

August 18, 2000

The Honorable Richard A. Meserve
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Chairman Meserve:

SUBJECT: ACNW VISITS TO NUCLEAR SITES AND INFORMATION EXCHANGES IN THE UNITED KINGDOM AND FRANCE, MAY 15-19, 2000

During the week of May 15–19, 2000, the Advisory Committee on Nuclear Waste (ACNW) visited nuclear waste management sites and attended information exchanges in the United Kingdom (UK) and France. This letter discusses some of our key observations that are relevant to issues of interest to the Commission, such as the critical role of clearing materials resulting from facility decommissioning activities, stakeholder involvement in repository siting, risk-informed regulation, and the management and disposal of low-level radioactive waste.

Background

On May 15, 2000, in the UK, the Committee visited decommissioning sites and waste processing facilities at Sellafield and the low-level waste (LLW) disposal facility at Drigg, Cumbria, which are operated by British Nuclear Fuels, Ltd. (BNFL). The Committee also met with the leader of the Cumbria County Council¹ and the Council's Environmental Planning Manager. On May 16 and 17, 2000, the Committee participated in a technical information exchange hosted by the UK Environment Agency in London with representatives of a variety of regulatory agencies, licensees, developers, and oversight groups.² On May 18, 2000, in France, the Committee participated in an all-day technical information exchange at the Paris headquarters of the National Radioactive Waste Management Agency (ANDRA)³ with a variety of participants.⁴ On May 19, 2000, the Committee visited the ANDRA-operated Centre de l'Aube LLW disposal facility and the site of the future high-level waste (HLW) underground research laboratory (URL) at Bure, Haute-Marne. Attached is a list of the handouts received during the May 15-20, 2000, foreign trip to the UK and France, which are available upon request.

¹ The Council Leader is also chairman of the Sellafield Liaison Committee.

² Participants included representatives from the UK Environmental Agency; the UK Department of Transport and the Regions; the UK Department of Trade and Industry; the UK Health and Safety Executive; the UK Atomic Energy Agency; the Scottish Environmental Protection Agency; UK NIREX, Ltd.; The Royal Society; the Radioactive Waste Management Advisory Committee; and the Parliamentary Office of Science and Technology.

³ ANDRA is a quasi-governmental agency responsible for radioactive waste disposal programs in France. Decommissioning of nuclear power plants is not included in its scope.

⁴ Participants included representatives from the Nuclear Installations Safety Directorate, the chief of decommissioning for Electricité de France (EdF), and researchers from the Institut National de Recherche en Informatique et en Automatique and the Université St. Etienne.

Observations on Decommissioning

In both the UK and France, an integrated approach to decommissioning includes the clearance of material that meets certain limits for either disposal in conventional waste disposal facilities or unrestricted use. To facilitate their decommissioning activities, both countries have developed a category of radioactive waste called very low-level waste (VLLW) that is not required to be disposed of in LLW sites.

The UK allows the practice of freely releasing decontaminated material that was slightly and superficially contaminated after it has passed a series of tests and specifications to show that it meets the release criteria. At Sellafield, the Committee members toured decommissioning activities at the “Windscale Piles.” Concrete “rubble” is broken up into a small aggregate size to facilitate monitoring for radioactivity. Material that meets specified limits is “released” and used as fill for repairing roads on BNFL property. Metal materials are bead blasted to provide assurance that the pieces are free of contamination and meet release requirements. Components that have features that could potentially mask contamination (such as riveted pieces) are segregated out and are not released.

In France, EdF is following the three-stage International Atomic Energy Agency process for nine shutdown reactor sites. The EdF current strategy is to decommission all nine reactors within 20-25 years to a green field state. France is currently developing methodologies and requirements to differentiate large volumes of reactor decommissioning waste into LLW, VLLW, and non-radioactive material. Waste in the latter two categories would go to conventional disposal sites or be cleared for unrestricted use, respectively.

