

## **FISCAL YEAR 2006 AND 2007 ACTION PLAN ADVISORY COMMITTEE ON NUCLEAR WASTE**

### **PURPOSE OF PLAN**

The purpose of this Action Plan (Plan) is to guide the Advisory Committee on Nuclear Waste (ACNW) in carrying out its mission. The Plan describes the ACNW's mission, vision, desired outcomes, commitments, goals, objectives, and priority topics. The Plan also links the ACNW goals to the strategic goals identified in NRC's Strategic Plan (NUREG-1614, Vol. 3) for fiscal years (FYs) 2004–2009.

This Plan also informs the Commission, NRC staff, and other interested stakeholders about the priority of topics the ACNW will review over the next two years. The Committee selected the first- and second-tier priority topics in a top-down manner designed to support its mission, vision, goals, and objectives. Some of the priority topics were requested by the Commission, some were chosen by the Committee itself, and some were requested by the NRC staff and other stakeholders.

### **SCOPE OF ACNW ACTIVITIES**

The Committee reports to and advises the Commission on technical matters related to nuclear waste management and nuclear materials. The bases for ACNW reviews include Title 10 of the *Code of Federal Regulations* (CFR) Parts 20, 40, 50, 60, 61, 63, 70, 71, and 72, and other applicable regulations and legislative mandates. The ACNW will undertake studies and activities related to interim storage of spent nuclear fuel, materials safety, decommissioning, application of risk-informed and performance-based (RIPB) regulations, and evaluation of licensing documents, rules, regulatory guidance, and other issues, as requested by the Commission. To fulfill its responsibilities, the Committee will interact with representatives of the public, the NRC, the Advisory Committee on Reactor Safeguards (ACRS), other Federal agencies, State and local agencies, Indian Nations, and private, international, and other organizations, as appropriate.

### **RISK-INFORMED, PERFORMANCE-BASED (RIPB) APPROACH**

The Committee believes that it best serves the Commission by taking an RIPB approach to ACNW activities. The Committee will accomplish this goal, in part, by supporting the Commission in applying the principles in the NRC's probabilistic risk assessment (PRA) policy statement, dated August 10, 1995 (60 FR 42622), to waste and materials regulations. The ACNW will continue to encourage the use of PRA principles (and associated sensitivity studies, uncertainty analyses, and importance measures) to enhance the effectiveness and efficiency of the regulatory process. The ACNW will also encourage realism, transparency, and consistency in risk and performance assessments, and will continue to identify uncertainties and sources of uncertainty in these assessments.

The Committee will also encourage implementation of a RIPB regulatory framework for the NRC's materials and waste regulations. A RIPB approach will increase flexibility and reduce inefficiencies that result from rigid interpretation and prescriptive approaches in the application

of regulations. A RIPB framework will facilitate the use of defensible and transparent regulations and will improve confidence in regulatory decisions.

## **ACNW MISSION**

The ACNW's mission is to provide the Commission with independent and timely technical advice on nuclear materials and waste management issues to support the NRC in conducting an efficient and effective regulatory program that enables the Nation to use nuclear materials in a safe manner for civilian purposes.

## **ACNW VISION, DESIRED OUTCOMES, AND COMMITMENTS**

### **Vision**

The ACNW's advice and recommended solutions are forward-looking, are based on the best available science and technology, can be implemented, and reflect the need to balance risk, benefit, and cost to society to enable the safe use of nuclear materials.

### **Desired Outcomes**

1. ACNW advice reflects the need for safety and the need to balance risk, cost, and benefit in all of the NRC's decisions.
2. ACNW advice is clear and concise.
3. ACNW provides a forum for public participation in the regulatory process, endeavors to increase public confidence in the regulatory process, and ensures that communication paths with the public remain open.
4. ACNW advice is provided in ample time for consideration by the Commission in making regulatory decisions.
5. ACNW advice reflects sound technical judgment and influences the NRC's regulations and guidance.
6. ACNW advice alerts the Commission to emerging and potentially challenging issues.
7. ACNW advice reflects consideration and awareness of relevant waste and materials issues that cut across other Federal agencies, institutions, and the industry.
8. ACNW advice provides value to the Commission, the NRC staff, the public, and other stakeholders.

