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CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

TRIP REPORT

SUBJECT: Attendance at Waste Management 2000
20.01402.761, 762, 951, 952, and 953

DATE/PLACE: February 27–March 2, 2000, Tucson, Arizona

AUTHORS: P. Mackin and G. Wittmeyer

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PERSONS PRESENT: Authors and several hundred conference participants

BACKGROUND AND PURPOSE OF TRIP:

The authors attended the Waste Management 2000 (WM2000) conference as a session co-chair, and paper presenters. The waste management series of annual conferences addresses broad concerns in areas related to management and disposal of radioactive waste.

SUMMARY OF PERTINENT POINTS:

Not applicable.

SUMMARY OF ACTIVITIES:

The authors attended a variety of the presentations during the course of WM2000. P. Mackin left the conference on Wednesday, February 29 to return to the Center for Nuclear Waste Regulatory Analyses (CNWRA). G. Wittmeyer attended most of the remainder of the conference but was not present for the last day. The following paragraphs summarize key points from individual sessions.

P. Mackin presented a paper titled, Development of a Risk-Informed and Performance-Based Review Plan for a Potential Repository at Yucca Mountain. This paper was coauthored with K. McConnell, C. Lui, and B. Russell. The paper discussed the basis and developmental strategy for the Yucca Mountain Review Plan and emphasized the ways in which risk-informed, performance-based considerations are being incorporated in the review plan.

D. Fox (Bechtel-B&W Idaho, Inc.) presented a paper titled, Worker Perspective on Integrated Safety Management—Worker Involvement in the ISM Process. This presentation discussed the implementation of an improved safety management program at Idaho National Engineering and Environmental Laboratory (INEEL). The focus of the presentation was that strong worker involvement, as opposed to management

direction, contributed to improved safety management at INEEL. Under the improved program, workers wrote safety and operations procedures, which were then refined by technical writers, thereby incorporating worker experience in the facility procedures. The program also included initiation of "safety report cards" by workers. These safety report cards not only addressed worker safety problems, but also addressed problems with facility management approaches to safety. The presentation described a facility excellence program that provided a structured method for workers to report deficiencies. The program required at least two workers to be participants in safety inspections and walkdowns in the facility. The program also established an employee safety committee, made up mostly of workers, that was used to set company safety and production goals and to develop safety awareness.

C. Phillips (British Nuclear Fuels, PLC) presented a paper titled, Reprocessing as a Waste Management and Fuel Recycling Option: Experience at Sellafield in the UK. His presentation included discussions of the individual facilities and processes used at the Sellafield plant. It addressed specific design features and principles that were employed to improve the efficiency of the facility. The presentation included a discussion of waste treatment processes and measures of process efficiency for comparison to design goals. The presentation documented substantial success in meeting process-level goals at the Sellafield facility.

R.L. Clark [U.S. Environmental Protection Agency (EPA)] presented a paper titled, Proposed Environmental Standards at Yucca Mountain, Nevada. Mr. Clark discussed the regulatory and technical background for the development of the EPA standards for Yucca Mountain (YM). He noted that while the Energy Policy Act requires that the EPA standard be consistent with recommendations from the National Academy of Sciences (NAS), EPA has determined that the NAS recommendations are not binding. Mr. Clark discussed the EPA selection of the term "reasonable expectation" as opposed to the Nuclear Regulatory Commission (NRC) term "reasonable assurance." He stated his opinion that the phrase "reasonable expectation" would be more realistic for the repository because it would allow the use of "reasonably expected parameter values." Mr. Clark also presented the EPA basis for the proposed groundwater protection standard at YM. His presentation was consistent with CNWRA understanding of EPA policies with respect to the proposed standard.

K. Loveland (Envirocare of Utah, Inc.) presented a paper titled, Envirocare of Utah: What the Future Holds for DOE Waste Disposal. Ms. Loveland's presentation discussed changes to Envirocare licenses and permits and expansions at the Envirocare facility. She noted that Envirocare accepts naturally occurring radioactive material, low-activity radioactive waste, mixed waste, and 11e.(2) byproduct material. She noted that Envirocare expects that future disposal activities will move away from large soil disposal projects to wastes from decommissioning and the associated debris. She discussed Envirocare's special nuclear material exemption, which allows Envirocare to maintain an inventory of greater than 350 grams of undisposed special nuclear material. The presentation also discussed Envirocare's capability to accept PCB waste and large debris for disposal—large debris includes items such as pumps, generators, tanks, and concrete blocks. Ms. Loveland noted recent acceptance of a remote/point-of-generation sampling procedure that allows characterization sampling of waste to be performed at the point of generation, rather than at the Envirocare facility, thereby reducing the costs of disposal.

