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Maine Center for Disease Control and Prevention
An Office of the Department of Health and Human Services

John E. Baldacci, Governor Brenda M. Harvey, Commissioner

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October 22, 2010

To: Honorable Ms. Elizabeth Mitchell, President of the Senate
Honorable Ms. Hannah Pingree, Speaker of the House

Subject: State Nuclear Safety Inspector Office's September 2010 Monthly Report to the Maine Legislature

As part of the State's long standing oversight of Maine Yankee's nuclear activities, legislation was enacted in the second regular session of the 123rd and signed by Governor John Baldacci requiring that the State Nuclear Safety Inspector prepare a monthly report on the oversight activities performed at the Maine Yankee Independent Spent Fuel Storage Installation facility located in Wiscasset, Maine.

Enclosed please find the Inspector's September 2010 monthly activities report. The highlights of this month's report include samplings of summaries and presentations from the three Blue Ribbon Commission meetings held, Connecticut Governor Rell's request to Energy Secretary Chu to halt the dismantlement of the Yucca Mountain Project, the recent U.S. Court of Federal Claims decision on damages awarded to Maine Yankee, Connecticut Yankee, and Yankee Rowe in Massachusetts. The decision, although subject to appeal by the Department of Justice, increases Maine Yankee's initial award of $75.8 million decreed in October of 2006 to $81.7 million. Another highlight includes the Department of Interior's allowance of a deadline to pass to file an appeal of the Tenth Circuit Court of Appeals' ruling on the Utah Skull Valley Band of Goshute Indians' permits for the construction of a centralized interim storage facility for used nuclear fuel on their reservation. One other highlight involves the States of Washington and South Carolina, Aiken County South Carolina, and the three Tri-City leaders near the Hanford site in Washington filing a motion with the U.S. Court of Appeals for the District of Columbia Circuit to lift the Court imposed stay on their motion for injunctive relief to stop the Department of Energy from terminating the Yucca Mountain Project. The court initially imposed a stay on its September 23rd hearing date based on expedited actions undertaken by the Nuclear Regulatory Commission (NRC) on June 30th to review the NRC's Atomic Safety and Licensing Board's (ASLB) June 29th denial of the Department of Energy's motion to withdraw its license application to construct a geological repository at Yucca Mountain in Nevada. Since then, the Commission has not rendered a decision on the ASLB's ruling.

Please note that this year's reports will not feature the glossary and the historical addendum. However, both the glossary and the addendum are available on the Radiation Control Program's website at http://www.maineradiationcontrol.org under the nuclear safety link. Should you have questions about the report's content, please feel free to contact me at 207-287-6721, or e-mail me at pat.dostie@maine.gov.

Patrick J. Dostie
State Nuclear Safety Inspector

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Enclosure

cc: Ms. Vonna Ordaz, U.S. Nuclear Regulatory Commission
Ms. Nancy McNamara, U.S. Nuclear Regulatory Commission, Region I
Mr. James Connell, Site Vice President, Maine Yankee
Ms. Brenda Harvey, Commissioner, Department of Health and Human Services
Mr. Geoff Green, Deputy Commissioner, Department of Health and Human Services
Ms. Lucky Hollander, Director of Legislative Relations, Department of Health and Human Services
Dr. Dora Mills, Director, Maine Center for Disease Control and Prevention
Mr. Patrick Ende, Senior Policy Advisor, Governor's Office
Ms. Beth Nagusky, Commissioner, Department of Environmental Protection
Mr. Richard Davies, Maine Public Advocate
Lt. Christopher Grotton, Special Services Unit, Maine State Police
Ms. Nancy Beardsley, Director, Division of Environmental Health
Mr. Jay Hyland, PE, Manager, Radiation Control Program

State Nuclear Safety Inspector Office

September 2010 Monthly Report to the Legislature

Introduction

As part of the Department of Health and Human Services' responsibility under Title 22, Maine Revised Statutes Annotated (MRSA) §666 (2), as enacted under Public Law, Chapter 539 in the second regular session of the 123rd Legislature, the foregoing is the monthly report from the State Nuclear Safety Inspector.

The State Inspector's individual activities for the past month are highlighted under certain broad categories, as illustrated below. Since some activities are periodic and on-going, there may be some months when very little will be reported under that category. It is recommended for reviewers to examine previous reports to ensure connectivity with the information presented as it would be cumbersome to continuously repeat prior information in every report. Past reports are available from the Radiation Control Program's web site at the following link: www.maineradiationcontrol.org and by clicking on the nuclear safety link in the left hand margin.

Commencing with the January 2010 report the glossary and the historical perspective addendum will no longer be included in the report. Instead, this information will be available at the Radiation Control Program's website noted above. In some situations the footnotes may include some basic information and may redirect the reviewer to the website.

Independent Spent Fuel Storage Installation (ISFSI)

During September the general status of the ISFSI was normal. There were no instances of spurious alarms or fire-related impairments.

There was one security-related impairment in September. The impairment was a carryover from August involving communication issues. Additional measures were in effect until September 22nd when the issues were resolved. Since the issues involved safeguards information, they can not be disclosed to the public.

There were 12 security events logged (SEL). Eleven of the SEL's were associated with transient camera issues due to temporary environmental conditions. The remaining SEL was for an emergency power source issue. A power spike tripped the unit momentarily.

There was one condition report[1] (CR) for the month of September. The report addressed the need for the Fire Protection Program to reference the spent fuel cask manufacturer's Final Safety Analysis Report, which it currently does not.

Other ISFSI Related Activities

On September 9th a worm digger crossed Maine Yankee property. Security intercepted the individual and advised the individual on the security restrictions associated with the site. The incident did not rise to the level necessitating a notification to the Nuclear Regulatory Commission's (NRC) Operations Center.

[1] A condition report is a report that promptly alerts management to potential conditions that may be adverse to quality or safety. For more information, refer to the glossary on the Radiation Program's website.

On September 9th the Nuclear Regulatory Commission (NRC) approved Maine Yankee's exemption request to not have the central alarm station within the protected area of the ISFSI. The NRC staff noted that the central alarm station building would preserve several of the attributes of a protected area boundary. The physical change will eliminate most transient camera issues due to temporary environmental conditions. "The NRC staff evaluated the public health and safety and environmental impacts of the proposed exemption and determined that granting the exemption would not result in any significant impacts."

On September 13th Maine Yankee submitted its annual Special Nuclear Material Report to the Department of Energy. The report is a material accountability of the amount of fissionable material, such as Uranium-235 and Plutonium-239, remaining in the spent fuel stored on-site.

On September 15th an individual was seen parked at the site entrance. The local law enforcement agency was notified and responded. The individual promptly left the area. The incident was not reported to the NRC's Operations Center.

On September 29th the State Inspector maintained his ISFSI site access authorization by completing the required annual general employee and radiological training.

Environmental

There was nothing new to report this month.

Maine Yankee Decommissioning

There was nothing new to report this month.

Groundwater Monitoring Program

On September 29th Maine Yankee notified the State that they had identified a discrepancy in the analyses of the groundwater samples. Since the June sampling was the final sampling to be performed according to the Post Decommissioning Agreement between Maine Yankee and the State, as part of the final close out of the groundwater monitoring program Maine Yankee noted that the Transuranic analyses for the radioactive element Plutonium-241 (Pu-241) was not performed to the required minimum specifications for laboratory detection capabilities. Therefore, after consultation with the State, Maine Yankee agreed to resample and re-analyze all the wells for the Pu-241 at the agreed upon sensitivity levels.

Other Newsworthy Items

1. In September the fall edition of the Issues in Science and Technology, the Journal of the National Academy of Sciences and Engineering, published a feature article, entitled "Nuclear Waste Disposal - Showdown at Yucca Mountain". The article provides some historical basis to structure arguments on what's at stake, the potential risks for the Blue Ribbon Commission's agenda, the evolution of the Waste Confidence Rule adopted by previous Nuclear Regulatory Commissions and its current membership, redefining Yucca Mountain as a staged repository and suggestions on how to be fair and equitable to Nevada. A copy of the article is attached.

2. In September the European Commission published a document, entitled "Implementing Geological Disposal of Radioactive Waste Technology Platform". The document was prepared by

representatives from Sweden, Finland, France and Germany. The 43 page report provides the ground work for implementing deep geological disposal. The platform manuscript is a vision document that includes the signatories of not only the preparers from the four European countries but also Belgium, Spain, Switzerland, and the United Kingdom. This document is part of a three stage platform process. The second stage is already in progress and defines a strategic research agenda to specify the necessary medium to long term objectives of the disposal program. The final stage implements the strategic research agenda with the mobilization of significant human and financial resources. The platforms are viewed as tools that provide a forum for discussing research, development and demonstration (RD&D) issues and priorities, a means for sharing RD&D information and results, and a mechanism for coordinating RD&D on topics of shared interests.

3. On September 1st the Blue Ribbon Commission on America's Nuclear Future Disposal Subcommittee held a meeting in Washington, D.C. The Subcommittee moderated two expert panels that focused on the essential elements for technically credible and publicly acceptable geologic disposal regulations and an institutional system for regulating their safety. There were numerous presentations available and a few summaries were chosen to provide a cross-section of expert opinions. They include perspectives from the Blue Ribbon Commission's Consultant, the Environmental Protection Agency, a Consultant to the State of Nevada, University of Oklahoma, California State University, an Independent Consultant, and an informative presentation on societal challenges from Clark University. Copies of the agenda, summaries and presentation are attached.

4. On September 2nd Governor Jodi Rell of Connecticut sent a letter to Energy Secretary Chu requesting that he halt the dismantlement of the Yucca Mountain project until legal actions on the withdrawal of the license application are resolved by the Nuclear Regulatory Commission and the U.S. Circuit Court of Appeals for the District of Columbia. A copy of the letter is attached.

5. On September 2nd the Nuclear Regulatory Commission staff filed with the Atomic Safety and Licensing Board (ASLB) its list of witnesses, as mandated by the ASLB, within 10 days of the issuance of a Safety Evaluation Report. The Safety Evaluation Report issued by the staff on August 23rd was Volume I on the Yucca Mountain license application review.

6. On September 7th the U.S. Court of Federal Claims issued its decision on Maine Yankee's, Connecticut Yankee's and Yankee Rowe's lawsuits against the federal government's breach of contract to take possession of their spent fuel. The Court awarded Maine Yankee $81.7 million, Connecticut Yankee $39.7 million and Yankee Rowe $21.2 million. In October 2006, the Court had initially awarded Maine Yankee $75.8 million, Connecticut Yankee $34.2 million, and Yankee Rowe $32.9 million. The ruling was appealed by the Justice Department and in August 2008 the U.S. Court of Appeals for the Federal Circuit upheld the Court of Federal Claims ruling that the three parties were due damages and remanded the case back to the Court of Federal Claims for a reassessment of the compensation package based upon a court approved fuel pick up rate. The recent ruling raises the damages initially awarded to Maine Yankee by $5.9 million over the period January 31, 1998 through 2002. Maine Yankee and the other two Yankees have filed a second round of damages that are specific to each company and are awaiting the Court of Federal Claims to set a schedule for trial dates. The litigations are expected to continue until the spent fuel is removed from the respective sites.

7. On September 8th the quarterly conference call of the Federal Energy Regulatory Commission rate case settlement briefing took place with representatives from the states of Connecticut, Maine and Massachusetts. The briefing updated the status of the nuclear waste lawsuits against the federal government, national activities, such as the Blue Ribbon Commission, Congress, the Nuclear Regulatory Commission, the Goshute Indians storage facility in Utah, the Decommissioning Plant

Coalition, the Nuclear Waste Strategy Coalition efforts, the National Conference of State Legislatures, the Council of State Governments and the National Association of Regulatory Utility Commissioners, and regional activities, such as those of the New England Governor's Conference and the New England Council.