### **Commitments**

To achieve its desired outcomes, goals, and objectives, the Committee makes the following commitments:

1. Make safety its highest priority.

2. Be responsive to the Commission's needs and requests.
3. Maintain technical excellence, independence, and credibility.
4. Adopt the NRC's plain language initiative.
5. Regard the public as its ultimate stakeholder and seek better ways to obtain meaningful public involvement.
6. Implement a risk-informed philosophy by asking: What is the risk? What are the important contributors to risk? What are the uncertainties associated with the risk?
7. Strive to examine issues and offer advice while regulatory solutions are still being formulated.
8. Foster an atmosphere of mutual problem solving with the NRC staff.
9. Remain flexible, anticipate change, and evaluate options and contingencies.
10. Keep informed of external trends and events that may adversely impact the NRC.
11. Keep abreast of international trends and developments that could affect the NRC's regulatory practices or approaches and apply the experience when practicable.
12. Identify relevant waste and materials issues that cut across the NRC and other Federal agencies, institutions, and industry.
13. Abide by the Committee's Action Plan to foster the efficiency and effectiveness of Committee activities and products.

## **GOALS AND OBJECTIVES**

The ACNW has developed goals and objectives consistent with its mission and vision. The following five goals provide strategic direction for the ACNW over the next two years and align well with the new strategic goals identified in the NRC's Strategic Plan for FY 2004–FY 2009. Each goal has several objectives.

**Goal 1: Assist the NRC in positioning itself to respond to external change in its regulation of the management of nuclear waste and materials. (This goal supports the NRC's Management goal to ensure excellence in agency management.)**

*Objective 1: Advise the Commission in a timely fashion on technical developments that may require changes in the NRC's regulations, policies, and practices.*

*Objective 2: Inform the Commission and recommend solutions to issues that the NRC needs to address.*

**Goal 2: Support the NRC in employing sound science in resolving key safety issues. (This goal supports the NRC's Safety goal to ensure protection of public health and safety and the environment.)**

*Objective 1: Keep informed of methods and technologies being developed and used worldwide for assessing and managing risks associated with the cleanup, disposal, and storage of nuclear waste.*

*Objective 2: Advise the Commission on enhancements to the NRC staff's technical capabilities that are needed to address current and expected Commission needs.*

*Objective 3: Advise the Commission and the NRC staff on ways to use risk-informed and performance-based approaches to develop an efficient and effective regulatory framework.*

**Goal 3: Advise the NRC on how to increase its reliance on risk as a basis for decisionmaking, including methods that (1) implement a risk-informed approach, (2) quantify and reveal uncertainties, and (3) are consistent across programs. (This goal supports two NRC strategic goals, the Safety goal to ensure protection of public health and safety and the Effectiveness goal to ensure that NRC actions are effective, efficient, realistic, and timely.)**

*Objective 1: Encourage the NRC staff in seeking and proposing approaches to gain a better understanding of the inherent risks of NRC regulated activities and of the relationship between regulations, cost, and safety.*

*Objective 2: Propose approaches that provide a better understanding of the inherent risks associated with nuclear power and the relationship between safety, regulations, and cost, and advise the Commission on the proposals.*

*Objective 3: Provide technically sound and realistic approaches for resolving new and emerging issues, and identify ways to utilize risk-informed and performance-based approaches to the safe use of nuclear materials for civilian purposes.*

**Goal 4: Support the NRC's Openness goal by evaluating current issues before the Commission and staff in a public forum.**

*Objective 1: Provide opportunities through the Federal Advisory Committee Act process for more meaningful public involvement in the regulatory process.*

*Objective 2: Recommend ways for the NRC to achieve more meaningful public involvement in the regulatory process, taking into consideration lessons learned from international experience.*

*Objective 3: Assist the NRC in making the agency's decisionmaking process more transparent and ensuring that agency documentation substantiates and addresses the relevant issues.*

**Goal 5: Support the effectiveness and efficiency of NRC operations. (This goal supports the NRC's Effectiveness goal, to ensure that NRC actions are effective, efficient, realistic, and timely.)**

*Objective 1: Select and evaluate feedback from stakeholders on ACNW operations.*

*Objective 2: Evaluate and modify existing ACNW operational procedures as appropriate to accomplish "more with less."*

## **PRIORITY TOPICS AND PROCESS IMPROVEMENTS**

In support of the above goals, the ACNW has identified its highest priority topics through FY 2006, and other important topics the Committee will address as time and resources permit. The highest priority topics are identified as first-tier priorities, while other important topics are identified as second-tier priorities. Unless otherwise directed by the Commission, the Committee plans to place most of its emphasis on reviewing issues under the first-tier topics. The ACNW will stay informed of issues associated with the second-tier topics, and will review such issues as time and resources permit.