One session of the conference presented risk-assessment projects conducted by the Center for Risk Excellence. Highlights of some of these presentations follow.

- M. MacDonnell (Argonne National Laboratory) presented a paper titled, Integrating Risks at Contaminated Sites. Ms. MacDonnell's presentation described the risk-assessment process used by

Argonne. This process is similar to those familiar to CNWRA and NRC staff members. She emphasized that when evaluating the risk environment, it is necessary to consider the total human environment, including such aspects as spiritual and cultural resources and impacts, consistent with an increased emphasis on a holistic approach to risk assessment. She stressed that her organization adopts a policy that it is not necessary to know everything before conducting a risk assessment and that risk assessments should be iterated as more information becomes available. She stressed making risk assessment outcome-based, with prioritization of mitigation based on results from sensitivity analysis. She also stated her philosophy that in conducting a risk assessment and defining resulting actions, it is not necessary to try to protect the affected environment forever: technology will change, allowing future risk assessments and updating activities to improve programs established in the past.

- V. Schreiber (Argonne National Laboratory) presented a paper titled, Risk Assessment of Chemical Mixtures at DOE Sites. This paper documented the development of a spreadsheet database to examine information from the literature regarding various hazardous chemicals. This database was compiled and then used to allow easier access to risk data for a site.

- Another paper titled, Managing Corporate Risk in the Case of Radiation Exposure, was presented by M.R. Brendel (Kirkpatrick and Lockhart, LLP). Mr. Brendel is a lawyer, and his risk evaluation considered the potential economic exposure of corporations as a result of lawsuits on nuclear issues. His risk equation (probability times consequence) defines probability as the probability of facing a lawsuit or a claim, and the consequence as financial penalty. He noted that there have been 195 nuclear industry lawsuits involving financial claims. His conclusions included that the nuclear industry is becoming increasingly liable to legal suits and that these risks must be considered in managing programs for the nuclear and waste management industries.

- The session also included a paper presented by M.D. Maloney (Kaiser Hill Company) titled, Programmatic Risk Assessment at Rocky Flats—A Tool for Technology Deployment Decisions. His presentation addressed the application of a programmatic risk assessment methodology for managing the Rocky Flats cleanup program. The process he described includes interviews with knowledgeable individuals, analyzing results, prioritizing activities, scheduling technology applications, and reassessing actions. He used Pareto charts to identify the most important activities or risks associated with the cleanup. The outcomes of the process described by Mr. Maloney included an identification of the priorities for applying technology, schedules for applying that technology, and assessments of the impacts and costs. He also stressed that this process is used to identify areas where productivity may be improved through the application of remote controls, instrumentation, or management consolidation.

- A final paper of this session was presented by F. Eide (Bechtel-B&W Idaho, Inc.) titled, Estimation of Risk Reduction Resulting from Waste Management Operations. His presentation addressed an assessment made for INEEL that compared the risk reduction achieved by cleanup to the risks incurred by not conducting the cleanup. This evaluation considered only human health and safety. The approach addressed in the paper included the definition of a no-action concept of risk. This no-action risk is the risk associated with not taking cleanup action. Risk curves for the no-action option as a function of time were then developed. The approach considers that risks change over time as wastes are moved or placed in different forms that might present different hazards. Risk curves associated with conducting the various waste management activities were developed, and the two sets of risk curves were then compared. The results for this particular case were that more risk was

incurred by processing and cleaning up the waste until the time at which offsite shipment for disposal began.

A. Matvas of Bechtel Power described the options that were considered for removing the reactor pressure vessel (RPV) from the Oyster Creek nuclear power plant in New Jersey before the decision was made to continue power generation for at least another ten years. The greatest obstacle to safe removal of the 800 ton RPV was the adjacent spent nuclear fuel (SNF) pool, which would have still held SNF. Three removal options were considered: (i) through the roof; (ii) through the end wall, and (iii) though the dry well below the RPV. The RPV could have been removed intact if it was lifted through the roof using a vertical gantry; however, a new cover would have to be constructed over the SNF pool to provide protection from a crane failure. Removal though the end wall or the dry well would have required tunneling through the concrete bioshield, but dry well removal would also require cutting up the RPV. The cheapest alternative would have been intact removal through the end wall, but the best alternative in terms of cost, schedule, and minimum worker dose would have been intact removal through the dry well.

