

MINUTES OF THE 83RD ACNW MEETING  
MAY 15-16, 1996

- TABLE OF CONTENTS -

	<u>Page</u>
I. <u>Chairman's Report</u> (Open) .....	2
II. <u>Meeting with the Director, Division of Waste Management, NMSS</u> (Open) .....	3
III. <u>Zirconolite as a Natural Mineral Analog for Nuclear Waste Disposal</u> (Open) .....	5
IV. <u>Executive Session</u> (Open) .....	8
A. Report, "Time Span for Compliance of the Proposed High-Level Repository at Yucca Mountain, Nevada" .....	8
B. Future Meeting Agenda (Open) .....	9
C. Future Committee Activities (Open) .....	9
D. New ACNW Members (Closed) .....	9

- APPENDICES -

- I. Federal Register Notice
- II. Meeting Schedule and Outline
- III. Meeting Attendees
- IV. Future Agenda and Working Group Activities
- V. List of Documents Provided to the Committee

409.55

DESIGNATED ORIGINAL

Certified By EMB

## **CERTIFIED**

**Certified by P. Pomeroy  
August 20, 1996**

**Issued: 7/31/96**

**MINUTES OF THE 83RD MEETING OF THE  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
MAY 15-16, 1996  
ROCKVILLE, MARYLAND**

The 83rd meeting of the Advisory Committee on Nuclear Waste was held at the Two White Flint North Building, 11545 Rockville Pike, Rockville, Maryland, on May 15-16, 1996. The purpose of this meeting was to discuss and take appropriate actions on the items listed in the attached agenda. The meeting was open to public attendance, except for a portion that dealt with organizational and personnel matters.

A transcript of selected portions of the meeting was kept and is available in the NRC Public Document Room at the Gelman Building, 2120 L Street, N.W., Washington, D.C. [Copies of the transcript are available for purchase from Neal R. Gross and Co. Inc., Court Reporters and Transcribers, 1323 Rhode Island Avenue, N.W., Washington, D.C. 20005. Transcripts are also available on FedWorld from the "NRC MAIN MENU." Direct Dial Access number to FedWorld is (800) 303-9672; the local direct dial number is 703-321-3339]

Dr. Paul W. Pomeroy, Committee Chairman, convened the meeting at 8:30 a.m. and briefly reviewed the schedule for the meeting. He stated that the meeting was being conducted in conformance with the Federal Advisory Committee Act. He also stated that the Committee had not received any requests from persons or organizations desiring to make an oral statement during the meeting. However, he did invite members of the public, who were present and had something to contribute, to inform the ACNW staff so that time could be allocated for them to make oral statements.

ACNW members, Drs. B. John Garrick, William J. Hinze, and Martin J. Steindler were present. [For a list of other attendees, see Appendix III.]

I. CHAIRMAN'S REPORT (Open)

[Note: Mr. Richard K. Major was the Designated Federal Official for this part of the meeting.]

Dr. Pomeroy identified a number of items that he believed to be of interest to the Committee, including:

- On May 16, 1996, Dr. Martin J. Steindler will receive an Honorary NRC meritorious service award for scientific excellence.
- Dr. Virginia Colton-Bradley has started a three-month rotation with the ACNW staff.
- Fort St. Vrain has essentially completed its decommissioning activities.
- President Clinton nominated Hubert Bell as Inspector General for the NRC on April 4.
- Former NRC Commissioner Gail de Planque has been appointed to the board of directors of two key nuclear firms, Northeast Utilities and British Nuclear Fuels Limited (BNFL).
- DOE expects to move all leftover spent fuel from the operation of the N reactor from Hanford's two "K" basins into a dry storage facility by December 1999.

**II. Meeting with the Director, Division of Waste Management, NMSS (Open)**

[Note: Mr. Richard K. Major was the Designated Federal Official for this portion of the meeting.]

Ms. Federline, Acting Director, Division of Waste Management, Office of Nuclear Material Safety and Safeguards (NMSS), began her discussions with an update on site characterization at Yucca Mountain. The exploratory studies facility tunnel is now more than 5,000 meters into the mountain. Work has begun on alcove 6 which will be used to study the Ghost Dance Fault. Alcove 5 will be the thermal test facility; the first heater tests will begin in the next fiscal year. Tracer injection tests are underway at the C-hole complex. DOE has also made recent reportable geologic events. Chlorine-36 has been found in five specific locations at the repository depth and may indicate fast travel paths for surface water into the repository horizon. A second reportable geologic event stems from recent mapping efforts that may indicate steeply dipping fractures in the middle of the Topopah Spring member. Surface mapping did not show indications that this fracture zone would be encountered underground.

Ms. Federline shared some thoughts on a recently held Nuclear Waste Technical Review Board meeting that was held in Austin, TX, April 29 through May 1, 1996. Ms. Federline believes the focus of DOE infrastructure and the communication among performance assessment practitioners, the repository design team, and those conducting site characterization are much improved. She also urged DOE to finalize the waste isolation strategy and make the repository design available. The NMSS staff is also concerned that DOE is limiting its investigations of the geologic setting to the control area, rather than a more expanded geographical area. This could have significant consequences, depending on the nature of the high-level waste standard.

Ms. Federline discussed the issue resolution process. The key technical issue (KTI) that is focussing on the EPA high-level waste standard has several remaining issues where there is no agreement. Discussions are in progress on these differences. The EPA HLW standard should be submitted to the Office of Management and Budget within the next several weeks. NRC and DOE will have a technical exchange in May 1996 on DOE's total system performance assessment. This item falls under the "integration" KTI. The staff is focussing on consequence analysis for the KTI on Igneous Activity. The processes of waste entrainment and dispersion are receiving attention.