The Committee has also defined the criteria it uses to select the priority topics. In support of its fifth goal to support the effectiveness and efficiency of NRC operations, the ACNW has identified the improvements in operational processes it will carry out this year and next. The Committee will track its progress toward these process improvements in a separate internal planning document and will periodically evaluate their impact.

For each priority topic addressed, the Committee will prepare a task action plan to identify the nature and scope of the issue, and a strategy for proposed action. The task action plans will include a schedule, purpose, scope, planned products, and performance measures to evaluate the Committee's effectiveness.

### **Criteria for Selecting Priority Topics**

The Committee selects priority topics during its annual planning retreat by discussing potential NRC activities during the next year, making a list of potential topics, and then identifying the highest priority topics by determining how many of the following criteria are met:

- If not properly addressed, the topic will likely result in a significant adverse impact on the environment, pose significant risk to the health and safety of the public, or involve unnecessary economic costs.
- The Commission or the Executive Director for Operations requests that ACNW review the topic.
- The ACNW can provide unique input on the topic and significantly contribute to the resolution of the issue.
- The topic is relevant to the NRC's near-term regulatory agenda and needs timely ACNW review.

- NRC's external stakeholders are highly interested in a topic and ACNW review of the topic will enhance openness

The number of topics is limited by the amount of time required by each topic and the projected resources available to the Committee.

### **First-Tier Priority Topics**

#### **1. Proposed Yucca Mountain Repository**

The U.S. Department of Energy (DOE) plans to submit a license application for construction of the Nation's first geologic repository for disposal of high-level radioactive waste (HLW) at Yucca Mountain. The submittal date is uncertain. The Yucca Mountain License Application (YMLA) is expected to have three main parts: general information, a safety analysis report (SAR), and a final environmental impact statement (FEIS). Once the YMLA is received, ACNW members will become familiar with it so they can provide technical advice on the Yucca Mountain project as requested by the Commission.

Until the YMLA is submitted, the Committee will continue to perform technical reviews of the staff's pre-licensing programs. Areas of interest include progress in staff assessments of the effects of certain disruptive events (e.g., igneous activity, seismicity) on the overall repository performance in the post-closure phase and progress in staff efforts to develop an independent performance assessment computer code capable of evaluating repository performance over longer times consistent with standards being promulgated by the Environmental Protection Agency and rules being promulgated by the Commission. The Committee will also continue to monitor staff reviews of DOE's progress in finalizing a geologic repository operations area design and to identify potential issues related to pre-closure worker safety. The Committee will also review guidance documents that the staff will use in the YMLA review, including interim staff guidance. The Committee's reviews in the aforementioned areas will focus on risk-significant issues. The Committee may hold working group meetings to solicit the views of knowledgeable subject matter experts on certain issues.

The Committee will assist the Commission by reviewing the technical aspects of the proposed revisions to 10 CFR Part 63 to conform to the draft revised EPA standard that is intended to comply with the court decision on the length of the compliance period. The Committee will advise the Commission of any technical issues that arise from its review.

#### **2. Risk-Informing Nuclear Waste and Material Regulatory Activities**

The ACNW will continue to support the Commission's policy statement on the use of probabilistic risk assessment (PRA) methods. The Committee notes that it is already working in several areas (e.g., decommissioning of complex sites, waste determinations, low-level waste, and Yucca Mountain pre-licensing reviews) where opportunities exist to risk-inform staff activities. Specifically, the Committee will continue to evaluate the strengths and weaknesses of adapting PRA techniques to the nuclear materials and waste areas and communicate risk insights to the Commission for use in decisionmaking. The Committee will continue to promote the use of PRA principles and associated analyses (sensitivity studies, uncertainty analyses, and importance studies) and will encourage realism, transparency, and consistency in risk and performance assessments, identification of uncertainty in these assessments. The Committee

will also promote the implementation of a flexible overall risk-informed performance-based regulatory framework for making regulatory decisions.

