



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001

February 24, 2010

MEMORANDUM TO: ACRS Members

FROM: Neil Coleman, Senior Staff Scientist */RA/*  
Derek Widmayer, Senior Staff Scientist */RA/*  
Reactor Safety Branch B, ACRS

SUBJECT: CERTIFICATION OF THE MINUTES OF THE RADIATION  
PROTECTION AND NUCLEAR MATERIALS SUBCOMMITTEE  
MEETING ON DECEMBER 16, 2009

The minutes for the subject meeting were certified on February 24, 2010. Along with the transcripts and presentation materials, this is the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated

cc w/o Attachment: E. Hackett  
C. Santos  
A. Dias

cc w/ Attachment: ACRS Members



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001**

**MEMORANDUM TO:** Neil Coleman, Senior Staff Scientist  
Derek Widmayer, Senior Staff Scientist  
Reactor Safety Branch B - ACRS

**FROM:** M. Ryan, Chairman  
ACRS Subcommittee on Radiation Protection and Nuclear Materials

**SUBJECT:** THE MINUTES OF THE MEETING OF THE RADIATION PROTECTION  
AND NUCLEAR MATERIALS SUBCOMMITTEE ON DECEMBER 16,  
2009, IN ROCKVILLE, MD

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject Meeting are an accurate record of the proceedings for that meeting.

/RA/ February 24, 2010  
M. Ryan Date  
Radiation Protection and Nuclear Materials  
Subcommittee Chairman

Certified by: Mike Ryan  
Certified on: February 24,2010

Issued: February 26,2010

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
RADIATION PROTECTION AND NUCLEAR MATERIALS SUBCOMMITTEE MINUTES  
DECEMBER 16, 2009  
ROCKVILLE, MD

Introduction

The ACRS Subcommittee on Radiation Protection and Nuclear Materials met on December 16, 2009 at NRC headquarters in Rockville, MD. Michael Ryan, Chairman, was presiding. The Subcommittee met with NRC staff members. Other attendees include members of the public and an industry representative. The purpose of this meeting was for the Subcommittee members to hear briefings on the following topics:

- Options to Revise Radiation Protection Regulations, SECY-08-0197 - Update
- Status of Rulemaking for Depleted Uranium and Other Unique Waste Streams
- Proposed Rev. 2 to RG 4.11, Terrestrial Environmental Studies for Nuclear Power Stations

Attendees (12/16/2009)

<b>ACRS Members/Staff</b>	<b>NRC Staff</b>	
Michael Ryan (Chairman)	J. C. Dehmel	G. Suber
John Sieber (Member)	G. Comfort	D. White
Dennis Bley (Member)	K. Hsueh	P. Doub
James Clarke (Consultant)	E. Roach	M. Bayssie
Neil Coleman (DFO)	S. Easson	D. Logan
Derek Widmayer (DFO)	R. Emch	M. Masnik
Mike Lee (ACRS staff)	R. Kellner	<b>NEI</b>
John Flack (ACRS staff)	R. LaVera	E. Anderson
	D. Esh	
	P. Yadav	<b>Talisman</b>
	C. McKenney	J. Lieberman
	M. Heath	
	L. Camper	<b>Platts/McGraw-Hill</b>
	P. Bubar	M. Conley

The presentation slides used during the open portions of the meeting are attached to the transcript of this meeting at the following website: <http://www.nrc.gov/reading-rm/doc-collections/acrs/tr/subcommittee/>. The presentations to the Subcommittee are summarized

below. There were no requests by members of the public to make written or oral statements.  
DECEMBER 16, 2009 - OPENING REMARKS BY CHAIRMAN RYAN

Chairman Michael Ryan brought the meeting to order and announced that it is a meeting of the Subcommittee on Radiation Protection and Nuclear Materials. He noted that the meeting would cover three topics, including: (1) an update on staff efforts to revise and update the Radiation Protection Standards in 10 C.F.R. Part 20 and 50; (2) the status of NRC rulemaking efforts for "unique Waste streams," including depleted uranium; and (3) review of proposed revision 2 to Reg. Guide 4.11, "Terrestrial Environmental Studies for Nuclear Power Plants." Chairman Ryan stated that there would be a public comment period after that last presentation, if there are any public comments to be made. The meeting is being transcribed, so participants were asked to speak with sufficient clarity and volume so that they could be readily heard. If anyone wishes to make a comment, they need to come to the microphone and identify themselves and speak clearly so that everyone can hear them. Neil Coleman and Derek Widmayer were the Designated Federal Officials for the various portions of this meeting. Chairman Ryan introduced Dr. Kimyata Morgan Butler of the NRC staff (Office of FSME – Federal and State Materials and Environmental Programs), who was making the first presentation.