8. On September 9th the State of Nevada issued a letter to the Nuclear Regulatory Commission (NRC) staff evaluating the Yucca Mountain license application. The letter expressed disappointment over the depth of Volume I that was issued on August 23rd and dissatisfaction on the NRC staff's handling of obvious errors in the report. A copy of the letter is attached.

9. On September 11th Governor Rell from Connecticut issued a news release further urging Secretary of Energy Chu to cease dismantling operations at Yucca Mountain. The news release captures highlights from her September 2nd letter to Dr. Chu. A copy of the release is attached.

10. On September 15th the Nuclear Regulatory Commission (NRC) issued a news release stating that they had approved the final version of their Waste Confidence Rule, which will allow for on-site storage of spent nuclear fuel for at least 60 years beyond the license life of any reactor. The approval also directed the staff to start a long term rulemaking for storage facilities for extended periods. The rule will be published in the federal Register in 60 days. A copy of the press release is attached.

11. On September 15th the Nuclear Waste Strategy Coalition (NWSC) held a conference call to brief its members on the status of the U.S. Court of Appeals and the Nuclear Regulatory Commission on the Department of Energy's Yucca Mountain license application, congressional appropriations for FY 2010 and FY 2011, an update of the Blue Ribbon Commission's Committee and Subcommittee hearings, and the recent decision by the U.S. Court of Federal Claims on the three Yankees case. The NWSC is an ad hoc group of state utility regulators, state attorneys general, electric utilities and associate members representing 47 stakeholders in 31 states, committed to reforming and adequately funding the U.S. civilian high-level nuclear waste transportation, storage, and disposal program.

12. On September 16th the Sustainable Fuel Cycle Task Force sent a letter to Energy Secretary Chu expressing their dissatisfaction over the Department of Energy's (DOE) handling of the scientific records accumulated over 25 years on Yucca Mountain by DOE's abrupt termination of the electronic access systems to retrieve this information. A copy of their letter is attached.

13. On September 16th a Massachusetts Institute of Technology task force released a report, entitled "The Future of the Nuclear Fuel Cycle". The summary report focused on the concept that encompasses both the kind of fuel used and what happens to the fuel after it has been used. The key messages of the report are that options for fuel cycle choices remain open. This would be accomplished by continuing with the current once-through fuel cycle, implementing a system for managing spent fuel storage for 100 years through centralized interim storage facilities starting with reactor sites that have been decommissioned, developing a geologic repository, and researching technology alternatives appropriate to a range of nuclear energy futures. The study also challenges the idea that uranium supplies will be limited in the future and supports the creation of a new quasi-government organization to manage the nation's nuclear waste.

14. On September 20th the Nuclear Waste Strategy Coalition submitted a letter to the Co-Chairs of the Blue Ribbon Commission's Transportation and Storage Subcommittee exhorting them to immediately recommend to the Department of Energy (DOE) to re-instate their transportation plan and remove the spent fuel marooned at decommissioned sites and operating reactors to volunteered

host sites. The letter also urged the Subcommittee to recommend to the DOE construction of a centralized interim storage facility. A copy of the letter is attached.

15. On September 20th the Nuclear Waste Strategy Coalition (NWSC) sent a second letter to the designated Federal Officer for the Blue Ribbon Commission (BRC) reiterating the NWSC's position on centralized interim storage and proposed that the BRC consider the Canadian model for managing nuclear wastes. A copy of the letter is attached.

16. On September 20th the Acting Principal Deputy Director of the Department of Energy's (DOE) Office of Civilian Radioactive Waste Management (OCRWM) forwarded a letter to the Nuclear Regulatory Commission notifying them that the new point of contact for the Yucca Mountain license application will be an outside counsel for the DOE, since the OCRWM will cease to exist after September 30th. The OCRWM was created by Congress in the Nuclear Waste Policy Act of 1982. A copy of the letter is attached.

17. On September 21st -22nd the Blue Ribbon Commission on America's Nuclear Future held a meeting in Washington, D.C. The first day of the full Commission focused on international perspectives and ethical considerations with presentations from Canada, Switzerland, and Spain. The second day centered on nuclear waste governance. Copies of the agenda and selected international summaries and governance presentations are attached.

18. On September 23rd the Blue Ribbon Commission's Transportation and Storage Subcommittee held a meeting in Washington, D.C. The half day meeting focused on "hardened" (designed for beyond design basis threats) on-site storage and transportation and storage risks. Three presentations were selected that illustrate the safety and security issues related to storage and transportation of spent nuclear fuel. The NAC International presentation includes an extra slide from another presentation that better illustrates the hardening concept of a dry cask storage module. Copies of the agenda and the presentations are attached.

19. On September 24th the Department of Interior (DOI) allowed the deadline to pass without filing an appeal of the Tenth Circuit Court of Appeals July 26th ruling ordering the Department to reconsider two issues involving the Utah Skull Valley Band of Goshutes' construction of an interim cask storage facility for spent nuclear fuel on their reservation. The storage site was licensed by the Nuclear Regulatory Commission in 2006. Utah leaders had urged the DOI to contest the ruling. The Tenth Circuit Court ruled the DOI's decisions were arbitrary and capricious.

20. On September 24th The House Science Committee approved an amendment to the Nuclear Energy Research and Development Act of 2010 that reinforces the federal government's responsibility to store spent nuclear fuel at the proposed Yucca Mountain repository in Nevada.

21. On September 27th the Nuclear Regulatory Commission (NRC), the Department of Justice, and the State of Nevada filed their status report with the U.S. Court of Appeals for the District of Columbia Circuit as ordered by the Court on July 28th. The filing noted that the NRC had not issued a decision on the twenty-three briefs submitted by thirteen parties on the Atomic Safety and Licensing Board's denial of the Department of Energy's motion to withdraw its license application on Yucca Mountain.

22. On September 27th the states of Washington and South Carolina, Aiken County, South Carolina, and the Tri-City leaders from near the Hanford site in Washington filed their status report with the U.S. Court of Appeals for the District of Columbia Circuit as ordered by the Court on July 28th. The status report indicated no change with respect to the briefs before the Nuclear Regulatory Commission.

23. On September 27th the states of Washington and South Carolina, Aiken County, South Carolina, and the Tri-City leaders from near the Hanford site in Washington filed a motion with the U.S. Circuit Court of Appeals for the District of Columbia to lift the stay the Court imposed and set an expedited briefing schedule on the initial oral arguments for the Yucca Mountain Project. The petitioners argue that the reason the Court imposed the stay was that it presumed an early decision from the Nuclear Regulatory Commission (NRC) on the Atomic Safety and Licensing Board's decision to deny the Department of Energy's motion to withdraw their Yucca Mountain license application.

24. On September 28th the U.S. Nuclear Waste Technical Review Board issued a news release indicating that they will hold a meeting on October 26th in Virginia to discuss technical lessons learned from high-level nuclear waste disposal efforts. A copy of the release is attached.

25. On September 28th the states of Washington and South Carolina, Aiken County, South Carolina, and the Tri-City Leaders from Washington State filed a notice with the U.S. Court of Appeals for the District of Columbia Circuit on their one editorial and two typographical corrections to the motion they filed a day earlier to lift the stay and set an expedited briefing schedule.

26. On September 29th the Nuclear Waste Strategy Coalition (NWSC) held a conference call to brief its members on the status of the U.S. Court of Appeals and the Nuclear Regulatory Commission on the Department of Energy's Yucca Mountain license application, congressional activities and appropriations, and an update of the Blue Ribbon Commission's Committee and Subcommittee hearings.

LUTHER J. CARTER
LAKE H. BARRETT
KENNETH C. ROGERS

Nuclear Waste Disposal

Showdown at Yucca Mountain

The administration's decision to withdraw the application for a nuclear waste repository at Yucca Mountain, Nevada, lacks scientific justification and could hamper the nation's effort to use nuclear energy to reduce emissions of greenhouse gases.

If the nation is to seriously confront a growing inventory of highly radioactive waste, a key step is to determine the merits of its geologic repository project at Yucca Mountain in Nevada. A board of the U.S. Nuclear Regulatory Commission (NRC) has for nearly two years been conducting an open and transparent licensing proceeding to accomplish exactly that. Moreover, in its forceful ruling of June 29, 2010, the board rejected as contrary to law a motion by Secretary of Energy Steven Chu to withdraw the licensing application and shut the proceeding down. Yet the administration's attempt to abandon Yucca Mountain continues and in our view poses a significant risk of a major setback for public acceptance of nuclear energy.

The licensing application was filed by the Bush administration under the Nuclear Waste Policy Act (NWPA) of 1982, and the proceeding itself began in October 2008. The NRC staff has almost completed its safety evaluation of repository performance for many tens of thousands of years. With this report in hand, the licensing board (acting for the commission) could begin hearing and adjudicating scores of critical contentions by the state of Nevada and other opposing parties. If the case for licensing is convincing, the granting of a construction license could come in 2012. But the licensing board is a creature of the NRC, and if the commission should order the proceeding terminated in keeping with Secretary Chu's motion, the board must comply.

The attempt by the current administration to withdraw the licensing application and abandon Yucca Mountain follows a commitment made by Barack Obama in early 2008 during the competitive scramble for Nevada delegates to the Democratic National Convention. Hillary Clinton, then the hands-on favorite for the nomination, had long sided with Nevada in its opposition to a repository at Yucca Mountain. Not to be outdone, Senator Obama declared his own categorical opposition to the project. Earlier this year, when President Obama, acting through Secretary Chu, moved to withdraw the licensing application, no scientific justification or showing of alternatives was offered. The project was simply dismissed as "not a workable option."

To cover Obama's political debt to Nevada, repository licensing would be terminated without congressional review and approval despite the fact that this vital project was sanctioned by Congress in elaborate detail and handsomely funded by a fee imposed on tens of millions of consumers of electricity produced by nuclear reactors. The licensing proceeding marks the culmination of a 25-year site investigation that has cost over $7 billion for the Nevada project itself and over $10 billion for the larger national screening of repository sites

from which the Yucca Mountain site was chosen.

What's at stake

To summarily kill the project would cap with still another failure a half-century of frustrated endeavors to site, license, and construct a geologic repository. The roughly 64,000 metric tons of spent reactor fuel that await permanent geologic disposal are now in temporary storage at 120 operating and shut-down commercial nuclear power reactors in 36 states. In addition, there are the thousands of containers of highly radioactive waste arising from the cleanup of nuclear weapons production sites in Washington, South Carolina, and Idaho.

Now pending before the U.S. Circuit Court of Appeals for the District of Columbia are lawsuits brought by Washington, South Carolina, the National Association of Regulatory Utility Commissioners, and several other plaintiffs to stop the licensing withdrawal. Most tellingly, the plaintiffs allege violations of the NWPA of 1982, with its detailed prescriptions for repository site selection, approval, and construction licensing. But also in play is the Administrative Procedure Act, under which agency decisions can be voided as "arbitrary and capricious" and an abuse of discretion.

In its refusal to accede to the Department of Energy's (DOE's) motion to withdraw the licensing, the licensing board questioned why the Congress, in enacting the NWPA, would have set out an elaborate sequence of steps and procedures for the selection and approval of a repository site if in the end the Secretary of Energy could undo everything by withdrawing the licensing application. "Unless Congress directs otherwise, DOE may not single-handedly derail the legislatively mandated decision-making process," the board said.

The Court of Appeals initially called for arguments in the pending litigation to begin this September but has now decided to first await an outcome at the NRC.

Coupled with the attempted withdrawal of the licensing application is a self-evident violation of the Federal Advisory Committee Act of 1972, which is intended to keep advisory committees from being "inappropriately influenced by the appointing authority or any special interest." According to its charter, the Blue Ribbon Commission on America's Nuclear Future (BRC), which Secretary Chu unveiled early this year, is to conduct a "comprehensive review of policies for managing the back end of the nuclear fuel cycle, including all alternatives for the storage, processing, and disposal of civilian and defense used nuclear fuel [and] high-level waste . . ." Left unstated, to say the least, was the fact that the commission was created in substantial part to show that Yucca Mountain was not being abandoned without identifying a full suite of waste management options—but with no intention to have the repository project serve as a baseline for this review.