M. Lesinski of Consumers Energy gave an assessment of the free release criteria for decommissioning as applied to the Big Rock Point nuclear power plant in Charlevoix, Michigan. The current plan is to return the Big Rock Point power plant to a "green field" in 7 yr, but this will require disposing of 85 million pounds of material, most of which is concrete. The greatest uncertainty Consumers Energy currently faces in developing and implementing their decommissioning plan is identifying what the NRC regulations will require. Lesinski noted that one advantage of onsite disposal of concrete is that it conserves low-level waste (LLW) space. Lesinski pointed out that the radionuclides of particular concern in volumetrically contaminated concrete are ^{60}Co, ^{137}Cs, ^{54}Mn, ^{3}H, and ^{152}Eu. Currently, Consumers Energy is following NRC Regulatory Guide 1.86 (which is neither dose- nor risk-based), but would prefer to follow the new American National Standards Institute (ANSI) N13.12 standard for decommissioning, which is supported by the health physics community. Lesinski stated that EPA feels that the 25-mrem/yr long-term release standard proposed by NRC is not protective and favors a 1- mrem/yr standard. Lesinski closed by noting that whereas the EPA has proposed a 1-mrem/yr release standard for concrete from decommissioned power plants, the EPA allows 10 mrem/yr for concrete that incorporates NORM-contaminated fly-ash.

A presenter from Stone and Webster reported on decommissioning the Maine Yankee nuclear power plant, which is now 25-percent complete. Since it began operations in 1972, the 860 MW Maine Yankee reactor has produced one-quarter of Maine's electrical power. One of the greatest difficulties the utility faced was to maintain staff as they changed from generating to decommissioning. Apparently the decommissioning is proceeding smoothly and the utility expects to return the facility to a "green field" by 2004.

D. Gardiner of the Sacramento Metropolitan Utility District described decommissioning the 913MW Rancho Seco nuclear power plant, which began operations in 1972, but was shutdown by a public referendum in 1989. Because Ranch Seco was shutdown after less than 15 yr of operations, there were insufficient funds to support rapid decommissioning. Currently, there are 100 persons working on decommissioning and it is hoped that the casked spent fuel will be moved to an independent spent fuel storage installation (ISFSI) by this Summer. Contaminated material was to be moved to California's Ward Valley LLW site; however, with Ward Valley unlikely to ever be licensed, the material will now be shipped to Envirocare in Utah (at a savings of $30 million). Gardiner noted they plan to segment the RPV to avoid the public spectacle of transporting the massive, intact RPV.

A presenter from U.S. Ecology reported on the transport and burial of the RPV from the Trojan nuclear power plant in Oregon. The presentation centered on a number of very good photographs of the RPV being transported by barge up the Columbia River to the Hanford Reservation where it was off-loaded and transported on an immense trailer to a disposal cell. It was noted that the RPV still contained 1.5 million Curies of radioactive material and had to be plated with shielding material to meet Department of Transportation regulations.

M. Giorgio of SGN presented a paper on evaluation of offsite doses caused by a dust release from the damaged Chernobyl nuclear reactor in the Ukraine. This was an extremely difficult talk to follow, but the conclusion of the study appeared to be that collapse of the sarcophagus roof as a result of earthquakes, hurricanes, or tornadoes could cause radioactive dust releases that would result in 1 to 5 Sv (100 to 500 rem) inhalation doses in the immediate area. A wet dust suppression device was designed to respond to such an accident.

S. Kopp of the Oak Ridge Site Specific Advisory Board (ORSSAB), which serves the five counties and over 1 million people in the vicinity of ORNL, discussed how this independent advisory board was formed and how it functions. ORSSAB allots seats to members from selected community organizations. The speaker stated that ORSSAB works to engage the public and encourage the participation of those persons who are unlikely to attend meetings. Failure to reach out may result in a board appearing to have been co-opted by the sponsoring agency [the U.S. Department of Energy (DOE) in this case]. ORSSAB sponsors community forums, issues news releases, publishes news letters, and maintains an interactive web site. To ensure that ORSSAB is meeting their objective, they conduct stakeholder surveys and solicit verbal feedback on their performance.