NRC's Office of Nuclear Material Safety and Safeguards (NMSS) recently prepared and made publically available a guidance document on risk-informed decisionmaking for nuclear materials and waste. The Committee plans to review this document, focusing on its application to ongoing nuclear waste and material regulatory activities. The Committee also plans to hold a working group and advise the Commission on this guidance document once the staff has experience with its application.

Finally, the Committee plans to keep informed about waste generation and management issues associated with DOE's Advanced Fuel Cycle Initiative, and about NRC's licensing strategy and risk-informed framework for prototype nuclear reactors specified by the Energy Policy Act of 2005. The Committee will consult with the Commission as issues arise before developing specific work activities in this area.

### 3. Decommissioning

In the coming year the ACNW will continue to review the development of NRC staff guidance for implementing the license termination rule (LTR). This guidance is currently out for public comment. The Committee will review the guidance documents after the public comment period and the reconciliation of the comments, and before the documents are sent to the Commission for approval. The Committee is currently preparing advice on the models and methodology used by the NRC staff and the Department of Energy (DOE) in the West Valley Demonstration Project performance assessments. The Committee's advice will be based on an October 19, 2005 working group meeting held near West Valley to foster stakeholder participation. As the West Valley performance assessments mature, the Committee intends to hold a working group to examine results and insights provided by the assessments.

In addition, the Committee proposes to review the decommissioning of a site that will be approved for unrestricted release under the LTR and one other complex materials site to gain an appreciation of the full range of issues. The site selected for review will be coordinated with NMSS.

### 4. Waste Determinations

Pursuant to the National Defense Authorization Act (NDAA) of 2005, the Commission will provide consultation to DOE on the waste determinations, and in coordination with the concerned State, NRC will also monitor disposal actions taken by DOE. In fulfillment of the Commission's role under the NDAA, the NRC staff will conduct reviews of waste determination submittals by DOE on a case-by-case basis. The NRC staff is also expected to develop a standard review plan (SRP) for waste determination reviews that will also cover monitoring of disposal activities. The ACNW will provide independent advice to the Commission on the development of the SRP and will also evaluate specific waste determination reviews by the NRC staff if the Commission so requests. The ACNW will also keep abreast of the waste determinations issues to ensure that the Commission receives current and independent advise.

### 5. Low-Level Radioactive Waste (LLW)

The ACNW has reviewed the regulations for the disposal of LLW (10 CFR Part 61), and reported its findings on how these regulations and their implementation could be risk-informed and performance-based. A number of issues have been identified during the last 20 years of unsuccessful LLW disposal facility licensing activities. Using this information the Committee will identify opportunities to risk-inform 10 CFR Part 61 guidance (or license requirements) and improve the LLW licensing process. (The ACNW will deliver a white paper on this subject during this planning period). Additionally, the Committee plans to keep informed of new developments in the management of LLW, including new disposal siting initiatives in States, industry trends in LLW processing and disposal, and studies by the National Academy of Sciences on LLW and low-activity waste management.

## **Second-Tier Priority Topics**

### **1. Health Physics**

The Commission has approved Option 2 of SECY-04-0030 ( to initiate a more proactive radiation protection research program). Key health physics areas to focus on recognizing advances in fundamental radiation biology, radiation dosimetry, radiation effects on humans, and the fate and transport of radioactive material to the environment. The ACNW will review the revised International Commission on Radiological Protection (ICRP) radiation protection guidance when it becomes available in FY 2006. The BEIR VII report indicated that while several radiation biology topics of interest have been emerging, none are conclusive enough to change its conclusions. Nonetheless, the Committee will keep informed of any developments in this area.