In March 2009, Secretary Chu and Nevada's Senator Harry Reid, the Senate's Democratic Majority Leader and a relentless foe of Yucca Mountain, struck a deal wherein Reid would drop his proposed legislation for a blue ribbon commission that Congress would appoint in favor of a commission that the Secretary of Energy would choose. In a press conference announcing the formation of the BRC on January 29, 2010, and later at their first formal meeting, commission members were told by Secretary Chu and White House aide Carol Browner that Yucca Mountain is past history and is not among the waste management options to be considered.

A blue ribbon agenda

The BRC's eminent co-chair, Lee Hamilton, the former Indiana congressman who served as vice chairman of the 9/11 commission, has made the general point that his study group's "recommendations will be ours and ours alone." Indeed, whatever the motivations of those who created it, the BRC is an independent advisory body chartered to provide a comprehensive review of waste management alternatives, and it cannot reasonably and honorably exclude Yucca Mountain from that review. The intellectual gyrations at play with respect to Yucca Mountain may be especially disturbing to those commission members well versed in nuclear energy issues, such as Richard Meserve (a former chair of the NRC), Per Peterson (chair of nuclear engineering at the University of California, Berkeley), and Phil Sharp (head of Resources for the Future and formerly a congressman from Indiana).

In turning its back on Yucca Mountain, the commission would put itself at high risk of failing to produce a report of significant policy impact and of coming across as little more than a fig leaf of respectability for the president's decision to abandon the repository. We don't think it will do that. This body could in fact prove itself enormously useful, not least by an insistence on recognizing and protecting the integrity of the NRC as an independent regulatory agency.

The commission could also emphasize that solid public acceptance of nuclear energy, together with the continued storage of large amounts of spent fuel in temporary surface facilities, may well turn on a credible promise of a geologic repository becoming available within the next few decades. This we see as a fundamental political reality that is accorded too little weight by the utility industry, the Secretary of Energy, and the NRC itself.

The utilities that are generating nuclear energy certainly

want a repository, but they do not want their lack of one to stand in the way of public support and federal subsidies for a nuclear expansion. So from this contorted position they argue the safety and acceptability of surface storage of spent fuel for decades into the future while quite properly pressing the government to honor its long-past-due obligation to take custody of most of that fuel.

But the politically critical nexus between reactors and spent fuel disposal has been evident since 1976, when Californians approved a referendum that declared that no more nuclear plants could be built in the state until a means for permanent disposal of spent reactor fuel and high-level waste was achieved.

Waste confidence

The NRC's successive "waste confidence" rule-makings during the past 25 years have been a milder response to the same issue. A lawsuit begun by the Natural Resources Defense Council in 1977 gave rise to the first such NRC rulemaking in 1984. In that ruling, "reasonable assurance" was found on three critical points: that at least one mined geologic repository would be available by the years 2007–2009; that spent fuel from any reactor could go to geologic disposal within 30 years of the expiration of the reactor's operating license; and that during the interim, the spent fuel could be safely kept in surface storage facilities either at the reactor site or elsewhere.

These confidence findings were renewed in 1990, then again in 1999, but with the difference that the latter finding envisioned a geologic repository becoming available "within the first quarter of the twenty-first century." In September 2009, a new confidence proceeding was initiated wherein the NRC expressed reasonable assurance of having a repository within 50 to 60 years of the licensed life of existing reactors, which for some reactors may extend to the year 2060.

In plain English, what this meant was that the commission would be comfortable not having a repository until sometime well beyond the year 2100, when our great-great grandchildren may be left to worry about the disposal of nuclear waste arising from the generation of nuclear electricity from which we benefit today. The NRC, with two vacancies at the time, had but three members to consider this confidence finding and only one was willing to adopt it without receiving public comment on policy changes affecting Yucca Mountain. That one was the commission's new chair, Gregory B. Jaczko, formerly a senior aide and close associate of Senator Reid. President Bush appointed Jaczko to the commission in 2005 and reappointed him in 2008, and last year President Obama named him chairman.

Since then, the NRC has undergone major changes in membership, and whether there is among the five commissioners a legally qualified quorum of three to decide pending Yucca Mountain issues is being challenged. Of the two members who opposed issuance of a confidence finding last year, Commissioner Kristine L. Svinicki continues to serve but her former colleague Dale E. Klein has completed his term and departed.

Meanwhile, three new members—George E. Apostolakis, William D. Magwood IV, and William C. Ostendorff—have come aboard. At their Senate confirmation hearing in February, Senator Barbara Boxer of California asked each of the three this question on behalf of Senator Reid: "If confirmed, would you second guess the DOE decision to withdraw license application for Yucca Mountain from NRC review?" All three answered, no. In the pending litigation, Washington State and South Carolina, plus a few other parties, cite this exchange as compelling grounds why, by law, they should recuse themselves from any decision on the Yucca Mountain licensing issue.

Apostolakis, a professor of nuclear science and engineering at the Massachusetts Institute of Technology (MIT) and a member of the National Academy of Engineering, has in fact since recused himself. But his stated reason for doing so was not his response to Senator Boxer but the fact that he chaired the Sandia National Laboratory panel that reviewed the Yucca Mountain performance assessment and found it adequate to support submittal of a license application.

Commissioners Magwood and Ostendorff, on the other hand, have now refused to disqualify themselves, contending that Boxer's question was vaguely put and that they were at the time unaware that a White House decision to withdraw the licensing application would be coming up for NRC review. But the DOE had already filed a motion to stay the licensing board proceeding and announced that a motion to withdraw the licensing application would soon follow. Counsel for Washington et al., citing Supreme Court precedents, argue that whether a judge or regulatory official recuses himself should turn not on "the reality of bias or prejudice but its appearance" and on whether a "reasonable man, [knowing] all the circumstances, would harbor doubts about the judge's impartiality."

Of course, in principle there's nothing to keep Magwood and Ostendorff from deciding not to join their chairman, Gregory Jaczko, in overriding the licensing board. This would deny Jaczko a majority on the issue and leave in force the board's refusal to stop the licensing. But however that may be resolved by the commissioners, the matter of the

For final disposal of long-lived nuclear wastes, geologic containment is the only option, and Yucca Mountain is the one place where this might happen in the next few decades.

new waste confidence finding is also pending. All five commissioners, including Magwood and Ostendorff, have issued position papers in which, despite differences in detail, there is broad agreement as to strategy. They have studiously avoided recognition of the elephant in the room, Yucca Mountain. The project's fate is either ignored or treated as by no means impeding a confidence finding.

The commissioners are counting on continued surface storage for up to 120 years or even much longer, and on having either a mined geologic repository or some other means of final disposal available "when necessary." The House report that accompanied the Nuclear Waste Policy Act almost 28 years ago noted that "an opiate of confidence" had led to a long trail of paper analyses and plans that had come to nothing. The record of frustration and failure that preceded that 1982 Act may well be extended right up to the present if the commissioners rubber-stamp the administration's withdrawal plans for Yucca Mountain or ignore the implications for waste confidence of the project's being abandoned at the very point of construction licensing.

Whatever happens at the NRC, the BRC must weigh in with its own judgments. A central fact to be recognized is that geologic storage or disposal of highly radioactive waste will not begin within this generation without a renewed commitment to Yucca Mountain. Apart from the continued surface storage of spent fuel, other waste management options that the commission is considering—spent fuel reprocessing, "recycling," and transmutation of dangerously radiotoxic species to more benign forms—have little to offer for the next half century or longer.

This is true for a mix of technical and financial reasons explained at length in studies done by experts at Harvard, MIT, and elsewhere. A primary reference is the National Research Council's Separations Technology and Transmutation Systems report of 1996. For the foreseeable future, waste management systems resting on such technologies would come at prohibitive cost and could not in any case eliminate all of the dangerously radioactive and long-lived wastes of concern. For final disposal of such waste, geologic containment is the only option, and Yucca Mountain is the one place where this might happen in the next few decades.

Redefining Yucca Mountain

The commission has an opportunity to broadly redefine the Yucca Mountain project to suggest how advantage might be taken of the repository's early potentialities and how uncertainties about its long-term performance might be reduced. Bear in mind that operation of the repository would come in two phases. There is, first, a pre-closure phase of up to several hundreds of years during which spent fuel and high-level waste would be emplaced retrievably. This is followed by a post-closure phase that begins when the repository is sealed.

Built in volcanic rock high above the water table and accessed by gently inclined ramps from the ridge slopes, a Yucca Mountain repository would be ideally situated to serve for monitored geologic storage of spent fuel, which ultimately could be retrieved if, say, fuel recycling should become economically attractive. Regrettably, in 1987, when the investigation of repository sites was narrowed to Yucca Mountain, the Congress, as a concession to Nevada, declared that no "monitored retrievable storage facility" could be built in that state. Here, Congress was, without doubt, referring to the kind of monitored retrievable surface storage facility that some sponsors of the NWPA of 1982 had deemed no less essential than a geologic repository and much more easily achieved.

But DOE officials did not believe that the NRC, under its licensing policies, would permit them to seek a license allowing retrievable emplacement of spent fuel and high-level waste early in the pre-closure phase while work continued on meeting the more stringent standards for permanent emplacement. They knew, too, that to propose such a two-phased strategy would arouse Senator Reid's wrath.

But the BRC could strongly advocate a two-phased approach to licensing, with vigorous pursuit of repository design alternatives to continue in parallel with the program of monitored retrievable geologic storage.

The National Research Council's Board on Radioactive

Waste Management has long recommended that repository design be approached in a phased, stepwise manner that allows intensive testing and analysis and a flexible, adaptive response to the setbacks and surprises sure to come. This concept was most recently articulated in the board's 2003 report *One Step at a Time: The Staged Development of Geologic Repositories for High-Level Radioactive Waste.*

In sorting things out, the commission might note with emphasis that commercial spent fuel and defense high-level waste differ greatly in the degree of hazard posed. Because there is relatively little presence of plutonium and other actinides of long half-life in the defense wastes, the period of hazard for these wastes may be as short as 10,000 years, compared to up to a million years for spent fuel.

A fair deal for Nevada

As for Nevada's grievances, the commission doubtless will note that when the Congress, in its 1987 amendment to the NWPA, narrowed the search for a repository site to Yucca Mountain, this came as an abrupt departure from the procedure originally mandated to go to a single candidate site only after an in-depth, in-situ exploration of three candidates. But the volcanic tuff site at Yucca Mountain had emerged from the first round of studies as clearly superior to the other two candidates: the site in volcanic basalt at Hanford, Washington, and the one in deep bedded salt in Deaf Smith County, Texas. A more tentative or contingent congressional choice of Yucca Mountain would almost certainly have survived an impartial technical review, so in our view the hasty adoption of what soon came to be known as the "screw Nevada bill" was as unnecessary as it was politically provocative.

We think Nevada's cause for redress turns chiefly on regional fairness and equity, on having been fingered to take dangerously radioactive and long-lived nuclear waste that probably no other state would willingly accept. A major question for the BRC to consider is what compensation is due the state chosen for the nation's first repository for permanent disposal of spent fuel and high-level waste? The state could, for example, be given preference in the siting of various other new government-sponsored or -encouraged enterprises, civil or military, nuclear or non-nuclear, promising to bring Nevada more high-tech jobs and attract other business.

Even today, Nevada's Nye County (host to Yucca Mountain) and several other rural counties see a duly licensed repository project as a distinct economic asset and quite safe. Also, some of Nevada's more visible Republican politicians openly advocate the project, too, but on condition that the "nuclear dump" many Nevadans envision be made more acceptable by adding other nuclear-related industrial activities. Although Senator Reid surely has had the wind at his back in opposing the repository, the oft-repeated claim that Nevadans are overwhelmingly opposed to the repository is a canard that dies hard.