Recommendations

- ! The NRC should consider development of regulatory classifications that clearly differentiate between LLW, VLLW, and non-radioactive waste.
- ! The UK method of rubbleizing concrete to an aggregate of small pieces seems to solve the problem of how to monitor the interior of concrete. We suggest that the NRC consider this process as a method of demonstrating compliance with a radiation standard.
- ! In the UK, the unrestricted use of superficially decontaminated solid metal pieces is only allowed for objects with external surfaces that can be readily monitored. Complex shapes are reduced to simple shapes for ease of monitoring. We suggest that the NRC consider this process as a method of demonstrating compliance with surficial contamination limits.

Observations on Repository Facility Siting

Quasi-governmental agencies in both countries have responsibilities for waste management and repository development: NIREX⁵ in the UK and ANDRA in France.

In the UK, the intermediate-level waste (ILW)⁶ repository siting program is on hold. Stakeholder issues played a significant role in the Cumbria County Council's rejection of the proposed rock characterization facility (RCF) at Sellafield to study potential host rock for an ILW repository.⁷ Although the Cumbria County Council is generally supportive of Sellafield operations, the Council expressed a number of technical and policy concerns about the RCF. There was also a need, we were told, for the presentation of technical material in a format that can be understood by the public. In our meetings in London, it was noted that there were problems with understanding the decisionmaking process followed by NIREX, and also there was a need to define processes and the roles of stakeholders. Currently, long-term storage (25-50 years) is envisioned for vitrified HLW and grouted ILW in the UK. The national policy on radioactive waste management and disposal is being re-evaluated.

France operates an integrated program for nuclear waste management set up under a law that emphasizes research and specifies processes, organizational responsibilities, and schedules. Early active involvement and agreement of stakeholders, with specific emphasis on local governments and communities, are mandated as an integral part of France's waste program. The law clearly defines the composition and roles of committees and the processes to be followed. The act requires openness in conducting the research program, including consultations (with the communities) before site selection, creation of a National Reviewing Board and a Public Interest Grouping to manage supporting measures, and establishment of Local Information Committees. Starting from 30 potential sites, ANDRA identified three candidate URL sites (two granite, one clay). Currently, work on the clay site is proceeding and the two granite sites have been rejected. ANDRA is looking for a new granite site.

In both countries, the ACNW noticed a significant openness in both the government and licensee interactions with the public, principally via elected public representatives such as local councils. They also make extensive use of public tours to communicate with the public. The result seems to be a long-term relationship from which trust and confidence can develop.

⁵ UK NIREX, Ltd., was originally founded as the "Nuclear Industry Radioactive Waste Executive."

⁶ ILW in the UK is defined as non-heat-generating radioactive waste that exceeds 12 GBq/tonne (β?) and/or 4 GBq/tonne (α).

⁷ Technically, the RCF review was conducted as a planning application by NIREX to the Cumbria County Council, which is required under the UK Town and Country Planning Act of 1990. The adversarial style proceedings, however, delved into a variety of siting and safety issues that might normally be considered in a safety case review (or by a hearing board) in the U.S).

Recommendation

- ! The NRC should consider as part of its public outreach effort issuing a document that defines specific roles, activities, and opportunities for elected representatives and other stakeholders to participate in the regulatory process.

Observations on Risk-Informed Regulation

Probabilistic risk assessments (PRAs) are used extensively in the UK by both developers and regulators, whereas in France the use of PRAs is not generally accepted or required by regulatory policy. A significant concern expressed to us in both countries was the difficulty in communicating to the public highly technical reports and safety assessments. Despite differences in approach, both countries focus much effort on understanding the underlying features, events, and processes that contribute significantly to the safety case for a repository system. The regulatory frameworks in both countries invoke the ALARA (as low as reasonably achievable) concept and require some system of multiple barriers (natural and engineered) to isolate nuclear waste.

Risk assessments are conducted in the UK by licensees, applicants, and regulators using probabilistic approaches. These state-of-the-art approaches are similar in some ways to the risk-informed approaches being implemented by the NRC, but the criterion for postclosure compliance is a numerical measure of risk rather than dose.⁸ Areas of continuing concern include the transparency of risk assessments, the level of confidence that can be attached to the level of risk, and approaches to broaden stakeholder participation in the risk assessment process.