## DISCUSSION OF AGENDA ITEMS

### 1. OPTIONS TO REVISE RADIATION PROTECTION REGULATIONS

The title of Dr. Morgan Butler's talk was "Options to Revise Radiation Protection Regulations, SECY-08-0197 – Update." She noted that the NRC staff had previously briefed ACRS on staff plans in November 2008, and February 2009. The Commission approved the staff's recommended option on April 2, 2009. The staff is proceeding to explore implications, as appropriate and where scientifically justified, of greater alignment with ICRP Publication 103. Given adequate protection, discussion is to focus on discerning the benefits and burdens associated with revising the radiation protection regulatory framework.

The staff have conducted various outreach activities, including: (1) public availability of an associated web site and a dedicated web address for public comments; (2) publication of a Federal Register Notice inviting inputs (72 FR 32198); (3) publication of FSME newsletter (No. 09-1); (4) an FSME Newsletter Press Release (No. 09-078); (5) release of an all state letter (FSME-09-025); and (6) presentations given to CRCPD, OAS, SNM, HPS, FCXT, ACNP, National SLO Conference, NEI, ASNC, ACMUI, AAPM, FL HPS/AAPM Fall Joint Meeting, NASA, and the 5th Asian Conference on the Evolution of the System of Radiation Protection.

Future plans include engaging the industrial radiography community, other industry segments, and public citizen groups. The staff have scheduled presentations to the ISOE/EPRI ALARA Conference, January 2010, the Regulatory Information Conference (March 2010), and the CRCPD (April 2010). Staff are now preparing for facilitated round-table discussions in the spring of 2010.

Dr. Morgan Butler described feedback that the staff have gotten from the public. They have received a wide range of views on major topics. There is general support for increasing the alignment with international recommendations and other national regulations to improve consistency and trans-boundary considerations. There is also general agreement that the scientific information should be updated. With regard to effective dose, there is support for an update and questions on the application of the current rule. With regard to occupational dose

limits, many want the limit to stay at 50 mSv/yr (5 rem). Several commenters recommended reducing the limit. Certain groups of licensees continue to have individuals with doses above 20 mSv/yr (2 rem). There is a preference by some stakeholders to keep a higher limit as a legal boundary, and to increase ALARA and perhaps constraints to reduce doses.

The staff received mixed feedback regarding dose limits for embryo/fetus. There is a lack of data, and some options challenge limits of detection for personnel monitoring. Nuclear medicine labs may prefer the current limit for operational reasons. Regarding the use of "constraints" for ALARA planning, it was noted that the concept of "constraints" is not well understood. Questions were raised about inspection, compliance, and reporting. Some stakeholders are leaning to endorse constraints, and setting values, to provide flexibility. The ICRP recommends the consistent application of constraints as a tool to optimize protection. Constraints are not to be limits. 10 CFR Part 20 already has a constraint for public exposures from airborne radionuclides from materials facilities. Many large licensees already use planning values in ALARA programs. The options with respect to constraints include (1) no change; (2) require licensees to use constraints as part of their radiation protection programs; and (3) specify a numeric value that the licensee should not exceed. The implications of use of constraints include potential impacts to programs, benefits in protection, relationship to dose limit, and appropriate selection of a regulatory requirement.

With respect to possible updates to 10 CFR Part 50 and Appendix I, the staff has had ongoing discussions with industry representatives related to efforts on new reactor licensing. Industry supports revision to Part 50 and its associated guidance documents. Industry will propose comprehensive recommendations, but has concerns about scope of revision, industry participation in the overall effort, and how revisions will be implemented. Industry will urge a revision of 40 CFR Part 190, as implemented under Part 20.1301(e) for reactors. The Nuclear Energy Institute (NEI) expects to issue a white paper in March 2010 with recommendations on realignment with ICRP 103.