President Obama, at the Copenhagen climate change summit last December, announced a goal of reducing carbon emissions by 83% by the year 2050. In pondering the nation's nuclear future, the BRC must be aware that a nuclear contribution on a scale truly relevant to that hugely ambitious goal might entail a fivefold expansion of the present suite of 104 large reactors and a fivefold increase in the annual production of spent fuel from 2,000 to 10,000 metric tons. Surely this is not the time to abandon the only currently viable option for very long-term geologic retrievable storage of spent fuel, and possibly final disposal.

But also at stake is the reputation of the NRC as an independent, trustworthy overseer of the civil nuclear enterprise. The NRC has been dealt with abusively by the Obama administration and Senator Reid in the matter of Yucca Mountain. So now will the commissioners acquiesce in the policies of the senator and the White House, or will they reassert the NRC's dignity and independence by upholding their own Yucca Mountain licensing board? Also, will they see the speciousness of their pending waste confidence finding that would ignore the blatantly political undoing of a sophisticated technical endeavor to build the world's first geologic repository for highly radioactive waste? How the commissioners exercise their great trust will soon be apparent.

Luther J. Carter (lcarter345@aol.com), an independent Washington writer, is the author of Nuclear Imperatives and Public Trust: Dealing with Radioactive Waste *(Resources for the Future, 1987). Lake H. Barrett, a former official of the Nuclear Regulatory Commission and the Department of Energy, directed for a number of years the DOE program for disposal of spent fuel and high-level waste. Kenneth C. Rogers, a former president of Stevens Institute of Technology, was a member of the NRC from 1987 to 1997.*

Blue Ribbon Commission on America's Nuclear Future

Disposal Subcommittee

September 1, 2010

Washington Marriott

1221 22nd Street NW, Washington, DC

Agenda

8:30 a.m.	Open Meeting, Review Agenda	*Timothy Frazier, Designated Federal Officer*
8:35 a.m.	Welcome, Opening remarks	*Co-Chairs Sen. Hagel and Jonathan Lash, Subcommittee members*
8:40 a.m.	Regulatory History of the Nuclear Waste Policy Act	*Dr. Thomas Cotton, Commission Staff Consultant*
9:15 a.m.	The current status and plans regarding regulations for deep geological repositories	*Timothy McCartin, Senior Advisor for Performance Assessment, Division of High Level Waste Repository Safety, Office of Nuclear Material Safety and Safeguards, NRC* *Jonathan Edwards, Director, Radiation Protection Division, EPA*
10:00 a.m.	*Break*	
10:15:a.m.	**Panel 1:** What are the essential elements of technically credible, workable, and publicly acceptable regulations for disposal (in geologic repositories)? • *What should* be the time frame for protection of public health and safety in disposal regulations? • How should compliance be demonstrated (including the role of performance assessment)? • Should there be requirements concerning	*Dr. Mark Peters, Deputy Director for Programs, ANL* *Dr. Robert Budnitz, Staff Scientist, LBNL* *Dr. Warner North, President and Principal, NorthWorks, Inc; Consulting Professor, Stanford University* *Dr. William Murphy, Professor, Department of Geological and Environmental Sciences,*

	retrievability? • What can be learned from international experience in developing and implementing HLW disposal regulations? • Are regulatory changes needed to accommodate staged repository development concepts? • Would different regulations be required for disposal systems other than mined geologic repositories (e.g. deep boreholes)? • Are there other regulatory issues (e.g. waste classification, dual regulation with RCRA) that should be reconsidered?	*California State University* *Daniel Schultheisz, Office of Radiation and Indoor Air, Radiation Protection Division, EPA* *Tim McCartin, Senior Advisor for Performance Assessment, NRC*
12:30 p.m.	*Lunch break*	
1:30 p.m.	**Panel 2.** What are the essential elements for a technically credible and publicly acceptable institutional system and process for regulating the safety of disposal? • How can needed regulations be developed in a coordinated, consistent, and timely manner? (I.e. how can we avoid the extended, out-of-sequence, and confusing process of development of NRC and EPA regulations for repositories in general and for Yucca Mountain?) • Is the current allocation of regulatory authorities among agencies appropriate? • What has been learned about developing and implementing disposal regulations from experience in the US and abroad? • What should be the role of state, local, and tribal governments in the process?	*Robert Neill, Director Emeritus, New Mexico Environmental Evaluation Group* *Dr. Michael Voegele, Independent Consultant* *Steve Frishman, Technical Consultant, State of Nevada Agency for Nuclear Projects* *Dr. Hank Jenkins-Smith, Professor, Associate Director, Center for Applied Social Research, University of Oklahoma* *Dr. Roger Kasperson, Research Professor and Distinguished Scientist, Clark University*
3:00 p.m.	*Break*	
3:15 p.m.	Round-table discussion	*Chaired by Co-chairs Sen. Hagel and Jonathan Lash. All participants in both panels*
4:15 p.m.	Public Comments	
5:00 p.m.	Adjourn	

Regulatory History
by Dr. Thomas Cotton, BRC Staff consultant
2nd Disposal Subcommittee meeting, September 1, 2010

Overview. The Nuclear Waste Policy Act of 1982 divides responsibilities for repository regulation among three agencies: (1) the Environmental Protection Agency (EPA) issues "generally applicable standards for protection of the general environment from offsite releases from radioactive material in repositories;" (2) the Nuclear Regulatory Commission (NRC) issues technical requirements and criteria for use in licensing repositories, to be "not inconsistent" with the EPA standards; and (3) DOE issues general guidelines for recommending sites for repositories based on criteria identified in the Act. Despite deadlines established in the Act, litigation and legislative intervention caused major delays and reversals in the regulatory development process, requiring repository developers to work for extended periods without clear guidance about repository performance standards. As a result of this history, the U.S. now has two significantly different sets of repository regulations -- one applicable only at Yucca Mountain and the other applicable everywhere else. The differences between them are sufficient that revised regulations may be required for a new repository development process.

Initial steps. In 1985 EPA issued generic regulation (40 CFR 191) for repositories for high-level and transuranic waste. They established "containment" requirements to protect populations through first-of-a-kind quantitative limits on the probabilities of releases of specified amounts of radioactive materials to the environment over a 10,000 year period, rather than limiting radiation doses or health effects to individuals. Recognizing that complete assurance that these requirements have been met is impossible, EPA required only a "reasonable expectation" of compliance. To protect individuals living near the repository, 40 CFR 191 includes a 25 millirem/year maximum radiation dose to individual members of the public, and numeric limits on the radionuclide concentrations in nearby irreplaceable sources of groundwater, both applicable for the first 1000 years after disposal. NRC's regulations (10 CFR 60) supplemented EPA's standard with quantitative performance goals for individual barriers in the repository system - waste package, the overall engineered barrier system, and groundwater travel time - as a way to compensate for calculational uncertainties inherent in showing compliance with the overall EPA system performance goal. NRC also specified favorable and potentially adverse site conditions that were to be evaluated, reflected in DOE's siting guidelines (10CFR960).

WIPP/Yucca Mountain split. A federal court remanded 40 CFR 191 in 1987 due in part to inconsistencies between the 10,000 year containment period and the 1,000 year period for the individual protection and groundwater requirements. When the issues had not been settled by 1992, Congress acted to resolve the impasse through (1) the Energy Policy Act of 1992 (EPAct) directing EPA to issue a site-specific dose-based standard for Yucca Mountain, based on recommendations from the National Academy of Sciences (NAS), and (2) the WIPP Land Withdrawal Act directing EPA to finalize a revision of 40 CFR 191 applicable to WIPP and repositories other than Yucca Mountain, act as the determining agency for WIPP's compliance, and recertify compliance every 5 years. EPA reissued 40 CFR 191 in 1993, with a 15 millirem individual protection standard and 10,000 year periods for both the individual protection and groundwater standards, issued implementation guidance for WIPP (40 CFR 194) in 1994, certified WIPP's compliance in 1998, recertified it in 2006, and is now considering DOE's application for the next 5-year recertification.

Yucca Mountain standards. In 1995 the NAS recommended a risk (not dose) standard for Yucca Mountain applied at the time of peak dose (within the limits of geologic stability, on the order of one million years at Yucca Mountain), found individual barrier requirements (as in 10 CFR 60) to be unnecessary and possibly counterproductive, and recommended probabilistic performance assessment as

the principal tool for compliance assessment. In 2001, EPA issued 40 CFR 197 retaining the 10,000 year individual dose limit and compliance period of 40 CFR 191 while requiring DOE to present calculations of the peak dose in the repository Environmental Impact Statement. NRC issued 10 CFR 63 to implement EPA's regulation, focusing on demonstration of total system performance and replacing 10 CFR 60's quantitative individual barrier requirements with a requirement to demonstrate the existence of multiple barriers, based on advances in performance assessment since 10 CFR 60 was developed that NRC believed made the specific barrier requirements unnecessary. DOE issued new siting guidelines for Yucca Mountain (10 CFR 963) to reflect the new regulations' focus on total system performance rather than characteristics of individual barriers as the criterion for suitability. 40 CFR 197 was remanded by federal court in 2004 because of inconsistency with the NAS recommendation to regulate to the time of peak dose. It was reissued in 2008 (along with a conforming revision of NRC's 10 CFR 63), retaining the 15 millirem limit for the first 10,000 years and adding a limit of 100 millirem for the remaining period to one million years. These standards are not applicable to repositories at other sites.

Summary of Statement to the Disposal Subcommittee of the Blue Ribbon Commission on America's Nuclear Future
Dan Schultheisz, U.S. Environmental Protection Agency
September 1, 2010

Performance Indicators: The primary purpose of a geologic repository is to contain the waste and isolate it from the biosphere for extended periods of time. Potential indicators of performance include exposure of designated receptors to radionuclides (dose or risk), movement of radionuclides through the accessible environment (flux), and concentrations in environmental media. EPA's generally applicable standards (40 CFR part 191) and Yucca Mountain-specific standards (40 CFR part 197) have employed these approaches. A difficulty with flux and concentration indicators is that they are not directly related to impacts on humans.

Compliance Period: There is widespread agreement that projecting repository behavior becomes more uncertain and speculative as the time period covered by projections increases. This is most problematic for dose or risk standards for which a receptor must be defined. The repository should be expected to perform for periods during which human civilizations are likely to change significantly (e.g., in technology or medical advances), while at longer time periods even evolutionary changes may be contemplated. There are suggestions that more emphasis for far-future projections should be given to indicators that rely solely on the geologic processes and properties, as these may be considered more reliable and predictable than future human behavior.

Performance Assessment: Probabilistic performance assessment provides a valuable tool in evaluating the long-term performance of a geologic repository. However, in the face of increased uncertainty, it cannot provide absolute assurance that future performance will be within the established standards, so EPA has required a "reasonable expectation" that the standard will be met. This judgment includes qualitative (e.g., adequate conceptual understanding of the disposal system) and quantitative (e.g., appropriate parameter input values) factors. Performance assessments using "cautious, but reasonable" assumptions should provide a basis for regulatory judgments regarding the disposal system's capabilities; however, at longer time periods, this judgment may give more emphasis to qualitative aspects to counterbalance the increased uncertainty in, and lessened confidence in the meaning of, quantitative results.

Retrievability: The need to provide for retrievability of some (or all) of the waste for some period after it is emplaced in the repository reflects the amount of confidence placed in the repository, the operator, the regulator, and the decision to dispose of the waste. Retrievability may be seen as desirable to increase public confidence that steps can be taken to correct problems. It may be most important to avoid emplacing used fuel until it is determined that it is no longer a potential resource.

International: Only a relatively small number of countries have developed standards for disposal of spent fuel and high-level waste, and some of these are being revised. In general, the more common approach internationally has been to require strict quantitative projections of dose or risk for an initial period, with a more qualitative evaluation thereafter. In this view, projected dose or risk in the very long-term is seen as one indicator of safety, rather than as a determinant of safety.