Ms. Federline also noted progress with DOE on KTIs that deal with structural deformation and seismicity, tectonic models and geophysics as well as on the KTI on saturated and unsaturated flow under isothermal conditions. Laboratory and field work are being revised on an ongoing basis as the issue resolution process continues.

Ms. Federline discussed the nuclear waste-related research program. In an effort to economize after the budget cuts the agency has undergone, waste-related research was consolidated under NMSS. Presently, both research and technical assistance are managed by NMSS. The research and technical assistance work are performed by the Center for Nuclear Waste Regulatory Analyses. Research items that are truly generic in nature, such as generic environmental transport issues, will be managed by the Office of Nuclear Regulatory Research.

Ms. Federline also explained that the HLW licensing support system would function through the Internet as a distributed database system. Each organization would have its own database, and each database would be accessed through the Internet. The goal is to have a pilot program operational by this summer.

III. **Zirconolite as a Natural Mineral Analog for Nuclear Waste Disposal** (Open)

[Note: Ms. Lynn G. Deering was the Designated Federal Official for this part of the meeting.]

Dr. William J. Hinze introduced Dr. Reto Gieré. Dr. Gieré is on leave from the University of Basel Mineralogy Petrology Institute and is presently at the Carnegie Geophysical Laboratory in Washington, D.C. Dr. Gieré presented results from his ongoing research on the use of the mineral zirconolite as a waste form for HLW and its ability to retain radioactive elements for millions of years. His research was done in conjunction with the University of Basel, the Natural History Museum of London, and the Australian Nuclear Science and Technology Organization (ANSTO).

**Highlights from Dr. Gieré's Presentation**

The advantages of crystalline waste forms over glass waste forms are that radioactive material can be stored in the crystalline structure, and that the crystals are generally more resistant to corrosion than is the matrix in borosilicate glass. Zirconolite is one of the components of the synthetic rock, Synroc, that is being studied as a potential wasteform for HLW. Dr. Gieré's research has included examining samples of zirconolite ranging in age from a few thousand years to a billion years to examine changes over time.

Zirconolite is rare in nature, only having been found in about 50 localities, including locations on the moon. It has thus far been found associated with carbonatites and metamorphic rocks but is known to occur in a wide range of chemical compositions and geologic environments.

Zirconolite consists of calcium, titanium, and zirconium, which have different ionic radii. Actinides can fit into either the  $\text{Ca}^{2+}$  or  $\text{Zr}^{4+}$  sites in the zirconolite structure. Zirconolite is unusual in that it does not fractionate, i.e., preferentially substitute certain elements over others. This unique quality allows zirconolite to mimic the composition of fluids that come into contact with it, which, in turn, allows for an exchange of actinides into the zirconolite structure.

Radioactive decay of actinides incorporated in zirconolite can cause radiation damage. Radiation damage is seen in older rocks in forms ranging from partial breakdown (i.e., dark or damaged spots) to complete breakdown of the entire structure of the mineral (metamict state). The dose received to the mineral can be calculated (alpha particles per milligram). Dr. Giere showed examples of zirconolite that exhibit different degrees of radiation damage. This information will be used to predict how much HLW can be incorporated in zirconolite before radiation damage will occur. Zirconolite will anneal after radiation damage and will recrystallize over long periods of time.

During the transition from a crystalline state to a metamict state (noncrystalline state) the density of the mineral decreases over the transition interval, accompanied by an increase in crystal volume. Fracturing may occur.

Although zirconolite is extremely resistant to corrosion in most fluids, Dr. Giere showed several examples of zirconolite alteration. In one example, actinides were released into the geologic fluid around it during the alteration, and in a second example, actinides were not released. The first example was a sample from the Adamello intrusion in a Tertiary batholith in the central Alps (42mybp). The zirconolite occurs in metasomatic rock, in veins of

dolomite marble. The second example was from a 2.5 billion-year-old carbonatite intrusion in Phalaborwa, South Africa. In the first example, the actinide thorium was lost during recrystallization of zirconolite. In the second example, it appears that lead was leached from a fractured zirconolite crystal, but was recrystallized in the form of galena. It is not known whether the lead lost is all accounted for in galena crystals; however, the actinides do not appear to have been lost.

Dr. Gieré concluded his presentation with the following highlights:

- Radiation damage is associated with volume increase and fracturing of the surrounding rock. This fracturing may create pathways for fluids, thereby making the rock more susceptible to corrosion.
- The transition phase is always in good agreement when compared with artificially damaged crystals.
- It is not known if the location of the actinides in a specific site of the zirconolite affects its stability.

Dr. Eugene Roseboom noted that because zirconolite is not found in nature in silica-rich rocks, such as the tuffs found at the Yucca Mountain site, the usefulness of zirconolite or Synrock as a waste form in this environment is questionable. Dr. Roseboom asked whether experiments have been done to heat zirconolite in the presence of silica to see what the reaction products are. Dr. Gieré responded that, while there is a need to conduct such experiments, none have been done. He noted that he and others have submitted such a proposal to the Swiss National Science Foundation.



Dr. Steindler suggested that learning the thermodynamics of some of the phases would be helpful. He urged Dr. Giere to contact Pat O'Hare at the National Bureau of Standards who has looked at combustion techniques and calculated free energies from zeolites in his extensive work on waste forms.

Dr. Hinze asked Dr. Giere whether there was a strategy in place to answer remaining questions, and if so, who was funding this research. Dr. Giere responded that the work, so far, has been done in collaboration with ANSTO, and that thus far there has been no truly organized effort, but they have much work planned to continue to look at samples from Australia and Russia.