### **2. Transportation of Radioactive Materials**

The ACNW will continue to advise and comment on the Package Performance Study (PPS) and the test program for Type B spent fuel casks. The ACNW will monitor U.S. and international developments in Type B cask testing and regulatory activities, as well as other transportation issues. In a Staff's Requirements Memorandum (SRM) on SECY-05-0051 ("Details and Projected Cost of a Demonstration Test of a Full-Scale Spent Nuclear Fuel Rail Transportation Cask Under the Package Performance Study") dated June 9, 2005, the Commission directed the staff to seek an ACNW review of a revised test protocol. Additionally, the Commission directed the staff to add a fire test to the protocol, to review full- and quarter-scale cask testing, to expect additional modifications to the test program from the Commission, to enter into an agreement with the Germans to share their test results and to ask the DOE to help fund the testing. The test review is currently scheduled for March 2006.

### **3. Waste Management Research**

The ACNW will continue to report periodically to the Commission on NRC's waste-related research and technical assistance programs. Specifically, the Committee will continue to examine the research performed by the NRC's Office of Nuclear Regulatory Research on nuclear waste safety and the technical assistance work performed by the Center for Nuclear Waste Regulatory Analyses.

### **4. Fuel Cycle Facilities**

As a complement to efforts required of the Office of Nuclear Reactor Regulations in the Energy Policy Act of 2005, the ACNW plans to become familiar with fuel cycles for the advanced reactor systems being developed by DOE. ACNW efforts will address the technical implications of such fuel cycles for existing NRC regulations and guidance with an emphasis on environmental and waste management issues. Similarly, the ACNW is aware of renewed interest in domestic uranium mining and plans to review the adequacy of existing NRC regulations to avoid future legacies that require expensive cleanup efforts. The ACNW will keep abreast of technical issues related to licensing of uranium enrichment facilities and integrated spent fuel storage facilities, in case the Commission asks the Committee to review future issues.

ACNW and ACRS are together reviewing key licensing documents concerning the waste management aspects of constructing and operating a fuel fabrication facility to convert DOE's surplus plutonium to mixed oxide fuel for use in commercial nuclear reactors. Duke COGEMA Stone & Webster (DCS) has submitted the application and the NRC has already issued a draft SER on the proposed facility. The ACNW plans to review the license application which the staff is expects to receive in FY 2006.

### **Working Groups**

ACNW usually holds approximately four ACNW working group meetings each year. Working groups focus on specific technical subjects related to the nuclear waste or materials. NRC staff, experts, and other interested stakeholders generally make presentations. The ACNW plans to hold the following working group meetings in FY 2006 and FY 2007:

#### **I. Decommissioning**

In FY 2006, the ACNW plans to hold the second in a series of working group meetings on proposed revisions to decommissioning guidance under the LTR and the reconciliation of associated public comments. The proposed revisions address institutional controls, engineered barriers, onsite disposal, realistic dose scenarios, restricted access options, and intentional mixing of soils. This working group meeting will also consider proposed inspection and oversight procedures designed to prevent future legacy sites. The Committee will advise the Commission on the guidance revisions before the documents are sent to the Commission for approval. The Committee will consult with NMSS management to support near-term risk-informed decisionmaking regarding decommissioning.

#### **II. West Valley Demonstration Project (WVDP)**

The NMSS staff sought the Committee's advice on the WVDP, a complex decommissioning site anticipated to require all of the options under the LTR. In October 2005, the Committee held its first working group meeting on the WVDP preliminary performance assessment approach and decommissioning status. The Committee plans to hold the second in a series of meetings in FY 2007, focusing on the results and insights from NRC's and DOE's performance assessments. New York State Energy Research and Development Authority and representatives from local stakeholder groups are expected to participate. The Committee believes this working group will provide risk insights into complex decommissioning activities that will support Commission decisionmaking.

#### **III. Modeling and Monitoring**

Performance assessment has become an accepted way to demonstrate future compliance with regulatory standards designed to protect humans and the environment. System and environmental monitoring can be used to verify predicted compliance, however, mathematical modeling and compliance monitoring are often approached as separate activities, missing out on opportunities to better risk-inform monitoring, and build confidence in the model as data are obtained. (The Committee observed this on the approach being taken to address the Strontium plume at the West Valley Demonstration Project.)