SUMMARY STATEMENT OF STEVE FRISHMAN
TECHNICAL CONSULTANT – AGENCY FOR NUCLEAR PROJECTS
STATE OF NEVADA
TO THE DISPOSAL SUBCOMMITTEE
BLUE RIBBON COMMISSION ON AMERICA'S NUCLEAR FUTURE
SEPTEMBER 1, 2010
WASHINGTON. D.C.

Panel 2: *What are the essential elements for a technically credible and publicly acceptable institutional system and process for regulating the safety of disposal?*

The regulatory arena associated with deep geologic disposal of high-level radioactive waste and used nuclear fuel has been subject to an array of policy changes, changes in philosophy, and internal struggles within and between the two affected regulatory agencies – the Nuclear Regulatory Commission and the Environmental Protection Agency. The interested and affected public often has been confused about the roles of the respective agencies, and the motivation, scope and meaning of the regulations proposed, while being confined in their responses to the review and comment provisions of the Administrative Procedures Act (APA), and ultimately the federal courts. Having been a participant in this process, at the affected state government level, for its entire nearly 30-year history, has been frustrating, to say the least. There were long periods when DOE proceeded with the repository program without final safety and licensing standards against which to evaluate safety and design analyses and decisions.

How can needed regulations be developed in a coordinated, consistent, and timely manner? And, is the current allocation of regulatory authorities among agencies appropriate?

Given the unique and broad scope of needed regulation, and the unprecedented long period of time that safety must be assured, development of regulations for disposal safety requires a coordinated and dedicated effort that draws not only from the expertise of both the EPA, for a safety standard, and the NRC for safety analysis and compliance assessment, but also from the knowledgeable public. A panel, made up of experts from both agencies who have access to the agencies' resources, as well as experts from the public sector, could hold public inquiries to invite and enable discussions, including the following topics: regulatory policy objectives and options, safety and environmental standards, feasibility of implementation, scope of consideration in safety analysis, level of assurance of safety required, and understandability. A comprehensive report and recommendations from this panel would become the basis for a single integrated disposal safety regulation with generic applicability, assuming geologic disposal is intended. The actual regulation, informed by the panel's report, would be written and promulgated by the implementing regulator, assisted by the other agency, following APA procedures.

Since final disposal safety regulations must precede any siting activity, state local, and tribal governments should be invited to participate in the panel's inquiry individually, and/or by their various representative associations.

Summary of Comments for the
Blue Ribbon Commission on America's Nuclear Future

Professor Hank C. Jenkins-Smith
University of Oklahoma

What are the essential elements for a technically credible, workable, and publicly acceptable framework for managing the nuclear fuel system? I will focus chiefly on the aspects that concern credibility and acceptance by the public, based on two decades of research sponsored by the Sandia National Laboratories, the National Science Foundation, and my home universities in New Mexico, Texas and Oklahoma.

Public credibility and acceptance of radioactive materials management options are affected by developments in the policy and regulatory process over time. This is evident from the substantial growth of public support for the Waste Isolation Pilot Plant (WIPP) facility in New Mexico from 1990-2001, changing from substantial public opposition to majority support. For nuclear fuel cycle (NFC) management options, the *policy design* sets the starting conditions and prospects for public support. Key features of the design for used nuclear fuel (UNF) disposal in the US been that (a) the material is once-through "waste", and (b) the facility is intended exclusively to permanently entomb that waste. Public debate has been framed by these attributes, and therefore dominated by arguments over the prospects for minimization of the physical, economic and social harms to the host state and local communities. This makes any UNF facility a very tough sell. That difficulty is compounded in that it places state-level representatives in the position of defending their constituents from a policy consisting of imposed risks in which the federal government can in the future (due to the Constitutional supremacy clause) change policy unilaterally.

Variation in UNF policy design can substantially alter the basis for public support. Though public opinion on UNF policies is still relatively nascent, a policy design that combines a repository with program attributes that offset perceived harms substantially increases public receptivity. Among attributes that increase support is retrievability for purposes of altering the policy or the facility (a) in light of new knowledge and technology that can increase safety and/or (b) exploiting the resource value of the UNF. In particular, combining a repository with a technical research program to ensure safe disposal substantially increases support even among those initially inclined to oppose the facility. Similar increases in support are evident for a UNF repository design that includes the option of reprocessing. As in the EU policy debate, pubic support for inclusion of retrievability is robust even when proliferation concerns are made prominent.

Maintaining technical credibility of the regulatory process of UFC management poses several important challenges. First, the public does not expect the communication of UNF risks to be unbiased. With the exception of experts representing the National Academy of Sciences, experts important in NFC risk communication (from regulatory agencies, national labs, and interest groups) are expected by large fractions of the public to systematically understate or overstate the risks of UNF management. Therefore relying on risk communication efforts to substantially change public perceptions of risk is extraordinarily difficult. In this context, it is far easier to undermine technical credibility (through apparent lapses) than it is to regenerate it. From the perspective of the technical communities involved in assessing possible repository sites, the changing regulatory environment that ensues over the transition from site characterization to licensing substantially shifts the professional and ethical context in which they work. Technical communities place a premium on open communication and peer review, which tends to be undermined in the adversarial regulatory procedures involving licensing. In the interest of maintaining technical credibility, the technical organizations involved in NFC analysis risk assessment should anticipate these transitions, both in the relevant organization culture and training and in the design of the relevant regulatory processes.

Statement by William M. Murphy for the Blue Ribbon Commission Disposal Subcommittee

I appreciate the invitation and the opportunity to share my ideas with the Blue Ribbon Commission Disposal Subcommittee at their meeting on September 1, 2010, and I will try to address the questions posed to the panel members. I gratefully acknowledge support for my participation from the US Nuclear Waste Technical Review Board, of which I'm a member. However, I want to be clear that the opinions I express are my own, and not necessarily representative of the TRB or any other organization.

My main technical expertise is in the geochemical characteristics and evolution of proposed repositories (e.g., Murphy, 2004). I advocate permanent geologic disposal as a feasible and proper solution to the problem of high-level nuclear waste. The time frame for permanent geologic disposal and its regulation can be considered objectively in relation to the half lives of radionuclide wastes. For example, the half lives of neptunium-237 and iodine-129, which are notorious in consideration of their hydrogeochemical mobility, are about 2 million and 16 million years, respectively. A million-year time frame is realistic for technical evaluations of geologic stability and geologic isolation of nuclear wastes. One million years is an unrealistic human time scale (human species: about 100,000 y; human civilization: about 10,000 y; nuclear science and technology: about 100 y). Nuclear waste disposal regulations currently and appropriately address requirements for environmental protection, which extend beyond the realistic time period of concern for human health.

Confidence in performance/safety/risk predictions for geologic disposal of nuclear waste can be achieved through multiple lines of technical evaluation that lead to convergent conclusions. Lines of reasoning include site characterization (e.g., geologic stability, hydrogeochemical transport), engineering design and assessment, laboratory and field scale experimental studies, theoretical and statistical modeling and analyses (including performance/risk assessments), and natural analog studies. Repository strategies and designs and regulations should invoke multiple lines of reasoning and multiple barriers to help provide confidence in respect to uncertainties in predictions.

Retrievability must be considered in the context of the individual geologic and engineered system. Retrievability may be relatively impractical for certain systems that could otherwise serve as acceptable repositories, e.g., deep borehole disposal, which is a kind of geologic repository, or sub-seabed disposal. In recognition of inevitable social instability on the time scale of the hazard of high-level nuclear waste, retrievability is a potentially hazardous feature of a repository. A good geologic repository should disappear. The concept of retrievability for the purpose of maintaining access to a potential resource must be considered separately from retrievability for the purpose of gaining confidence in the adequacy of safe permanent disposal.

In the present state of high-level waste management in the US, geologic site selection needs reconsideration. Reasonable requirements regarding site selection from EPA (e.g., comparative performance assessments for long times), NRC (e.g., balancing favorable and potentially adverse conditions), and DOE (e.g., disqualifying conditions) were abandoned in the aftermath of the Nuclear Waste Policy Amendments Act of 1987. International (e.g., IAEA) guidance on site selection is valuable.

Reference: Murphy, W.M. (2004) Measures of Geologic Isolation. In Scientific Basis for Nuclear Waste Management XXVIII, Materials Research Society Symposium Proceedings, v. 824, p. 533-541.

Development of a High-Level Radioactive Waste Regulatory Structure.
Michael Voegele

The U.S. high-level radioactive waste repository legal and regulatory structure was developed over nearly 50 years. It was defined by Federal panel as well as National Academy committee recommendations. There were notable points of apparent progress, yet the entire process was characterized by disagreements and lawsuits. Issues arose due to: well intentioned policies that proved not only difficult to implement but that also were subject to manipulation; original regulations that had not considered certain aspects of disposal and that needed to be changed; expectations on the parts of all parties that were either not clearly understood or were unattainable as originally envisioned; significant technical advances in numerical modeling capabilities; and the responsibilities of two regulators with differing perspectives on how to address long term safety.

The U.S. regulations in place today can be considered to be more proscriptive and restraining than any others developed to date; there remains, however, a sense that there is a need for new, generic regulations, and that the regulatory structure for the program must be in place well in advance of future site screening activities. Not surprisingly this is traceable in large extent to experience gained during the development of the Yucca Mountain program regulations. It is likely that any attempt to develop new generic regulations, if they have the proscriptive nature as those today, also will not withstand the tests of time. Multiple regulators and public expectations compound the difficulty of sorting out a path forward.

It could be argued that because generic versions of the Environmental Protection Agency and Nuclear Regulatory Commission regulations, as well as the Department of Energy siting guidelines, are still in force, that they could be used should the country become involved in another site screening program. It must be recognized, however, that the technical advances and policy changes that have been reflected in the site-specific Yucca Mountain regulations and to some degree in the regulation used at the Waste Isolation Pilot Plant, would likely be required attributes or components of any new repository siting program regulations.

The National Academy of Sciences noted in their 1990 report *Rethinking High-Level Radioactive Waste Disposal,* that the U.S. regulatory structure was rigid and inflexible and needed to be developed as the program moved forward. Adverse public reaction to the development of the regulatory structure for Yucca Mountain does not show this to be an acceptable approach in the manner the Yucca Mountain regulations were developed. Rather, the development shows a lack of commitment by the responsible agencies to involve all affected parties in a meaningful way.

The amendment of the Nuclear Waste Policy Act in 1987, which selected Yucca Mountain as the single site to be studied, led to several associated policy directives that affected the regulatory structure. Principally, the Nuclear Regulatory Commission and Environmental Protection Agency regulations had been developed for a saturated zone site; when Yucca Mountain, an unsaturated zone site, was selected for characterization, only the Nuclear Regulatory Commission had amended its regulations to specifically allow disposal in the unsaturated zone. Further, following the amendment, Congress directed that the Environmental Protection Agency and the Nuclear Regulatory Commission promulgate site-specific regulations for the Yucca Mountain site. The fact that Congress was attempting to prevent disqualification of a site on the basis of a condition without appreciable health risk, and ensure protection of those most affected by the repository was lost in the reaction as unfair treatment of Nevada.

Blue Ribbon Commission Disposal Subcommittee Sept 1, 2010
Essential Elements of a State Technical Review and Lessons Unlearned on Radioactive Waste Disposal

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It is essential to have a state conduct a technical evaluation of the impact on public health and the environment of any proposed High Level Waste (HLW) repository in that state.
The following identifies essential elements for such an evaluation.