IV. EXECUTIVE SESSION (Open/Closed)

[Note: Mr. Richard K. Major was the Designated Federal Official for this portion of the meeting.]

A. Report (Open)

Time Span for Compliance of the Proposed High-Level Waste Repository at Yucca Mountain, Nevada (Report to Chairman Jackson, NRC, from Paul W. Pomeroy, ACNW Chairman, dated June 7, 1996)

**B. Future Meeting Agenda (Open)**

Appendix IV summarizes the proposed items endorsed by the Committee for the 84th ACNW Meeting, Rockville, Maryland, June 25-27, 1996, and future Working Group meetings.

**C. Future Committee Activities (Open)**

The Committee discussed anticipated and proposed Committee activities, future meeting dates, and agenda.

**D. New ACNW Members (Closed)**

The Committee reviewed and approved a letter to the Commission recommending candidates for nomination to the ACNW.

The meeting was adjourned at 2:25 p.m., Thursday, May 16, 1996.

For the Nuclear Regulatory Commission.  
**Ramin R. Asa,**  
*Project Manager, Project Directorate III-2,  
 Division of Reactor Projects—III/IV, Office of  
 Nuclear Reactor Regulation.*  
 [FR Doc. 96-8908 Filed 4-9-96; 8:45 am]  
 BILLING CODE 7899-01-9

#### Application for a License to Export a Utilization Facility

Pursuant to 10 CFR 110.70(b) "Public notice of receipt of an application", please take notice that the Nuclear

Regulatory Commission has received the following application for an export license. Copies of the application are on file in the Nuclear Regulatory Commission's Public Document Room located at 2120 L Street, NW., Washington, DC.

A request for a hearing or petition for leave to intervene may be filed within 30 days after publication of this notice in the Federal Register. Any request for hearing or petition for leave to intervene shall be served by the requester or petitioner upon the applicant, the Office of the General Counsel, U.S. Nuclear

Regulatory Commission, Washington, DC 20555; the Secretary, U.S. Nuclear Regulatory Commission; and the Executive Secretary, U.S. Department of State, Washington, DC 30520.

In its review of the application for a license to export a utilization facility as defined in 10 CFR part 110 and noticed herein, the Commission does not evaluate the health, safety or environmental effects in the recipient nation of the facility to be exported. The information concerning this application follows.

Name of applicant	U.S. dept. of energy—HO	Description of facility	End use
Date of Application .....	26 March 1996	Complete Control Rod system; main coolant pump and various reactor components.	Convert IAN-R1 research reactor from HEU core to LEU core.
Date Received .....	29 March 1996		
Application Number .....	XR164		
Country of Destination .....	Colombia		

Dated this 4th day of April 1996 at Rockville, Md.

For the Nuclear Regulatory Commission.  
**Reinald D. Hamber,**  
*Director, Division of Nonproliferation,  
 Exports and Multilateral Relations, Office of  
 International Programs.*  
 [FR Doc. 96-8962 Filed 4-9-96; 8:45 am]  
 BILLING CODE 7899-01-9

#### Licensing Support System Advisory Review Panel Meeting

AGENCY: Nuclear Regulatory Commission.

ACTION: Notice of public meeting.

**SUMMARY:** The Licensing Support System Advisory Review Panel (LSSARP) will hold its next meeting on May 2 and 3, 1996, in Pueblo Room #1119, Clark County Government Center, 500 Grand Central Parkway, Las Vegas, Nevada 89155. The meeting will be open to the public pursuant to the Federal Advisory Committee Act (Pub. L. 94-483, 86 Stat. 770-776).

**AGENDA:** The meeting will be held from 8:30 a.m. to 4 p.m. on Thursday, May 2, and from 8:30 a.m. to 10 a.m., as needed, on Friday, May 3, 1996. The following agenda is planned:

1. LSS Administrator's Report
2. DOE Activity Report
  - a. Schedule for LSS Development
  - b. Availability of Records Information System (RIS) and Demonstration
3. LSS Senior Management Team Report
  - a. Topical Guidelines Publication
  - b. Assessment of Licensing Support Technology/Options
  - c. Decision Capture Process and Procedure
4. Future Panel Activity

**SUPPLEMENTARY INFORMATION:** The Nuclear Regulatory Commission (NRC) established the LSSARP in 1989 to provide advice and recommendations to the NRC and to the Department of Energy (DOE) concerning the design, development and operation of an electronic information management system, known as the Licensing Support System (LSS), for the storage and retrieval of information relevant to the Commission's future licensing proceeding for a geologic repository for the disposal of high-level radioactive waste. Membership on the Panel consists of representatives of the State of Nevada, Nye County Nevada, a coalition of local counties of Nevada and California adjoining Nye County, the National Congress of American Indians, the nuclear industry, DOE, NRC and other agencies of the Federal government which have experience with large electronic information management systems.

**FOR FURTHER INFORMATION CONTACT:** John C. Hoyle, Office of the Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555; telephone 301-415-1999.

#### Public Participation

Interested persons may make oral presentations to the Panel or file written statements. Requests for oral presentations should be made to the contact person listed above as far in advance as practicable so that appropriate arrangements can be made.

Dated: April 5, 1996.

**John C. Hoyle,**  
*Acting Advisory Committee Management  
 Officer.*  
 [FR Doc. 96-8964 Filed 4-9-96; 8:45 am]  
 BILLING CODE 7899-01-9

#### Advisory Committee on Nuclear Waste; Meeting

The Advisory Committee on Nuclear Waste (ACNW) will hold its 63rd meeting on May 15-16, 1996, Room T-2B3, at 11545 Rockville Pike, Rockville, Maryland. The date of this meeting was previously published in the Federal Register on Wednesday, December 6, 1995 (60 FR 62485).