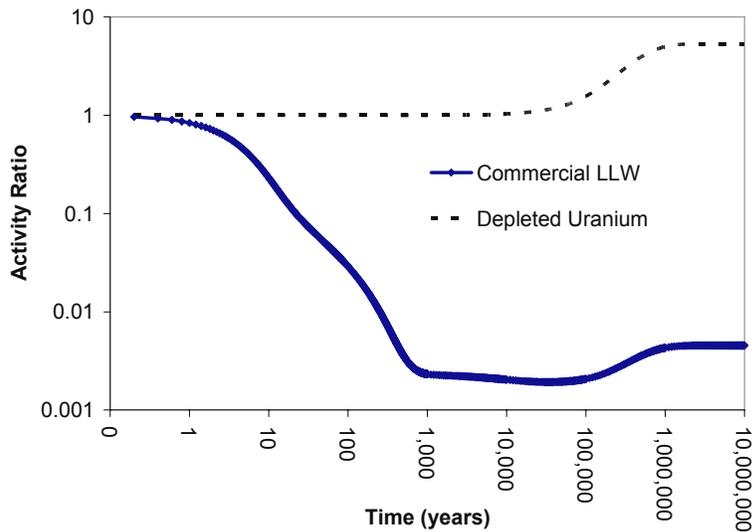
The current schedule for 2010 includes initiating detailed discussions, including possible workshops, on options and impacts. The Office of Nuclear Regulatory Research will support data needs for the technical basis needed for regulatory updates. There are also ongoing interactions with Federal agencies and State agencies. The staff is continuing to monitor international developments. Finally, below is the link to the staff's rulemaking web page to provide information to the public:

<http://www.nrc.gov/about-nrc/regulatory/rulemaking/opt-revise.html>

## 2. STATUS OF RULEMAKING FOR DEPLETED URANIUM (DU) AND OTHER UNIQUE WASTE STREAMS

This presentation was given by Ms. Priya Yadav, who is a Project Manager in NRC's Office of FSME, Division of Waste Management and Environmental Protection. She began with a series of background comments. The staff developed this term "unique waste streams" to apply to significant quantities of DU because really DU is very different from typical low-level wastes. The quantities of DU that we are seeing commercially generated were not included in the Environmental Impact Statements (EIS) associated with 10 CFR Part 61 because DOE was the only entity generating large quantities at the time the EIS's were developed. In other words, it was not a commercially generated waste stream at that time. DU behaves differently over time than typical low-level waste. For more typical low-level waste the hazard would decrease over time. With DU, the hazard increases over time and persists for a longer period due to the in-

growth of long-lived uranium daughter products. This long-term behavior of DU activity is shown in the figure below:



DU is currently classified as Class “A” waste. The current regulations assumed that only small quantities of DU would be disposed, i.e., approximately 6 MT. The specific activity of DU is 0.5  $\mu\text{Ci}/\text{cm}^3$ .

At present, the staff sees emerging commercial enrichment and significant quantities for disposal, more than 1 million metric tons. There are planned shipments of DU from SRS by DOE. The Commission has directed (Memorandum and Order CLI-05-20, 10/19/05) that the staff, outside of the LES adjudication, consider whether the quantities of DU at issue in the waste stream from uranium enrichment facilities warrant amending section 61.55 (a)(6) or the section 61.55 (a) waste classification tables.

Ms. Yadav said that a Commission paper was prepared in October 2008 to discuss a range of options informed by Technical Analysis. A screening model has been developed to examine key variables, including period of performance, disposal depth, receptor types and scenarios, and site characteristics. The staff has performed a probabilistic assessment using an analysis methodology for unique waste streams that is consistent with the original 10 CFR Part 61 analysis.

The staff analysis has found that if radon is included, shallow disposal at an arid site is challenging. For humid sites, the hypothetical dose from the groundwater pathway can exceed the performance objectives. Greater consideration of long-term stability is needed. Site-specific conditions can result in large variance in modeled impacts.

With respect to path forward, the Commission chose a two-tiered approach that includes site-specific performance assessments and assessment of budget needs to reexamine the waste classification framework in the long-term. The staff needs to develop supporting guidance and specify criteria that would be needed for analyses. Performance assessment has several roles, including helping to assess compliance, evaluate waste streams, and to update assumptions made in the initial analyses. Over the long term, rulemaking will seek to risk-inform the waste classification framework, will seek to change conforming legislation as needed, and will provide the process to evaluate and revise waste classification tables to explicitly address classification of DU and consider a full range of alternatives.

Ms. Yadav summarized the status of workshops. Two have been completed, one on September 2-3, 2009 in Bethesda, MD that approximately 75 people attended. A second workshop was held in Salt Lake City, Utah during September 23-24, 2009, and approximately 90 people attended. Staff now plans to develop a technical/regulatory basis document by September 30, 2010 and a proposed rule and draft guidance by September 30, 2011. A final rule and guidance is planned to be developed by September 30, 2012.