OBJECTIVITY neither pro nor anti
INDEPENDENT no external approval
COMPETENT senior, knowledgeable staff
MULTIDISCIPLINARY but primarily radiation protection
PUBLISH ANALYSES EEG issued 80 reports
TESTIFY BEFORE LEGISLATURE AND CONGRESS about 50 times
PRESENTATIONS AT PROFESSIONAL MEETINGS state, national and intl
LEADERSHIP ROLE IN PROF SOCIETIES

CANDOR Recognition of uncertainties in predictions of waste behavior over 10,000 years
HUMILITY Identify uncertainties in predictions of radiation dose over 1 million years

PART OF WIPP SUCCESS STEMS FROM PUBLIC CONFIDENCE BASED ON EEG EVALUATION OF IMPACT ON PUBLIC HEALTH
WIPP A$19 Billion repository for defense transuranic waste. The CH-TRU waste is respirable, soluble and in a carbon steel vented 55 gal drum (DOT Type A)
Public acceptance is greater for activities in defense of the country. (Note that 10% of HLW is defense waste)
States do not regulate HLW or TRU waste. DOE does. States do regulate the non –radiological toxic organics under RCRA. The hazards of RCRA waste at WIPP are much less than the radionuclides.

LESSONS UNLEARNED IN RADIOACTIVE WASTE DISPOSAL

- It is necy to plan, evaluate and plan some more to avoid "changed our mind" syndrome as has been done for HLW after spending over 10 B on YMP. Planning for a 2nd rep was discontinued since it would be easier to increase capacity of first than proceed with a second. With abandonment of first, we have no back up.
- The 1957 NAS report recommended resolving all major technical concerns before authorizing construction. This 53 year old recommendation is important.
- Don't use screening approach of identifying 5 sites through lists of desirable criteria, , then 3 and finally one..
- Resolve jurisdictional disputes between regulatory agencies promptly. The 2 year impasse between EPA and NRC should not have been allowed to occur.

- Predicting a radiation dose from the inhalation of resuspended particulates over a million year time period is meaningless. Similarly, doses from the ingestion of radionuclides in food is not useful because we don't know what diets will be. The standards must be revisited.
- Most of the existing standards of EPA and NRC are salvageable.
- DOE should not rely so heavily on contractors for key analyses and should develop scientific in-house staff for decision making. Contractors don't identify the authors of reports which prevent ready access to information. The disclaimer that DOE puts in front of each contractor report that DOE disowns the usefulness of the information should be eliminated.
- Don't ask Congress to solve technical regulatory problems. Either convince the regulator of the validity of your concerns or modify the design

PERSPECTIVE

Radiation exposure from radioactive waste is not unique. Ionization is the same whether it is from a fissionable material or an X-ray. Medical diagnostic and therapeutic exposure to the US public is 9000 times greater than the collective dose from nuclear power plants! (NCRP 160 2009)

- Risk analyses are vital but we need to do benefit analyses as well. People appear to believe the benefits of the 7.3 increase in medical radiation in two decades (now 50% of total exposure) outweigh the risks
- People in Africa starve to death each day since food spoils before getting to market and people must shop each day. Food irradiation can extend the shelf life of many foods for months.

FUNDING

- Over $10 Billion on YMP HLW to date
- Over $22 Billion collected from rate payers for electricity from nuclear power plants
- Estimated cost of YMP $97 Billion
- Amount of HLW to be disposed exceeds authorized quantities
- Future funding will be more difficult to obtain

PRESENTATION TO THE BLUE RIBBON COMMISSION ON AMERICA'S NUCLEAR FUTURE
By Dr. Roger Kasperson

As the National Research Council has repeatedly advised the Federal Government and Congress, the "biggest challenges to waste dispoal programs are societal in nature." Four fundamental problems face the Commission in the design and implementation of a new program: (1) disposing of spent fuel and HLW is a deep uncertainty problem, (2) effective public involvement and collaboration will be required at all stages of the disposal process, (3) fairness in process and results will be essential but difficult to achieve, and (4) the process must move forward under conditions of high social distrust.

This presentation explores the substantive, rich findings of several decades of social and behavioral research. Much is known. The presenter summarizes in the depth allowed by the brevity of the panel schedule the nature of the four issues identified above and some principal implications of the accomplished research for Commission considerations of program design and related implications. The presentation concludes with principal criteria to guide new program and regulatory system initiatives and processes.

GEORGE PERKINS MARSH INSTITUTE

Blue Ribbon Commission Presentation

September 1, 2010

Roger E. Kasperson

Clark University

WHAT ARE THE CHIEF CHALLENGES FOR A SUCCESSFUL SPENT FUEL AND HLW DISPOSAL PROGRAM?

"TODAY THE BIGGEST CHALLENGES TO WASTE DISPOSITION PROGRAMS ARE SOCIETAL IN NATURE. DIFFICULTIES IN ACHIEVING PUBLIC SUPPORT HAVE BEEN SERIOUSLY UNDERESTIMATED IN THE PAST, AND OPPORTUNITIES TO INCREASE PUBLIC INVOLVEMENT AND GAIN PUBLIC TRUST HAVE BEEN MISSED."

NRC, DISPOSITION OF HIGH-LEVEL NUCLEAR WASTE AND SPENT NUCLEAR FUEL. WASHINGTON: NAS, 2001, pp. 29-30.

GEORGE PERKINS MARSH INSTITUTE

GEORGE PERKINS MARSH INSTITUTE

Nuclear Waste: Knowledge Waste?

"A stalled nuclear waste program, and possible increase in wastes, beg for social science input into acceptable solutions."

Rosa, E. et. al., Science, 13 August 2010, pages 762-763.

WHAT FUNDAMENTAL SOCIETAL PROBLEMS ARE WE FACING?

- DISPOSING OF SPENT FUEL AND HLW IS A DEEP UNCERTAINTY PROBLEM;
- EFFECTIVE PUBLIC INVOLVEMENT AND COLLABORATION WILL BE REQUIRED AT ALL STAGES OF THE DISPOSAL PROCESS;
- FAIRNESS IN PROCESS AND RESULTS WILL BE ESSENTIAL BUT DIFFICULT TO ACHIEVE;
- THE PROCESS MUST MOVE FORWARD AND WIN BROAD SUPPORT UNDER CONDITIONS OF HIGH SOCIAL DISTRUST.

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RADIOACTIVE WASTE DISPOSAL IS A DEEP UNCERTAINTY PROBLEM

- THE EXTRAORDINARILY LONG TIME FRAMES MAKE A "PROOF OF SAFETY" IMPOSSIBLE;
- THE PHYSICAL AND CHEMICAL PHENOMENA THAT CONTROL SITE AND REPOSITORY EVENTS AND THE NATURE OF OTHER FUTURE EVENTS (E.G.CLIMATE CHANGE);
- FUTURE INTERACTIONS WITH HUMAN SYSTEMS ARE ESSENTIALLY UNKNOWABLE;
  - FUTURE POPULATIONS
  - LIFE STYLES AND VALUES
  - HEALTH AND MEDICAL ISSUES
  - POLITICAL STABILITY

RADIOACTIVE WASTE DISPOSAL IS A DEEP UNCERTAINTY PROBLEM (cont.)

- THE DISPOSAL FACILITY WILL BE A FIRST-OF-A-KIND FACILITY AND RISKS AND UNCERTAINTIES WILL BE HIGHLY SITE-SPECIFIC;
- IMPLICATION: UNDERSTANDING OF RISKS AND UNCERTAINTY WILL BE EVOLUTIONARY WITH THE PROGRESS OF SCIENCE AND EXPERIENCE

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ACHIEVING EFFECTIVE PUBLIC INVOLVEMENT AND COLLABORATION

- TWO-WAY RISK COMMUNICATION MUST BE FOR REAL;
- EXTENSIVE PUBLIC INVOLVEMENT, EXCEEDING SUBSTANTIALLY WHAT TYPICALLY PREVAILS IN FEDERAL PROJECTS, WILL BE REQUIRED;
- PUBLIC INVOLVEMENT WILL NEED TO ESTABLISH BASELINE PUBLIC PERCEPTIONS, VALUES, AND CONCERNS AND PROCEED THROUGH ALL PROJECT STAGES;
- ONGOING INDEPENDENT EVALUATION WILL BE NEEDED TO GUIDE THE DESIGN FOR MID-COURSE CORRECTIONS AND INFORM STEPWISE DEVELOPMENTS;

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ACHIEVING EFFECTIVE PUBLIC INVOLVEMENT AND COLLABORATION (cont.)

- MAJOR UNCERTAINTIES WILL NEED TO BE SHARED OPENLY WITH STAKEHOLDERS AND PUBLICS;
- THE ENTIRE DISPOSAL DEVELOPMENT PROCESS NEEDS TO BE COLLABORATIVE WITH THE HOST STATE AND COMMUNITY;
- PUBLIC INVOLVEMENT SHOULD AIM AT MAXIMIZING VOLUNTARY CONSENT AND MINIMIZING COERCION.

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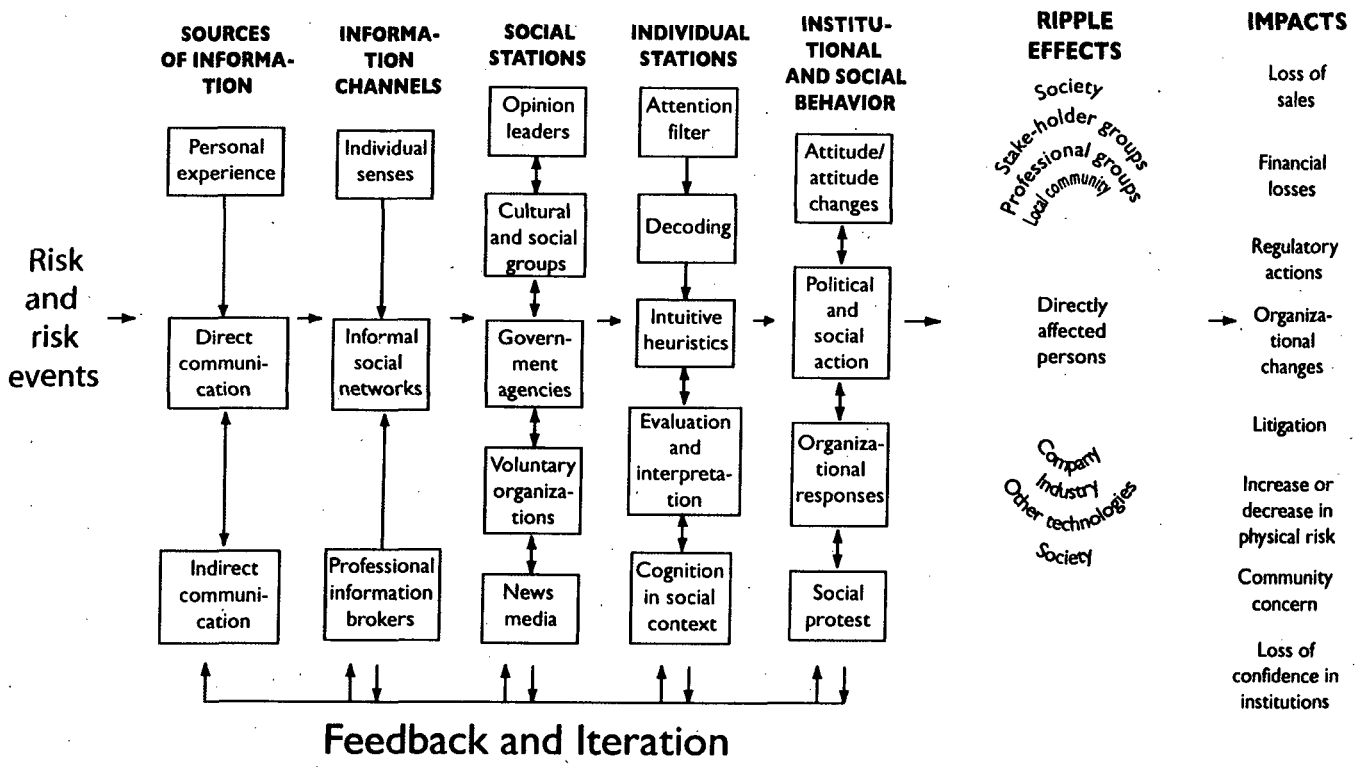
AMPLIFICATION AND ATTENUATION



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FAIRNESS IN PROCESS AND RESULTS WILL BE ESSENTIAL

- TWO TYPES OF FAIRNESS ARE REQUIRED—PROCEDURAL AND DISTRIBUTIONAL;
- THE PAST 25 YEARS HAVE BADLY VIOLATED THE EQUITY ARCHITECTURE OF THE NUCLEAR WASTE POLICY ACT AND THEREBY GUARANTEED CONFLICT AND EVENTUAL FAILURE;
- THE KEY TO FAIRNESS IN PROCESS IS THE EMPOWERMENT OF THE HOST STATES AND THOSE AT RISK FROM DISPOSAL UNCERTAINTIES, INCLUDING FUTURE GENERATIONS;
- THE KEY TO DISTRIBUTIONAL EQUITY IS COLLABORATIVE SHARING IN THE DECISION PROCESS;
- COMPENSATION TO REDRESS ANY REMAINING UNFAIRNESS WILL BE REQUIRED

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SOCIAL TRUST— A PRECIOUS RESOURCE

- OVER THE PAST 25 YEARS, DOE AND THE CONGRESS HAVE LOST THE TRUST OF THE PRINCIPAL STAKEHOLDERS AND PUBLICS IN THE MANAGEMENT OF RADIOACTIVE WASTES;
- SOCIAL TRUST ONCE LOST IS NOT EASILY REGAINED AND SO A NEW DISPOSAL PROGRAM WILL PROCEED UNDER CONDITIONS OF HIGH SOCIAL DISTRUST
- THE LOSS OF TRUST IS PRONOUNCED IN THE NUCLEAR AREA BUT IS SYSTEMIC ACROSS SOCIAL INSTITUTIONS IN THE U.S.