The entire meeting will be open to public attendance, with the exception of a portion that may be closed to discuss information the release of which would constitute a clearly unwarranted invasion of personal privacy pursuant to 5 U.S.C. 552(b)(6).

The agenda for this meeting shall be as follows:

**Wednesday, May 15, 1996—8:30 A.M. until 6 P.M.**

**Thursday, May 16, 1996—8:30 A.M. until 4 P.M.**

During this meeting the Committee plans to consider the following:

**A. Total System Performance Assessment 1995—**The Committee will review comments from the NRC staff on the Department of Energy's Total System Performance Assessment 1995. Participation by the staffs of both DOE and NRC is anticipated.

**B. Natural Analogues—**The Committee will discuss Zirconolite as a natural mineral analog for nuclear waste disposal. A representative from the Geophysical Laboratory, Carnegie

stitution of Washington will make the presentation.

**C. Meeting with the Director, Division of Waste Management, Office of Nuclear Materials Safety and Safeguards**—The Director will discuss

items of current interest related to the Division of Waste Management programs which may include: Progress at the Yucca Mountain site, Status of Key Technical Issues resolution, and a discussion of shallow-land disposal long-term performance.

**D. Status of Nuclear Waste Related Research**—The Committee will meet with representatives of NRC's Offices of Nuclear Regulatory Research and Nuclear Material Safety and Safeguards to discuss the current status of nuclear waste related research.

**E. Preparation of ACNW Reports**—The Committee will discuss proposed reports, including: time frames for regulatory concern, the use of expert elicitation, elements of an adequate Low-Level Waste program, Committee priorities and task action plans, and biological effects from low-levels of ionizing radiation.

**F. Committee Activities/Future Agenda**—The Committee will consider topics proposed for future consideration by the full Committee and Working groups. The Committee will discuss ACNW-related activities of individual members. The Committee will also consider potential new ACNW members. A portion of this session may be closed to public attendance to discuss information the release of which would constitute a clearly unwarranted invasion of personal privacy pursuant to 5 U.S.C. 552b(c)(6).

**G. Miscellaneous**—The Committee will discuss miscellaneous matters related to the conduct of Committee activities and organizational activities and complete discussion of matters and specific issues that were not completed during previous meetings, as time and availability of information permit.

Procedures for the conduct of and participation in ACNW meetings were published in the *Federal Register* on September 27, 1995 (60 FR 50924). In accordance with these procedures, oral or written statements may be presented by members of the public electronic recordings will be permitted only during those portions of the meeting that are open to the public, and questions may be asked only by members of the Committee, its consultants, and staff. Persons desiring to make oral statements should notify the Chief, Nuclear Waste Branch, Mr. Richard K. Major, as far in advance as practicable so that appropriate arrangements can be made to allow the

necessary time during the meeting for such statements. Use of still, motion picture, and television cameras during this meeting may be limited to selected portions of the meeting as determined by the ACNW Chairman. Information regarding the time to be set aside for this purpose may be obtained by contacting the Chief, Nuclear Waste Branch prior to the meeting. In view of the possibility that the schedule for ACNW meetings may be adjusted by the Chairman as necessary to facilitate the conduct of the meeting, persons planning to attend should check with Mr. Major if such rescheduling would result in major inconvenience.

Further information regarding topics to be discussed, whether the meeting has been cancelled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor can be obtained by contacting Mr. Richard K. Major, Chief, Nuclear Waste Branch (telephone 301/415-7366), between 8 A.M. and 5 P.M. EDT.

ACNW meeting notices, meeting transcripts, and letter reports are now available on FedWorld from the "NRC MAIN MENU." Direct Dial Access number to FedWorld is (800) 303-6672; the local direct dial number is 703-321-3339.

Dated: April 8, 1996.

John C. Boyle,

Acting Advisory Committee Management Office.

[FR Doc. 96-8963 Filed 4-9-96; 8:45 am]

SELLING CODE 7000-01-M

## Biweekly Notice

### Applications and Amendments to Facility Operating Licenses Involving No Significant Hazards Considerations

#### I. Background

Pursuant to Public Law 97-415, the U.S. Nuclear Regulatory Commission (the Commission or NRC staff) is publishing this regular biweekly notice. Public Law 97-415 revised section 189 of the Atomic Energy Act of 1954, as amended (the Act), to require the Commission to publish notice of any amendments issued, or proposed to be issued, under a new provision of section 189 of the Act. This provision grants the Commission the authority to issue and make immediately effective any amendment to an operating license upon a determination by the Commission that such amendment involves no significant hazards consideration, notwithstanding the

pendency before the Commission of a request for a hearing from any person.

This biweekly notice includes all notices of amendments issued, or proposed to be issued from March 16, 1996, through March 29, 1996. The last biweekly notice was published on March 27, 1996 (61 FR 13521).

#### Notice Of Consideration Of Issuance Of Amendments To Facility Operating Licenses, Proposed No Significant Hazards Consideration Determination, And Opportunity For A Hearing

The Commission has made a proposed determination that the following amendment requests involve no significant hazards consideration. Under the Commission's regulations in 10 CFR 50.92, this means that operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety. The basis for this proposed determination for each amendment request is shown below.

The Commission is seeking public comments on this proposed determination. Any comments received within 30 days after the date of publication of this notice will be considered in making any final determination.