Public comments have been received, with 33 comments from varying stakeholders, including 228 post cards with four versions of comments from individuals in Idaho. Workshop agendas, transcripts, and meeting summaries are available at the following website:

<http://www.nrc.gov/about-nrc/regulatory/rulemaking/potential-rulemaking/uw-streams.html>

Ms. Yadav briefly summarized some of the comments received. Staff was advised to identify in the rule the period of performance, an intruder dose limit of 500 mrem/yr, and a requirement to perform and update a performance assessment. Guidance documents should identify specific details about exposure scenarios. Other comments found there was no need to define a threshold for "Significant Quantities," and also no need to define the term "unique waste streams." These concepts should be addressed on a case-by-case basis through performance assessment. Some of the comments expressed concerns that shallow land burial may not be appropriate, and that geologic disposal may be more appropriate, including possible disposal in salt ore bodies. Public release of the SECY screening model and regulatory basis document was encouraged.

Potential changes to the rulemaking scope were identified. Other sections of Part 61 were identified as needing revision, including (1) performance objectives (61.42) for intruder dose limit; (2) changes to requirements for technical analysis (61.12 and 61.13); and (3) conforming changes to the concepts section (61.7).

The staff plans to develop guidance to be used in the interim period, and will offer to demonstrate and explain the SECY model in public sessions. The staff will respond to any requests for technical assistance to States and will incorporate public comments into development of a technical/regulatory basis document. The staff will also include key messages from the workshops on the website they developed.

The meeting transcripts contain additional details on these and other topics. Copies of presentation slides used to brief the ACRS are attached to the transcripts.

### 3. PROPOSED REVISION 2 TO REGULATORY GUIDE 4.11 – TERRESTRIAL ENVIRONMENTAL STUDIES FOR NUCLEAR POWER STATIONS

This presentation was given by Mr. Peyton Doub, a Terrestrial Ecologist on the staff of the Office of New Nuclear Reactors (NRO). His opening remarks provided background on the use of regulatory guides, that Regulatory Guide 4.11 had not been revised since 1978, and that the guide addresses only terrestrial ecology and not aquatic ecology. He explained the basic relationship between this regulatory guide, the need for an applicant to prepare an environmental report (ER), and the guidance that staff has issued in NUREG-1555 for preparation of an applicant's ER.

He explained that the decision to update this guide without aquatic ecology is mostly because of the decision to only update the current set of guides as opposed to a decision that aquatic ecology guidance is not needed. Since wetlands are a transitional zone between water and dry land, and they have increased greatly in importance since 1978, it was decided to include

wetlands which had emergent vegetation in this guide, while wetlands with only submerged vegetation would be left to an aquatic ecology guide.

He explained that the organization of the draft revision to the guide mirrors the organization of the current revision of the guide, but includes greatly expanded sections and guidance. The siting support guidance portion is notable for its expansion. The revised guide describes the “baseline” ecological studies that are necessary to describe the ecology of the site that should be included in the applicant’s ER. The revised guide references the universe of resources which are now available to conduct these baseline studies called for in the guide, without providing necessarily a guide on which ones to use for which purpose. Mr. Doub explained that these baseline studies are site-specific, so the assigned ecologists would determine which resources would work best for the site they were studying.

The discussion also included clarification that many ecological “requirements,” come from State and local governments, so these need to be addressed within the studies conducted for completeness to provide the full set of information requested in NUREG-1555. Of note in this discussion is the difference between “jurisdictional” and “non-jurisdictional” wetlands (as determined by the US Army Corps of Engineers) and the information that should be addressed to properly include both of these types of wetlands in the ER.

Mr. Doub also explained that “important” animal and plant species that needed to be addressed was not limited to only endangered or threatened species, but may also include those that would be severely impacted by the action or which would need to be monitored after the plant was operating. He explained that this monitoring might be required by another federal agency like the US Fish and Wildlife Service, not the NRC.

Mr. Doub also explained the types of impact analyses that would need to be conducted in addition to the baseline studies discussed above, and the inclusion of the impact analyses in the ER.

Dr. Clarke, consultant to the Subcommittee, provided his comments and recommendations based on his review of the draft guide. The most important of his recommendations discussed at the Subcommittee Meeting are:

- 1) Clarification is needed on the use of the guide to meet NEPA requirements, and how the studies discussed in this guide can be used to address items that should be in an ER prepared in accordance with NUREG-1555;
- 2) This guide should be for use for ERs for new nuclear power plants only and references to its utility for other licensing applications should be removed;
- 3) Care should be used in the guide on the use of the words, “should,” “must,” “may,” and “can;”
- 4) A companion guidance document on the aquatic environment should be prepared.