SOCIAL TRUST— A PRECIOUS RESOURCE (cont.)

- WHERE THOSE BEARING RISKS LACK TRUST IN THOSE MAKING DECISIONS, THEY DEMAND A GREATER ROLE IN DECISION MAKING.
- THE INTERACTION AMONG A HIGHLY DREADED HAZARD, LARGE UNCERTAINTIES, AND LOW SOCIAL TRUST CREATES UNUSUALLY DIFFICULT MANAGEMENT AND REGULATORY CHALLENGES.

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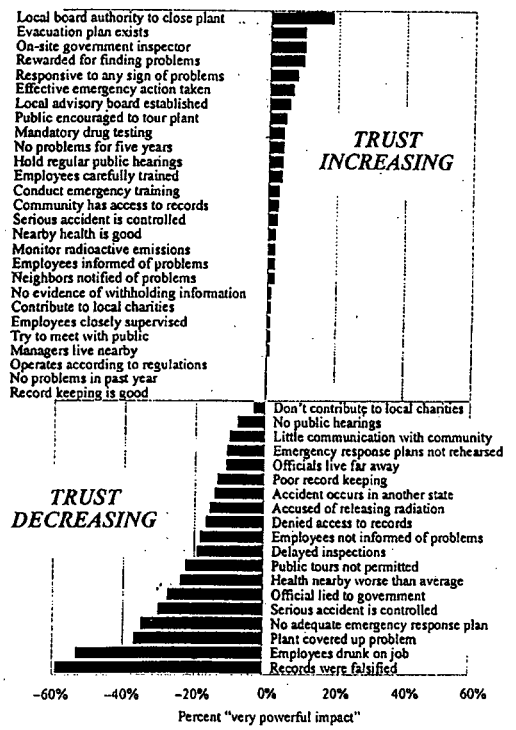

Figure 12. Differential impact of trust-increasing and trust-decresing events. Note: only percentages of Category 7 ratings (very powerful impact) are shown here. Source: Slovic (1993).

SEI

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IMPLICATIONS FOR REGULATORY SYSTEMS

- EXPLICIT RECOGNITION OF DEEP UNCERTAINTY AND THE EVOLUTIONARY NATURE OF KNOWLEDGE AND EXPERIENCE IS NEEDED;
- THE BURDEN OF PROOF IN UNCERTAINTY SHOULD BE BORNE BY THE DEVELOPER AND FEDERAL GOVERNMENT, NOT THE RISK BEARERS;
- THE SOUNDNESS OF ANY PROPOSED REGULATORY SYSTEM WILL BE JUDGED BY ITS FAIRNESS AS A MAJOR CRITERION;

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IMPLICATIONS FOR REGULATORY SYSTEMS (cont.)

- REGULATORY SYSTEMS SHOULD EMPOWER HOST STATES, COMMUNITIES, AND THOSE AT RISK;
- REGULATORY SYSTEMS SHOULD BE BUILT AROUND ADAPTIVE MANAGEMENT PRINCIPLES AND PROCEED WITH DISPOSAL IN A STEPWISE FASHION;
- COMPENSATION SHOULD BE PROVIDED FOR IRREDUCIBLE RISK AND UNCERTAINTY, AND LACK OF FAIRNESS IN THE DECISION PROCESS.

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M. Jodi Rell
GOVERNOR
STATE OF CONNECTICUT

September 2, 2010

Secretary Stephen Chu
U.S Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0002

Dear Secretary Chu:

I am writing regarding my concern over the Department of Energy (DOE)'s actions to dismantle operations at Yucca Mountain. I request that you halt all actions to dismantle operations at least until legal action regarding the withdrawal of the Yucca Mountain license application is resolved by the Nuclear Regulatory Commission and the U.S. Court of Appeals for the District of Columbia Circuit.

As you know, Connecticut is home to one of New England's three permanently shut down single unit reactor sites (known as Connecticut Yankee) and one multiple operating reactor site (known as the Millstone Power Plant). The ratepayers of Connecticut continue to pay millions of dollars annually for the continued storage of spent nuclear fuel at both sites. The Nuclear Waste Policy Act of 1982 (NWPA), as amended, required that the DOE Secretary begin disposing spent nuclear fuel not later than January 31, 1998 in return for payment of the fees established pursuant to NWPA Section 302 (42 U.S.C. § 10222). To implement NWPA Section 302, the DOE established the contractual terms and conditions under which DOE would make available nuclear waste disposal services to the owners and generators of spent nuclear fuel and high-level radioactive waste. DOE has spent decades and billions of dollars investigating the suitability of Yucca Mountain as a geologic repository, determined in 2002 that Yucca Mountain was a suitable location, and even now concedes that its Yucca Mountain application is neither flawed nor the site unsafe. To now reverse developing Yucca Mountain as a permanent storage site as a matter of policy is a disservice to Connecticut ratepayers, who continue to be burdened by DOE's delay in proceeding with its license application.

In addition, the Nuclear Regulatory Commission licenses canisters for spent nuclear fuel storage and transportation for only 20 years. Decision points at both sites are quickly approaching because spent nuclear fuel has already been in storage for several years and these canisters will shortly need to be relicensed by the Nuclear Regulatory Commission for continued use. The uncertainty presented by the canisters' limitations creates the potential for significant safety and environmental issues.

It is especially critical to find a permanent solution for the storage of spent nuclear fuel at sites such as Connecticut Yankee that are now permanently shut down and decommissioned.
At Connecticut Yankee, all decommissioning and site restoration activities have been completed on areas removed from the Nuclear Regulatory Commission license. Only the nuclear fuel storage area

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and associated activities remain licensed by the Nuclear Regulatory Commission. Accordingly, this site in Connecticut could be fully returned to the benefit of the local community, but for the fact that the spent nuclear fuel and greater than class C radioactive waste has not been removed by the federal government, as required by law and contract. Conversely, as a decommissioned site there is no longer the ability to move spent nuclear fuel and greater than class C waste from the existing canisters to new ones, should the canisters reach their lifetime limitations.

The expedited removal and consolidation of spent nuclear fuel and greater than class C waste from decommissioned reactor sites is sound public policy. The Department of Energy has heard this message from, among others: the New England Governor's Conference; National Association of Regulatory Utility Commissioners; National Conference of State Legislatures; National Commission on Energy Policy; American Physical Society; National Research Council; and Nuclear Waste Strategy Coalition.

On June 29, 2010, the Nuclear Regulatory Commission's Atomic Safety and Licensing Board (the Licensing Board) ordered DOE's motion to withdraw its license application for Yucca Mountain be denied, a clear statement that the DOE does not have the authority under the Nuclear Waste Policy Act to unilaterally terminate Yucca Mountain. One month later on July 28, 2010, the U.S. Court of Appeals for the District of Columbia Circuit issued an order stating that it would wait until the Nuclear Regulatory Commission makes a decision with respect to the Licensing Board's June 29, 2010 order before it will hear oral arguments in the lawsuit over the DOE's request to withdraw its license application for Yucca Mountain. Prior to this the D.C. Circuit Court had taken the important step of approving a motion to expedite legal actions contesting DOE's authority to withdraw with prejudice its application for Yucca Mountain, and had combined cases involving the State of Washington, State of South Carolina, Aiken County, and Tri-Cities, Washington Community leaders. This is a clear demonstration by the Court that the merits of the case must be heard and ruled upon prior to further action by the Department of Energy to shut down Yucca Mountain.

The Nuclear Waste Policy Act designated Yucca Mountain as the only candidate site for the national repository. Congressional intent is clear -- Congress has voted several times to retain Yucca Mountain as the national repository. In light of recent legal and regulatory actions, I am deeply troubled that the Department continues to move forward with terminating the project. I am deeply disappointed that DOE has overstepped its bounds and has ignored congressional intent without peer review or proper scientific documentation.

I ask that you recognize the letter and spirit of the law, and halt all efforts to reprogram funds or terminate contracts related to Yucca Mountain while the pending regulatory and court actions proceed.

Sincerely,

M. Jodi Rell

M. Jodi Rell,
Governor

JIM GIBBONS
Governor

STATE OF NEVADA

BRUCE BRESLOW
Executive Director

OFFICE OF THE GOVERNOR
AGENCY FOR NUCLEAR PROJECTS
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September 9, 2010

Lawrence Kokajko, Director
Division of High Level Radioactive Waste Repository Safety
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

RE: Safety Evaluation Report Related to Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada, Volume 1: General Information (NUREG-1949, Vol. 1).

Dear Mr. Kokajko:

I am writing to express my disappointment with the NRC Staff's Volume 1 of its Safety Evaluation Report on DOE's application for a construction authorization for the Yucca Mountain repository (SER Volume 1). It appears from SER Volume 1 that the Staff's review of the general information portion of the application (the subject of SER Volume 1) included little or no independent evaluation. SER Volume 1closely resembles a completeness review, or possibly a trivial review merely to verify that DOE's summaries of detailed evaluations presented later in the application were accurate summaries. I do not understand how such an extremely limited review serves any legitimate public purpose.

Moreover, the Staff's repetitive finding that DOE complied with the Commission's regulations applicable to general information creates the misleading impression that the review was more substantive than it actually was. The NRC Staff must have known that favorable review findings such as this would be touted by Yucca proponents as evidence the Yucca Mountain Project should proceed over the Administration's objections. The Executive Summary of SER Volume 1 should have explained upfront, in clear, non-bureaucratic terms, that the Staff's review of general information was essentially non-substantive and that nothing in SER Volume 1 should be construed as implying that Yucca Mountain is a safe repository site. We hope that the

Staff's virtually unqualified acceptance of DOE's representations in its general information portion of the application will not be representative of the rest of the Staff's Safety Evaluation Report, should Staff's preparation of that Report continue.

SER Volume 1 includes two significant mistakes, notwithstanding its limited scope. The first mistake relates to a non-existent DOE commitment. In Section 1.1, General Description, Location and Arrangement of the GROA (Geologic Repository Operations Area), the Staff states (p. 1-3):

> "Initially, the NRC staff identified that GI Figures 1-2 and 1-4 were inaccurate with regard to Federal ownership, the site boundary, and location of the controlled areas; however, the applicant has committed (DOE, 2009au) to update the license application to reflect the private ownership and the correct acreage of Patent 27-83-0002 in GI Figures 1-2 and 1-4 and revise the figures to show that the Patent 27-83-0002 area is private land excluded from the proposed land withdrawal area."