Normally, the Commission will not issue the amendment until the expiration of the 30-day notice period. However, should circumstances change during the notice period such that failure to act in a timely way would result, for example, in derating or shutdown of the facility, the Commission may issue the license amendment before the expiration of the 30-day notice period, provided that its final determination is that the amendment involves no significant hazards consideration. The final determination will consider all public and State comments received before action is taken. Should the Commission take this action, it will publish in the *Federal Register* a notice of issuance and provide for opportunity for a hearing after issuance. The Commission expects that the need to take this action will occur very infrequently.

Written comments may be submitted by mail to the Rules Review and Directives Branch, Division of Freedom of Information and Publications Services, Office of Administration, U.S.

APPENDIX II



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

April 10, 1996

SCHEDULE AND OUTLINE FOR DISCUSSION  
83RD ACNW MEETING  
MAY 15-16, 1996  
TWO WHITE FLINT NORTH  
ROCKVILLE, MARYLAND

Wednesday, May 15, 1996, Two White Flint North, Room T-2B3, 11545  
Rockville Pike, Rockville, Maryland

8:35  
1) 8:30 - 8:45 A.M.

Opening Remarks by the ACNW Chairman  
(Open)

1.1) Opening Statement (PWP/RKM)

1.2) Items of Current Interest (PWP/RKM)

8:40

2) ~~8:45~~ - 9:45 A.M.

Meeting with the Director, Division of  
Waste Management, NMSS (Open) (PWP/RKM)

The Director will discuss recent items  
of interest with the Committee, topics  
may include:

- Progress of Site Characterization at  
Yucca Mountain
- Status of Waste Related Research
- Preview the Current Status of Key  
Technical Issue Resolution

9:45 - 10:00 A.M.

\* \* \* BREAK \* \* \*

11:25  
3) 10:00 - 12:00 NOON

Zirconolite as a Natural Mineral Analog  
for Nuclear Waste Disposal (Open)  
(WJH/LGD)

11:25 - 11:35 Recess

11:35 - 12:40 (see Item 11)

- Presentation by Reto Giere, Carnegie  
Institution of Washington Geophysical  
Laboratory

~~12:00 - 1:00 P.M.~~

\* \* \* LUNCH \* \* \*

~~12:40 - 1:55~~

4) ~~1:00 - 5:00 P.M.~~

Preparation of ACNW Reports (Open)

Discuss possible reports on the  
following topics:

- 4.1) Time Frame for Regulatory Concern
- 4.2) Use of Expert Elicitation
- 4.3) Elements of an adequate LLW  
Disposal Program
- 4.4) ACNW Priorities and Task Action  
Plans (See Item 9)
- 4.5) Biological Effects from Low-Levels  
of Ionizing Radiation

1:55 - 4:00

5) ~~2:00 - 3:30 P.M.~~

Cancelled

4:00 4:05

~~3:30 - 3:45~~

Watch Commission Briefing on Performance Assessment Progress in HLW, LLW, and SDMP (Open)  
View Commission presentation on closed circuit t.v. broadcast

\* \* \* BREAK \* \* \*

6) ~~3:45 - 5:00~~

4:00 - 8:17

Preparation of ACNW Reports (Open)  
Continue preparation and approval of ACNW Reports

7) ~~5:00 - 6:00 P.M.~~

Discussed during  
Lunch

Selection of New Members (Closed)  
(Note: This session will be closed to discuss matters that relate solely to the internal personnel rules and practices of this Advisory Committee, and matters the release of which would constitute a clearly unwarranted invasion of personal privacy.)

8:17

~~6:00 P.M.~~

\* \* \* RECESS \* \* \*

Thursday, May 16, 1996, Two White Flint North, Room T-2B3, 11545 Rockville Pike, Rockville, Maryland

8) 8:30 - 8:35 A.M.

Opening Remarks by ACNW Chairman (Open)

9) 8:35 - 10:00 A.M.

ACNW Priorities/Task Action Plans (Open)  
(ACNW Members/ACNW Staff)  
The Committee will discuss priority issues it will consider in the future and action plans for accomplishing these reviews initiated by the ACNW

9:50 - 10:10

~~10:00 - 10:15 A.M.~~

\* \* \* BREAK \* \* \*

10) ~~10:15 - 12:00~~

~~10:10 - 11:30~~

11:20 - 11:35

~~12:00 - 1:00 P.M.~~

Preparation of ACNW Reports (Open)  
Continue preparation and approval of ACNW Reports listed above  
Recess

\* \* \* LUNCH \* \* \*

11) ~~1:00 - 2:00 P.M.~~

Moved to 5/15/96

11:35 - 12:40 PM

Committee Activities/Future Agenda (Open) (PWP/RKM)

11.1) Set Agenda for 84th ACNW, June 26-28, 1996

11.2) Review Items for the Out Months

11.3) Future Working Group Topics

11.4) Reports on Outside Meetings attended

- a) NWTRB Meeting in April
- b) CNWRA Meeting in May
- 11.5) Future Outside Meetings Members may attend
- 11.6) Reconcile EDO Responses to Committee letter reports
- 11.7) Election of ACNW Officers for July '96 - June '97
- 11.8) Interest in an ACNW Retreat?
- 11.9) Issues for discussion with the Commissioners. Preparation Plans

12) <sup>2:25</sup>  
~~2:00 - 3:30~~ P.M.

NRC Awards Ceremony

Attend awards program on the green between OWFN and TWFN

13) <sup>11:35 - 2:25</sup>  
~~3:00 - 4:00~~ P.M.

Preparation of ACNW Reports (Open)

Complete preparation and approval of proposed ACNW reports for this meeting.