ACNW will convene a working group of experts and NRC staff in FY 2006 to identify and explore synergies between monitoring, usually done to demonstrate compliance, and environmental measurements, usually done to validate a model and build confidence. The Committee believes that strategies that combine modeling with monitoring may improve demonstration of compliance and increase confidence in a facility's performance. (When compliance can be demonstrated only by modeling – when monitoring data cannot be collected – the demonstration at best provides reasonable assurance.) The working group will examine these strategies for prospective design of new facilities and retrospective design for operating facilities and facilities being decommissioned under the license termination rule. Strategies for near-term and longer-term compliance and performance confirmation will be discussed, including use of NMSS guidance on risk-informing regulatory decisions in the materials and waste areas.

#### IV. Cementitious Materials (as Components of Near-Surface Engineered Barriers)

Cementitious materials are ubiquitous components of engineered barriers (e.g., waste containers, caps, walls, waste matrices) for radioactive wastes destined for near-surface disposal. As a consequence, the performance over times ranging to tens of thousands of years is important to assessing risks from near-surface waste disposal in site decontamination and decommissioning, low-level waste disposal, and near-surface disposal of DOE tank waste components.

ACNW will convene a working group, including a panel of experts in FY 2006 to examine the technology for predicting the performance of cementitious materials used in near-surface engineered barriers. The barriers are designed to maintain (a) physical integrity for the purpose of impeding water ingress and (b) chemical conditions for the purpose of reducing the mobility of valence-sensitive radioelements such as technetium and transuranics. The Committee believes that such elaboration will help risk-inform decisions and improve our understanding the performance of near-surface waste disposal facilities that use cementitious engineered barriers, and identify beneficial avenues for research and development.

#### V. Low-Level Radioactive Waste (LLW):

The Committee will hold a working group meeting on LLW in FY 2006. The ACNW has reviewed the regulations for the disposal of LLW (10 CFR Part 61), and has reported its findings on making these regulations and their implementation risk-informed and performance-based. A number of issues have been identified during the last 20 years of unsuccessful LLW disposal facility licensing activities. Using this information the Committee will identify opportunities to risk-inform 10 CFR Part 61 guidance and improve the LLW licensing process. The working group will also explore new developments in management of LLW, industry initiatives including

new disposal siting initiatives in States, other industry trends in LLW processing and disposal, and studies by the National Academy of Sciences on LLW and low-activity waste management.

#### VI. Risk-Significant Yucca Mountain Issues

The Committee will also consider holding a working group meetings in FY 2006 or FY 2007 on risk-significant pre-licensing issues for Yucca Mountain, consistent with Commission direction and its previous working group activities. In FY 2006, the Committee plans to evaluate the use of a NMSS guidance document on risk-informed decisionmaking in the context of this application. The Committee will advise the NRC on the use of risk to support resolution of associated Yucca Mountain issues.

#### **JOINT ACRS/ACNW SUBCOMMITTEE ACTIVITIES**

The joint subcommittees work on activities that are within the scope of both committees. Using the expertise of both committees in a joint subcommittee is more effective and efficient. Topics of common interest that may be the subject of joint subcommittee meetings include risk-informing regulatory activities for nuclear material and waste activities including proposed safety goals, PRA for spent fuel dry cask storage, decommissioning issues on which both ACNW and ACRS are expected to give advice, advanced fuel cycle initiatives and facilities, and areas of common interest in the Energy Policy Act of 2005.

#### **MEASURES OF SUCCESS**

The Committee will assess the extent to which the goals and objectives in this Plan have been met and will report the results in the annual ACNW operating plan. The Committee has established performance metrics to measure its overall effectiveness. The performance metrics are the ACNW's effectiveness, efficiency, quality, timeliness, and success in contributing to the RIPB regulatory process. As part of its annual self-assessment, the Committee has and will continue to solicit stakeholder feedback as a source of information for evaluating the ACNW's effectiveness.

## **UPDATING THE PLAN**

The ACNW will continue to conduct top-down planning on an annual basis to identify goals and priority issues for the coming year. Revisions to the Plan will be based on input from the Commission, changes in legislation, changes to the NRC Strategic Plan, the results of customer surveys and self-assessments, external events, and available resources. As part of the Committee's efficiency and effectiveness goal, the ACNW will continue to use a separate planning document to track the outcomes of operational process improvements, special projects, ideas for working group meetings, possible follow-up of staff responses to past ACNW letters, and items that the Committee considers important but cannot pursue this year due to time or resource limitations.