Although there is some use of probabilistic information in risk and safety analyses in France, it is not used in a formalized fashion. The French regulations invoke dose limits as the criteria for compliance.⁹ The safety demonstration, which takes into account both qualitative and quantitative analyses, is focused on understanding the system and identifying disruptive events. Performance assessments are deterministic and include both bounding and best estimate calculations. The ANDRA representatives believe that the public will not understand probabilistic approaches to performance assessment.

Recommendation

- ! The NRC should ensure that important technical points and key documents related to public concerns are presented clearly and concisely and are simplified so that stakeholders can appreciate the key issues, results, and uncertainties.

⁸ In the UK, regulatory guidance specifies an individual risk “target” of 1×10^{-6} for post-institutional control. During institutional control, the dose limit to a representative member of the critical group is 0.3 mSv/yr (30 mrem) for a “source-related dose” and 0.5 mSv/yr (50 mrem) for a “site-related dose.”

⁹ The French regulations limit doses to the public to 1 mSv/yr (100 mrem) for the “normal evolution” (of the repository), with .25 mSv/yr (25 mrem) constraint over the time scale of interest (10,000 yrs). Disruptive events (incidental or accidental scenarios) are considered on a case-by-case basis, according to the probability of the scenario. Doses to workers are limited to 100 mSv (10 rem) over 5 years with a maximum of 50 mSv (5 rem) in 1 year. Transportation worker doses are limited to 20 mSv/yr (2 rem).

Observations on LLW Disposal

Both the UK and France have operating LLW disposal facilities sized to deal with the anticipated wastes for the next 50 or so years. This situation is helping to establish a base of public confidence in waste management that may be carried over into the HLW disposal area.

At the Drigg site in the UK, the disposal methodology has evolved over time to the current system of concrete entombments. There is an ongoing development of a postclosure safety assessment with regulatory oversight by the Environment Agency. One of the aspects of the regulatory review is an issue resolution process similar to NRC's issues resolution approach.

France is operating a sophisticated LLW disposal facility at Centre de l'Aube. Although, by United States standards, what they are doing is more than is required for similar Class A¹⁰ LLW, France has thereby moved toward gaining public confidence in its waste management program.

Finally, we observed at l'Aube the use of a color-coded¹¹ radiation hazard symbol rather than the "universal" magenta. The l'Aube employees seem to be more sensitive to the distinction. As a result, the signs seem more effective than the single color signs used in the United States.

Recommendation

! The color-coded "standard" radiation warning signs used in France seemed very effective, and we recommend that the NRC consider adopting such a system.

It is clear to the Committee that the UK and France have valuable experience in radioactive waste management for the NRC to consider. This experience relates to many of the Committee's tier one priorities on the regulation of nuclear wastes, including decommissioning, risk-informed practices, and public (and stakeholder) participation.

Sincerely,

/RA/

B. John Garrick
Chairman

Attachment: List of Handouts Received During the May 15-20, 2000 ACNW Foreign Trip to the UK and France.

¹⁰ 10 CFR 61.55, "Waste Classification."

¹¹ Green for suspect areas, yellow for very low levels, orange for intermediate levels, and red or magenta for high levels.