<sup>2:25</sup>  
~~4:00~~ P.M.

ADJOURN

- Presentation time should not exceed 50 percent of the total time allocated for a specific item. The remaining 50 percent of the time is reserved for discussion.
- Number of copies of the presentation materials to be provided to the ACNW - 35

### APPENDIX III: MEETING ATTENDEES

#### 83RD ACNW MEETING MAY 15 AND 16, 1996

<u>ACNW MEMBERS</u>	<u>1st Day</u>	<u>2nd Day</u>
Dr. Paul W. Pomeroy	<u>X</u>	<u>X</u>
Dr. William J. Hinze	<u>X</u>	<u>X</u>
Dr. B. John Garrick	<u>X</u>	<u>X</u>
Dr. Martin J. Steindler	<u>X</u>	<u>X</u>
<u>ACNW STAFF</u>	<u>1st Day</u>	<u>2nd Day</u>
Dr. Andrew Campbell	<u>X</u>	<u>X</u>
Dr. Virginia Colten-Bradley	<u>X</u>	<u>X</u>
Ms. Lynn F. Deering	<u>X</u>	<u>X</u>
Mr. Howard J. Larson	<u>X</u>	<u>X</u>
Mr. Richard K. Major	<u>X</u>	<u>X</u>
Dr. John T. Larkins	<u>X</u>	<u>X</u>
Dr. Richard P. Savio	<u>X</u>	<u>X</u>
Ms. Michele S. Kelton	<u>X</u>	<u>X</u>



**ATTENDEES FROM THE NUCLEAR REGULATORY COMMISSION**

**MAY 16, 1996**

S. Wastler	NMSS
S. McDuffie	NMSS
J. Bradbury	NMSS
R. Johnson	NMSS
E. O'Donnell	RES
M. Nataraja	NMSS
B. Jagannath	NMSS
M. McNeil	RES
F. Ross	NMSS

**ATTENDEES FROM OTHER AGENCIES AND GENERAL PUBLIC**

**MAY 16, 1996**

R. Wallace	U.S. Geological Survey
F. Scheuritzel	Conn. DEP
F. Rodgers	U.S. DOE
D. Fenster	U.S. DOE
B. Lowry	French Embassy
B. Leslie	U.S. EPA
J. York	Weston
R. Giere	Carnegie Inst.
R. Andersen	NEI
G. Roseboom	USGS (retired)
T. O'Holleran	INEL

## APPENDIX IV: FUTURE AGENDA

The Committee agreed to consider the following during the 84th ACNW Meeting, June 25-27, 1996:

- A. Total System Performance Assessment 1995 - The Committee will review comments from the NRC staff on the Department of Energy's Total System Performance Assessment 1995.
- B. Meeting with the Director, NRC's Division of Waste Management, Office of Nuclear Materials Safety and Safeguards - The Director will discuss items of current interest related to the Division of Waste Management programs which may include: progress at the Yucca Mountain site, the status of EPA's Yucca Mountain standards and NRC's high-level waste regulations, and the status of NRC draft technical guidance on expert elicitation.
- C. Meeting with the NRC Commissioners - The Committee will discuss items of mutual interest with the Commissioners. Potential topics include: Issues and NRC activities associated with the National Research Council's Report, "Technical Bases for Yucca Mountain Standards;" ACNW comments on High-Level Waste Prelicensing Program Strategy and Key Technical Issues; ACNW Priority Issues; health effects of low levels of ionizing radiation; time span for compliance of the proposed high-level waste repository at Yucca Mountain, Nevada; and the use of expert judgment in nuclear waste licensing.
- D. Discussions with Dr. Dade Moeller, Moeller and Associates, Inc. - The Committee will discuss several topics of interest to the ACNW with Dr. Moeller including: the open market trading rule which would allow the operator of a facility that is releasing contaminants into the environment the option of reducing its own discharges or those of other sources in the same geographical area, the use of the linear-no-threshold model of dose response to ionizing radiation, and defining a critical group to predict the anticipated effects of a waste repository.
- E. DOE's Program Plan - The Committee will meet with representatives of the Department of Energy and the NRC staff to review DOE's current program for developing a high-level waste repository.
- F. Specification of Critical Group and Reference Biosphere - The Committee will review options under consideration for specifying the critical group and reference biosphere to be used in a performance assessment of a nuclear waste disposal facility.
- G. Time of Compliance in Low-Level Waste Disposal - The Committee will discuss options for setting a regulatory time of compliance for a low-level waste disposal facility.
- H. Committee Activities/Future Agenda - The Committee will consider topics proposed for future consideration by the full Committee and Working Groups. The Committee will discuss ACNW-related activities of individual members.

- I. Preparation of ACNW Reports - The Committee will discuss proposed reports, including: time frames for regulatory concern; the use of expert elicitation; elements of an adequate low-level waste program; Committee priorities and task action plans; and biological effects from low levels of ionizing radiation. The Committee may also prepare reports on topics discussed during this meeting.
  
- J. Miscellaneous - The Committee will discuss miscellaneous matters related to the conduct of Committee activities and organizational activities and complete discussion of matters and specific issues that were not completed during previous meetings, as time and availability of information permit.

**APPENDIX V**  
**LIST OF DOCUMENTS PROVIDED TO THE COMMITTEE**

[Note: Some documents listed below may have been provided or prepared for Committee use only. These documents must be reviewed prior to release to the public.]

