o Interpretation and response to concerns raised by the Nuclear Information and Resource Service as well as by the nuclear industry (e.g. NUMARC, GE, CE, and others).

Response: The principal concerns raised by the Nuclear Information and Resource Service principally reflect their written comments submitted during the public comment period. The primary issues are addressed in the following locations in the Commission paper and its enclosures:

Changes in concentration limits for the public:

Issue: The revised rule provides higher concentration limits than the present Part 20.

Response: This is true for most of the concentration limits for occupational exposure, but is not true for the limits applied to the public because, in addition to any upward change caused by the adoption of the effective dose concept, there is a 10-fold lowering of the dose that the concentration limits for the public are based upon (from 500 millirem per year to 50 millirem per year). (See Enclosure 3, pp. 95-96).

Need for an Environmental Impact Statement:

Issue: Whether the NRC should prepare a full Environmental Impact Statement rather than just an Environmental Assessment.

Response: The revised Part 20 has little impact on the doses delivered to unrestricted areas. Although the dose limits for members of the public are reduced by a factor of 5 (from 500 millirem/year to 100 millirem/year), there are other more restrictive standards that would generally control doses to members of the public to lower levels (e.g. Appendix I to 10 CFR Part 50 for power reactor effluents, EPA's generally-applicable environmental radiation standards such as 40 CFR Part 190 for the Uranium Fuel Cycle, 40 CFR Part 191 for High-Level Waste. 40 CFR Part 193 (under development) for Low-Level Waste, and the EPA Clean Air Act Emission Limitations in 40 CFR Part 61. Most of these standards control doses to members of the public to 25 millirem per year or less; consequently, there is no significant risk reduction and no significantly different impact on the environment produced by the reduction in limits in the revised Part 20. (See Enclosure 8, the Environmental Assessment and Enclosure 3, pp. 101-103 for more discussion).

A-138-2

Need for Public Hearings:

Issue: Whether public hearings are needed on the revised Part 20 rule.

Response: The staff believes that all of the major issues regarding the adoption of the ICRP-26 system of dose limitation have been addressed in the over 800 public comments received on the proposed rule during the extended 250-day+ comment period and that no significiant new information would be developed. The staff also believes that the four regional hearings (Washington, DC; Houston, Texas; Chicago, Illinois; and San Francisco, California) held by the EPA with NRC staff participation on the proposed Federal Guidance on Occupational Protection also covered most of the issues involved with the adoption of the ICRP system for occupational protection. (¶2 page 3 of the Commission paper and pp. 5-6 of Enclosure 3).

In addition, because of the time to organize and hold a public hearing, the Part 20 rule might have been delayed by 1-2 years.

o Clarification by EPA as to whether the proposal by GE to adopt a system using committed dose for design and daily control of the workplace and annual dose to assess and manage the actual dose to workers conforms with the President's Federal Guidance. [This is basically the option afforded in the deleted exemption in §20.205 of the proposed rule.]

Response: This is addressed in the November 18, 1988 note from Allan C.B. Richardson, Chief of the Guides and Criteria Branch in EPA's Office of Radiation Programs to Commissioner Curtiss. Basically, Mr. Richardson believes that § 20.205 in the proposed rule would not conform to the 1987 Federal Guidance on Occupational Exposure.

The guidance permits use of the annual dose only for situations where an overexposure has already occurred (See Enclosure 1, p 2832, 2nd ¶), whereas both the proposed § 20.205 and the industry positions would permit its use when doses are still within the limits.

V. Miscellaneous:

o Discussions as to how the 3 basic assumptions listed on page 4 of Enclosure 3 relate to the rule. (Explanation of the assumptions in greater detail.)

Response: "(a) Within the range of exposure conditions usually encountered in radiation work, there is a linear relationship, without threshold, between dose and probability of stochastic health effects (such as latent cancer and genetic effects)."

"(b) The severity of each type of stochastic effect is independent of dose"

This means that once a cancer has been induced, its seriousness (e.g. fatal or non-fatal) is not related to the dose that produced it. For the statistical (stochastic) effects, the dose determines the probability of producing the effect, but not its severity.

"(c) Non-stochastic (non-random) occurrence of radiation-induced health effects can be prevented by limiting exposures so that doses are below the thresholds for their induction."

AA38-2

o Effect on the industry of going to 1 cm^2 effective area for skin dose evaluation and likelihood that this new requirement would be impacted by a subsequent resolution of the hot particle issue.

Response: This is not a new requirement, the NRC has always used a 1 cm^2 area for averaging skin doses. This value is not found in the current Part 20, but is found on tha back of NRC Form 5. The proposed rule had a 10 cm^2 area, but the final rule reverts back to past practice.

Resolution of the "hot particle" issue would require amending Part 20 to add that provision; however, it is expected that this would apply only to "hot particles" and that the 1 cm^2 value would be retained for averaging the dose from other forms of skin exposure.

(See pp. 27-28 of Enclosure 3).

o Discussions of possible ramifications of summing internal and external doses (e.g. difficulties, assumptions (10%), etc.).

o Discussion of the impact of lowering airborne concentration limits for radionuclides such as thorium and uranium. Implications for fuel fabrication licensees in terms of risk and cost.

Response: (See pages 3.11 - 3.12 of the Regulatory Analysis, Enclosure 7 for a discussion of the costs and pages 3.13 and 3.14 of Enclosure 7 for a discussion of the dose reductions.

o Definition of ALARA for other than reactor licensees (Ref.: page 21 of Enclosure 3).

Response: Numerical ALARA guidelines exist in the NRC regulations only for light-water power reactor effluents (Appendix I to 10 CFR Part 50).