HANDOUTS RECEIVED DURING THE MAY 15-20, 2000
ACNW FOREIGN TRIP TO THE UK AND FRANCE

1. LA GESTION DES DÉCHETS RADIOACTIFS - CATALOGUE DES PUBLICATIONS
2. ETAT et LOCALISATION des - DECHETS RADIOACTIFS en FRANCE
7eme EDITION 1999
3. LeCENTRE DE L'AUBE
4. CUMBRIA COUNTY COUNCIL - ECONOMY FORUM - 9TH JUNE 1999
"A NUCLEAR FUTURE"
BACKGROUND PAPER - THE STORY OF RADIOACTIVE WASTE MANAGEMENT IN
THE UK - JOHN HETHERINGTON, ENVIRONMENTAL PLANNING MANAGER
5. COMMITTED TO BECOMING THE LEADING GLOBAL NUCLEAR COMPANY
BNFL ANNUAL REPORT & ACCOUNTS 1999
6. RESPONSIBLE FOR SAFETY AND CARE FOR THE ENVIRONMENT - BNFL
ENVIRONMENT, HEALTH & SAFETY REPORT 1998/99
7. BNFL - SELLAFIELD VISTORS INFORMATION - MAP
8. BRIEFING NOTES ON ASPECTS OF BNFL - NUCLEAR WASTE
9. BRIEFING NOTES ON ASPECTS OF BNFL - SELLAFIELD AND THE IRISH SEA
10. BRIEFING NOTES ON ASPECTS OF BNFL - REPROCESSING
11. AGENDA - ACNW VISIT TO UK
12. UK NUCLEAR SITES
13. ENVIRONMENT AGENCY - ACNW VISIT TO THE UK MEETING IN LONDON, 16-17
MAY 2000 - Welcome, and Introduction to Roles of UK Organizations, Clive Williams,
Policy Developments Manager, Radioactive Substances Regulation
14. RADIOACTIVE WASTE: POLICY, ADVICE, REGULATION AND OPERATION IN THE UK
15. RISK ASSESSMENT - POLICY DRIVERS
16. ENVIRONMENT AGENCY - RADIOACTIVE WASTE DISPOSAL RISK-BASED
REGULATORY APPROACH - ROGER YEARSLEY - ENVIRONMENT AGENCY
17. ACNW (MEMBERS) VIEWGRAPHS

18. APPROACHES TO RISK ASSESSMENT USED FOR REGULATORY COMPLIANCE - ALAN HOOPER, DEPUTY MANAGING DIRECTOR, NIREX - PRESENTATION TO THE ACNW, LONDON 16 MAY 2000
19. UKAEA APPROACH TO RISK ASSESSMENT - JOHN CROFTS
20. TECHNICAL ISSUES IN DEVELOPING NUCLEAR WASTE REPOSITORIES: UK HISTORICAL PERSPECTIVE - DR. MALCOLM WAKERLEY, RADIOACTIVE SUBSTANCES DIVISION, DEPT OF THE ENVIRONMENT, TRANSPORT AND THE REGIONS
21. SITIING AND DEVELOPMENT ISSUES IN THE UK - ALAN HOOPER, DEPUTY MANAGING DIRECTOR, NIREX - LONDON 17 MAY 2000
22. BRIEFING NOTES ON ASPECTS OF BNFL - DECOMMISSIONING
23. HEALTH AND SAFETY EXECUTIVE - INTERMEDIATE LEVEL RADIOACTIVE WASTE STORAGE IN THE UK: A REVIEW - By HM NUCLEAR INSTALLATIONS INSPECTORATE
24. ENVIRONMENT AGENCY - INFORMATION PACK
25. UNDERGROUND RESEARCH LABORATORY - PUBLIC INFORMATION SPACE
26. RADIOACTIVE WASTE MANAGEMENT - CATALOGUE OF PUBLICATIONS
27. LA GESTION DES DÉCHETS RADIOACTIFS - CATALOGUE DES PUBLICATIONS
28. CENTRE DE L'AUBE - WHAT DO YOU THINK WE'RE DOING AT ANDRA?
29. JOURNAL du CENTRE DE L'AUBE 8 SEPTEMBER 98 EXPOSITION - LES VITRAUX
30. CETTE FEUILLE DE PAPIER PERMANENT est conforme a la definition de la NF ISO 9706 de NOVEMBRE 1994:
31. CENTRE DE LA MANCHE DISPOSAL FACILITY
32. WHAT IS RADIOACTIVE WASTE, WHAT IS ANDRA
33. CENTRE DE L' AUBE - DISPOSAL FACILITY
34. WHERE, WHEN, HOW: THE PLACE OF RADIOACTIVE WASTE IN FRANCE. ACTIVITY REPORT 1998
35. PREPARING FOR WELL-INTEGRATED LABORATORIES - PREREQUISITE ADMINISTRATIVE PROCEDURES FOR THE IMPLEMENTATION OF THE ANDRA'S UNDERGROUND RESEARCH LABORATORIES
36. RESEARCH IN RADIOACTIVE WASTE MANAGEMENT - LAW OF DECEMBER 30, 1991

37. UNDERGROUND RESEARCH LABORATORY - STATE OF KNOWLEDGE AND EXPERIMENTAL PROGRAM