**MEETING HANDOUTS**

**AGENDA**  
**ITEM NO.**

**DOCUMENTS**

- 5 Watch Commission Briefing on Performance Assessment Progress on HLW, LLW, and SDMP
  - 1. Commission Briefing on Performance Assessment Progress in HLW, LLW, and SDMP (Handouts utilized by NMSS staff for the May 15, 1996, Commission Briefing) [Agenda Item 5, Handout #1]
- 11.5 2. Possible Joint Review of the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), dated May 13, 1996 [Agenda Item 11.5, Handout #1]

MEETING NOTEBOOK CONTENTS

TAB

NUMBER

DOCUMENTS

1 Opening Remarks by ACNW Chairman

1. Agenda, dated April 10, 1996
2. Introductory Statement by the ACNW Chairman, undated
3. Items of Current Interest, undated
4. Introductory Statement by the ACNW Chairman - Second Day, undated

2 Meeting with the Director, Division of Waste Management, NMSS

5. Status Report

3 Zirconolite as a Natural Mineral Analog for Nuclear Waste Disposal

6. Table of Contents
7. Status Report
8. E-mail from Reto Gieré, Carnegie Institution of Washington, to Lynn Deering titled, "Significance of Natural Zirconolite in High-Level Nuclear Waste Disposal," undated
9. Paper titled, "REE-Bearing Minerals in a Ti-Rich Vein From the Adamello Contact Aureole (Italy)," by Reto Gieré, Institut für Mineralogie und Petrographie, ETH-Zentrum, Zurich, Switzerland, and C. Terry Williams, Department of Mineralogy, The Natural History Museum, London, United Kingdom, dated 1992
10. Paper titled, "Prediction of the Long-Term Performance of Crystalline Nuclear Waste Form Phases from Studies of Mineral Analogues," by G. R. Lumpkin, K. L. Smith, M. G. Blackford, K. P. Hart, and P. McGlinn, Advanced Materials Program, Australian Nuclear Science and Technology Organisation, Menai, Australia; R. Gieré, Mineralogisch-Petrographisches Institut der Universität, Bernoullistrasse, Basel, Switzerland; and C. T. Williams, Department of Mineralogy, The Natural History Museum, London, United Kingdom, presented at the 9th Pacific Basin Nuclear Conference, Sydney, Australia, May 1-6, 1994

4.1 Time Frame for Regulatory Concern

11. Status Report
12. Facsimile from William J. Hinze, ACNW, to Andrew C. Campbell, ACNW: Draft 3 of Report to The Honorable Shirley Ann Jackson, Chairman, NRC, on Time of Compliance for the Proposed High Level Waste Repository at Yucca Mountain, Nevada, dated May 4, 1996
13. Memorandum to William J. Hinze, ACNW, from Martin J. Steindler, ACNW: Response to Draft 2 of Time Letter, dated May 6, 1996 [Facsimile]

13. Memorandum to William J. Hinze, ACNW, from Martin J. Steindler, ACNW: Response to Draft 2 of Time Letter, dated May 6, 1996 [Facsimile]
14. Memorandum to John Garrick, ACNW, and Paul Pomeroy, ACNW, from Andy Campbell, ACNW: Revised Draft from Bill Hinze dated 4/27/96, dated April 29, 1996
15. Facsimile to Dr. William J. Hinze, ACNW, from Dr. B. John Garrick, ACNW, forwards comments on Draft Time of Compliance Letter, dated April 24, 1996

## MEETING NOTEBOOK CONTENTS

### TAB

#### NUMBER

#### DOCUMENTS

#### 4.1 Time Frame for Regulatory Concern cont'd

16. Facsimile to B. John Garrick, ACNW, William J. Hinze, ACNW, Andy Campbell, ACNW, from Martin J. Steindler, ACNW, forwards comments on and fundamental issues re compliance time, dated April 24, 1996
17. Note from Andy Campbell, ACNW, to Bill Hinze, ACNW: Suggested Revisions to Letter (faxed on 4/23/96), undated
18. Facsimile to Dr. Andrew Campbell, ACNW, from Dr. B. John Garrick, ACNW, forwards facsimile to Dr. William J. Hinze, ACNW, dated April 18, 1996: Time of Compliance Letter, dated April 19, 1996
19. E-mail to B. John Garrick, ACNW, from Bill Hinze, ACNW: Time of Compliance Letter (Draft 1), dated April 16, 1996
20. Memorandum to Dr. Bill Hinze, ACNW, from Andy Campbell, ACNW: Outline of General Principles for the Time of Compliance for Waste Disposal Facilities, dated April 12, 1996
21. Memorandum to Lynn Deering, ACNW, from Rod Ewing, University of New Mexico re reconsideration of the relation between glacial cycling and 10,000 year compliance period, dated April 11, 1996
22. Memorandum to Dr. William Hinze, ACNW, from Lynn Deering, ACNW: Thoughts on Time Frame of Regulatory Compliance, dated April 9, 1996
23. Facsimile to Richard Major, ACNW, Howard Larson, ACNW, Lynn Deering, ACNW, and Andy Campbell, ACNW, from Martin J. Steindler, ACNW, forwards memo re time of compliance, dated April 8, 1996
24. Memorandum to Andrew C. Campbell, ACNW, from Rod Ewing, Consultant, ACNW: Summary Comments on Working Group "Regulatory Time of Compliance for Radioactive Waste Disposal," 82nd ACNW Meeting, Washington, D.C., March 27, 1996, dated April 2, 1996
25. Article from Science, entitled, "Verification, Validation, and Confirmation of Numerical Models in the Earth Sciences," Vol. 263, pp. 641-646, dated February 4, 1994

MEETING NOTEBOOK CONTENTS (CONT'D)