R. Ferguson of EPA discussed the public outreach program developed as part of the Waste Isolation Pilot Plant (WIPP) certification process. EPA hired a DC-based firm to interview New Mexico citizens to establish the specific requirements of a public outreach program. The citizens of New Mexico wanted involvement in the rule making process, full disclosure of the WIPP program, early notification of meetings, and prompt response to public inquiries. The EPA developed public information documents and conducted three focus group studies to determine the level of public knowledge of the WIPP program. In addition to the public information documents, the EPA developed a reporter's guide that provided a technical description and glossary for WIPP. The keys to success of the EPA public outreach program were (i) consulting the stakeholders, (ii) seeking early stakeholder involvement, (iii) educating the press, and (iv) communicating its role and involvement to the public.

S. O'Connor from Xavier University of Louisiana described a study of public perception of radioactive contamination problems at the Hanford Reservation in Washington. Of interest was that the public did not react with concern when tritium concentrations of 1.8 and 8.0 million pCi/L were reported in groundwater samples at the site (note that the drinking water limit for tritium is 20,000 pCi/L). Because of the confusing nature of this presentation, it was not clear why the public was unconcerned.

R. Martinez of Fluor Hanford described the formation of a tiger team to re-baseline operations at the plutonium finishing plant at Hanford, Washington, where plutonium nitrate was converted to plutonium metal. A chemical explosion in a tank occurred several years ago, and although there were no radioactive material releases from the plant, this accident led to a general shutdown of operations for 2 yr. The tiger team develops new operating procedures to ensure that the plutonium finishing plant can be stabilized and then decommissioned.

N. Orlando of the NRC gave an overview of the status of the NRC decommissioning program. Currently, when a nuclear power plant is decommissioned, it must be safely removed from service with the site released for either unrestricted (25 mrem/yr) use followed by license termination or restricted (100 mrem/yr plus stewardship) use without termination. Final guidance on decommissioning is expected by June of 2000; however, Orlando noted that greater emphasis will be placed on meeting with the applicant prior to submission of a decommissioning plan so that only one round of requests for information is necessary. Much of the prelicensing consultation will focus on the dose-pathway modeling that must be performed for each site. Orlando also noted some of the past and ongoing decommissioning actions being undertaken by NRC including (i) terminated licenses for Fort St. Vrain and Shoreham; (ii) license termination plans for Trojan, Maine Yankee, and Saxton; (iii) 26 sites placed on the Site Decommissioning Management Plan (SDMP) program; (iv) 20 sites that have been taken off the SDMP program; and (v) 14 sites that have been transferred to agreement states.

L. Bergeman of Nuclear Power Plant Gundremmingen (Germany) described the processes that have been developed in Germany for reducing the volume of contaminated concrete and cables from nuclear power plants. Cables are chopped into short (around 1 m) sections, and are then shredded to strip the contaminated insulation, which is separated from the copper on a vibratory table. Because it is difficult to conduct accurate radio-assays of irregularly shaped pieces of concrete, this material is crushed (1 to 5 cm in size) and placed in drums, which are subjected to external activity assays. It appeared that considerable progress has been made by German engineers in developing technology that facilitates the concentration of contaminated materials from defunct power plants.

R. Simon of the European Union discussed the development of clearance standards for contaminated materials. A typical 1,000 MW PWR contains 160,000 tonnes of material, of which some 20,000 tonnes must be assayed and cleared. This 20,000 tonnes of material typically contains 1,500 tonnes of radioactive metals, 1,000 tonnes of radioactive concrete, and 500 tonnes of radioactive secondary waste. Currently, the European Union is considering adopting clearance standards that restrict the whole body dose to 10 μSv/yr (1 mrem/yr) and the dose to the skin to 50 mSv/yr (5 rem/yr). Considerable discussion ensued about the political ramifications of adopting such conservative release criteria for the European community. Simon also described some of the dose-pathways that were considered for recycled materials, including re-use of (i) copper in musical instruments, (ii) stainless steel in kitchen sinks, and (iii) steel in ships.

Poster sessions were visited and materials relevant to NRC projects were collected for further distribution.

IMPRESSIONS/CONCLUSIONS:

Although WM2000 provided opportunities to present NRC and CNWRA work and to attend sessions related to areas of NRC interest, much of the material presented at this conference had little application to CNWRA work for the NRC. Participation in future waste management conferences is recommended, but at a relatively low level, as was the case this year.

PROBLEMS ENCOUNTERED:

None.

PENDING ACTIONS:

None.

RECOMMENDATIONS:

CNWRA participation in this series of conferences should be continued, but at a relatively low level, as was the case this year.

SIGNATURE:

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Date

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