TAB

NUMBER

DOCUMENTS

4.1 Time Frame for Regulatory Concern  
cont'd

26. Facsimile to Andrew Campbell, ACNW, from George M. Hornberger, Consultant, ACNW, forwards meeting report from 82nd ACNW Meeting, March 26, 1996 re time frame for regulatory compliance of high-level and low-level radioactive waste, dated April 2, 1996
27. NRC Advisory Committee on Nuclear Waste, Working Group on Time of Compliance for Radioactive Waste Disposal Meeting of March 27, 1996: Comments and Conclusions of Eugene H. Roseboom, Jr., USGS, Consultant to ACNW, dated April 1, 1996
28. E-mail to Andy Campbell, ACNW, from Barbara B. Saunders-Price, ACNW Consultant: Consultant Report to ACNW -- Time Period for Compliance, dated April 1, 1996
29. Paper, "Late Glacial Climate Estimates for Southern Nevada the Ostracode Fossil Record," by Richard M. Forester, USGS, and Alison J. Smith, Kent State University
30. Note to ACNW Staff transmitting articles from Dr. William Hinze as background information for Committee's time frame letter, dated May 7, 1996
31. Letter to Mr. Ray Clark, EPA, from Stephan J. Brocoum, DOE, forwards recommendations on "Technical Bases for Yucca Mountain Standards," dated March 29, 1996

4.2 Use of Expert Elicitation

32. Status Report
33. Memorandum to ACNW Members and Staff, from John Garrick, ACNW: Committee Actions Regarding Expert Elicitation, dated May 7, 1996
34. Memorandum to John Garrick, ACNW, from Andy Campbell, ACNW: Comments and Observations on Background Information in the BTP on Expert Elicitation, dated May 7, 1996
35. Task Action Plan, "The Use of Expert Judgment in the High-Level Radioactive Waste Program," dated March 18, 1996
36. Draft "Branch Technical Position on the Formal Use of Expert Judgment in the High-Level Radioactive Waste Program," dated February 1996
37. Article from Pennsylvania Law Weekly entitled, "Ruling on TMI Experts Challenged," dated January 29, 1996
38. Facsimile from Bill Hinze, ACNW, to Paul Pomeroy, ACNW: January 10-11, 1996 Nuclear Waste Technical Review Board Meeting, dated January 13, 1996



**4.3 Elements of an Adequate LLW Disposal Program**

39. Memorandum to Distribution from Martin J. Steindler: Elements of An Adequate Low-Level Radioactive Waste Program of the U.S. Nuclear Regulatory Commission, dated March 30, 1996, Version 1.5

**4.5 Biological Effects from Low-Levels of Ionizing Radiation**

40. Draft letter to The Honorable Shirley Ann Jackson, "Health Effects of Low-Levels of Ionizing Radiation," Revision 5, May 2, 1996

**7 Selection of New Members**

41. Status Report

**9 ACNW Priorities/Task Action Plans**

42. Status Report  
43. Suggested Assignments  
44. Memorandum to Chairman Jackson, NRC, from Paul W. Pomeroy, ACNW Chairman: Revision of ACNW Priority Issues, dated December 28, 1995  
45. Memorandum to Distribution from Martin Steindler, ACNW: Miscellaneous Topics of Possible ACNW Interest, dated March 19, 1996 [Facsimile]  
46. ACNW Task Action Plan, "Negligible Incremental Risk Level (NIRL)," dated March 4, 1996  
47. Task Action Plan, "Site Characterization Activities Related to Waste Isolation Strategy FY 1996," Draft 1.1, dated February 28, 1996  
48. Facsimile to Lynn Deering, ACNW, from Martin J. Steindler, ACNW, forwards comments on Draft Task Plan on Site Characterization, dated March 4, 1996  
49. ACNW Task Action Plan, "Role of NRC/ACNW in LLW Disposal," dated March 7, 1996  
50. Facsimile to Richard Major, ACNW, and Howard Larson, ACNW, from Martin J. Steindler, ACNW, forwards Addendum to the Task Action Plan on NRC/ACNW Role in LLW Disposal, dated March 12, 1996  
51. Memorandum to ACNW Members from Andy Campbell, ACNW: The Use of Expert Judgment in the High-Level Radioactive Waste Program - A Priority Issue, dated March 18, 1996  
52. ACNW Task Action Plan, "Regulatory Framework," Draft, dated April 11, 1996  
53. ACNW Task Action Plan, "Couple Processes"  
54. Memorandum to ACNW Members from Andy Campbell, ACNW: Risk-Based Regulation - A Priority Issues, dated May 7, 1996  
55. ACNW Task Action Plan, "Role of ACNW in Decommissioning," Draft, dated April 26, 1996

9 ACNW Priorities/Task Action Plans  
cont'd

- 56. Facsimile to Howard Larson ACNW, from Martin J. Steindler, ACNW, forwards comments on write-up on Task Action Plan, "Role of ACNW in Decommissioning," dated April 24, 1996
- 57. Supplemental Notebook

11 Committee Activities/Future Agenda

- 58. Set Agenda for 84th ACNW Meeting, June 26-28, 1996
- 59. Review Items for the Out Months
- 60. Future Working Group Topics
- 61. Memorandum to John T. Larkins, Executive Director, ACRS, from James L. Blaha, EDO: Proposed Agenda Items for the ACRS and the ACNW, dated April 10, 1996
- 62. Calendar of Events, May 1996 - May 1997

11.3 Future Working Group Topics

- 63. Draft Agenda, Advisory Committee on Nuclear Waste, Working Group Meeting, June 27-28, 1996, Igneous Activity, undated
- 64. ACNW Working Group on Igneous Activity at Yucca Mountain, Draft Straw Man, May 3, 1996