And then the Staff makes the following finding:

> "On the basis of the applicant's commitment (DOE, 2009au) to revise GI Figures 1-2 and 1-4 to accurately reflect ownership of the land, site boundary, and the location of controlled areas, the NRC staff finds the applicant has provided accurate information showing the location of the site and general location of the GROA."

While this obvious error on DOE's part shows a blatant disregard for accuracy in the simplest details of its license application, the Staff's acceptance of a 2009 DOE commitment to repair the error in a future update of the license application ignores a subsequent DOE statement made public in March 2010 that DOE has no intent ever to update its Yucca Mountain license application. This announcement, extinguishing the validity of the Staff's finding, came months prior to the Staff's issuance of this SER volume, and should have been so noted and taken into account by the Staff in its review findings.

The second mistake relates to the Staff's review of DOE's descriptions of plans for physical security and material control and accounting. In Sections 1.3, Physical Protection Plan, and Section 1.4, Material Control and Accounting Program, the Staff finds that the material presented by DOE is complete and acceptable because it addresses the applicable elements of the Yucca Mountain Review Plan and regulations. But, in lieu of providing the detailed descriptions of the plans and programs called for in an application for a construction authorization, these findings rely on DOE's paraphrasing of the Review Plan and its commitments to provide the required plan documents "no later than 180 days ***after*** NRC issues a construction authorization" (emphasis added). DOE previously had announced this commitment without objection by the Staff, but in so doing all parties, including the NRC Staff, were unnecessarily deprived of the ability to review these two critical elements of the license application for construction

authorization. The Staff's findings in these two sections of the SER are unjustified, especially in view of the previous history of unfulfilled commitments by DOE to the NRC Staff. Moreover, SER Volume 1 would have been more candid and informative if it had acknowledged the Commission's previous finding that the regulations being applied by the Staff in its evaluation "are not adequate to protect the common defense and security or the public health and safety." See 72 Fed. Reg. 72,522, 72,524 (December 20, 2007).

The Staff's approach of limiting the scope of its review of general information in the application also has the unfortunate effect of leaving certain improbable and even ridiculous DOE representations unchallenged. For example, in Section 1.2, Proposed Schedules for Construction, Receipt, and Emplacement of Waste, the Staff accepts, without comment, DOE's statement that NRC will issue a construction authorization in 2011. It is common knowledge that under current circumstances it is impossible that a construction authorization would be issued in 2011, even if the application cannot be withdrawn. Not only have lengthy licensing board hearings not yet begun, but NRC Staff has published a schedule calling for its own SER Volume 5 to be issued in approximately February 2012. Completion of the full SER and a full and favorable initial decision in the contested licensing proceeding are prerequisites to issuance of a construction authorization.

In Section 1.1, General Description (p. 1-7), the NRC Staff provides the following finding regarding waste retrieval and alternative storage: "On the basis of the NRC staff's review of the information in GI Section 1.2.4, the NRC staff finds that the applicant provided a description of plans for the retrieval and the alternative storage of radioactive wastes, should retrieval be necessary." Section 1.2.4 of the General Information Volume of the license application for construction authorization begins a 4 paragraph discussion of this issue by stating that "this section is a summary of SAR (Safety Analysis Report) Section 1.11." However, the Staff finding is made without benefit of review of Section 1.11. The Staff wrote the following:

> "The NRC staff confirms that the applicant's summary description included (i) how the GROA is designed to permit retrieval of any or all emplaced waste, starting at any time up to the beginning of permanent closure; (ii) reasons why retrieval operations could be initiated; and (iii) how, if a retrieval decision is made, waste would be placed in a storage or disposal facility designed in accordance with the regulations that are applicable at the time."

The limited scope of Staff's review allowed it to avoid commenting on certain representations in Section 1.11. Had there been a more in-depth review, Staff might have questioned why DOE believes it could take up to eight or more years to begin retrieval operations once a decision has been made to retrieve waste, as a consequence possibly of an emergency situation.

In Chapter 2 of the SER, Vol. 1 Staff finds that DOE's proposed schedules for construction, receipt of waste and emplacement are "sufficiently detailed" to allow NRC

staff evaluation. The entire repository design depends upon annual delivery of 90% of the commercial SNF in TAD canisters, a virtual impossibility given current utility storage practices and the annual acceptance schedule established by DOE for years 1-5, based on the standard contracts. Moreover, the GROA lacks rail access for delivery of TAD casks, and DOE does not have the STB CPCN needed to even begin what would be a decade or more of rail construction. The Staff's limited review approach allowed it to avoid any discussion of schedule uncertainty, possible contingency plans, and implications for NRC staff evaluation.

The public interest is not served by the issuance of government documents that are easily misconstrued as meaningful and substantive when they are not intended as such, and that sweep apparent deficiencies under the rug by claiming a limited scope of review. The Staff should have foregone the issuance of its SER Volume 1 altogether.

Sincerely,

Bruce Breslow

Bruce Breslow
Executive Director

BHB/
cc Parties to and participants in the Yucca Mountain Licensing Proceeding
Nevada Congressional delegation
Nuclear Waste Technical Review Board
Catherine Cortez Masto, Nevada Attorney General
Nevada Commission on Nuclear Projects
Nevada State Legislature's High-Level Radioactive Waste Committee

STATE OF CONNECTICUT
EXECUTIVE CHAMBERS

M. JODI RELL
GOVERNOR

FOR IMMEDIATE RELEASE
September 11, 2010

CONTACT: Adam Liegeot, 860-301-4055
adam.liegeot@ct.gov

Governor Rell Urges Energy Secretary To Reverse Course on Dismantling Yucca Mountain

Connecticut Ratepayers Spend Millions to Store Spent Nuclear Fuel in State

Governor M. Jodi Rell today announced that she is urging the U.S. Department of Energy (DOE) to stop its plans for dismantling operations at Yucca Mountain, the nation's nuclear waste repository in Nevada, until a pending request to withdraw its license application is legally resolved.

In a September 2 letter to DOE Secretary Stephen Chu, the Governor expressed deep concern and that in the nearly three decades that the Yucca Mountain project has been in the works, Connecticut ratepayers have spent millions of dollars to store spent nuclear fuel here from two nuclear plants.

Connecticut is home to one of New England's three permanently shut down single unit reactor sites (Connecticut Yankee) and one multiple operating reactor site (Millstone). A 1982 federal law – the Nuclear Waste Policy Act (NWPA) – required that DOE establish a national repository by 1998.

"DOE has spent decades and billions of dollars investigating the suitability of Yucca Mountain as a geologic repository, determined in 2002 that Yucca Mountain was a suitable location, and even now concedes that its Yucca Mountain application is neither flawed nor the site unsafe.

"To now reverse developing Yucca Mountain as a permanent storage site as a matter of policy is a disservice to Connecticut ratepayers, who continue to be burdened by DOE's delay in proceeding with its license application," the Governor wrote.

The DOE's request to withdraw the operating license has been denied by the Nuclear Regulatory Commission's (NRC) Atomic Safety and Licensing Board. The full NRC is reviewing the Licensing Board's finding. A federal lawsuit on the issue is also

pending in South Carolina and that court has indicated it will wait until the NRC ruling before proceeding with the case.

Governor Rell has also written to the state's Congressional delegation asking for their support in keeping Yucca Mountain from closing.

"The Nuclear Waste Policy Act passed by Congress designated Yucca Mountain as the only candidate site for he national repository," the Governor told the delegation. "Congressional intent is clear – Congress has voted several times to retain Yucca Mountain as the national repository. I hope you will join me in fighting the DOE's effort to ignore Congressional intent."

- 30 -

NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION
Office of Public Affairs Telephone: 301/415-8200
Washington, D.C. 20555-0001
E-mail: opa.resource@nrc.gov
Site: http://www.nrc.gov

No. 10-162 September 15, 2010

NRC APPROVES UPDATES TO NUCLEAR WASTE CONFIDENCE FINDINGS AND RULE

The Nuclear Regulatory Commission has approved final revisions to the agency's "Waste Confidence" findings and regulation, expressing the Commission's confidence that the nation's spent nuclear fuel can be safely stored for at least 60 years beyond the licensed life of any reactor and that sufficient repository capacity will be available when necessary.

In a Staff Requirements Memorandum (SRM) approved and issued today, the Commission approved the revisions to the draft final rule and additionally directed the staff to initiate a long-term rulemaking to address impacts of storage at onsite storage facilities, offsite storage facilities or both for extended periods.

"Today the Commission affirmed our confidence that spent nuclear fuel can be stored safely and securely without significant environmental impacts for at least 60 years after operation at any nuclear power plant," said NRC Chairman Gregory B. Jaczko. "We also directed the NRC staff to conduct additional analysis for longer-term storage to ensure that we remain fully informed by current circumstances and scientific knowledge relating to spent fuel storage and disposal. This decision was carefully considered by the Commission. It is an important step forward as it provides a measure of certainty to all of our stakeholders."

The Commission made clear in its SRM that the revisions of the waste confidence findings and rule are not intended to signal an endorsement of indefinite storage of spent fuel at reactor sites.

The current Waste Confidence rule (10 CFR Part 51.23) and findings, that this new rule and findings will update, express confidence that commercial high-level radioactive waste and spent fuel generated by any reactor "can be stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor" in its spent fuel basin or at either onsite or offsite independent spent fuel storage installations.

The SRM gives the staff 60 days to incorporate these revisions to the Waste Confidence rule and findings before sending them to the *Federal Register* for publication. It also directs the staff to provide a plan to the Commission for the long-term rulemaking by the end of the calendar year.

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Sustainable Fuel Cycle
TASK FORCE

www.sustainablefuelcycle.com

Sustainable Fuel Cycle Task Force Science Panel

September 16, 2010

Dear Secretary Chu:

On behalf of the Sustainable Fuel Cycle Task Force (SFCTF) Science Panel, we are writing to express our disappointment and frustration at the apparently careless handling recently of the scientific records accumulated during the 25 years of investigation at Yucca Mountain.

These records, developed at public expense, have enormous value to future scientific research in the field of nuclear waste disposal and transportation. It is imperative that these records be kept available in some systematic fashion to researchers in this scientific field.

The abrupt discontinuance of the web site portals and ready electronic access to the information in these scientific reports to researchers, both internal and external to the Department of Energy and its contractors, violates the principles of scientific openness and transparency that President Obama and you have espoused in the past.

While there may be policy reasons for DOE's decision to terminate the Yucca Mountain program, it is clear that the nation must still seek a viable program to manage spent fuel and nuclear waste for many years to come. Whatever this program, free and open access for all to the scientific documents that have been developed over the last 25 years is an essential part of the scientific enquiry essential to development of a viable solution. The public deserves nothing less. Placing the records in boxes in a warehouse somewhere is not sufficient. The abrupt and total discontinuance of the previous electronic access systems has essentially destroyed the information by making it virtually inaccessible.

We respectfully request that this system be re-established without delay to allow full and ready electronic access to these records. This is not an expensive step and would facilitate future research by our national laboratories and academic institutions.

We firmly believe that free, open and transparent access to this scientific information by anyone interested in it is essential to development of an effective waste disposal program for the future.

Thank you in advance for your attention to this important issue.

Sincerely,

Charles Fairhurst, Ph.D.

D. Warner North Ph.D.

Ruth Weiner, Ph.D.

Isaac Winograd, Ph.D.

Wendell Weart, Ph.D.

Eugene H. Roseboom Jr., Ph.D.

Executive Committee Officers:
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Director of Government Affairs, Yankee Atomic/Connecticut Yankee
Greg White, Communications
Commissioner, MI Public Service Commission

NWSC
Nuclear Waste Strategy Coalition

September 20, 2010

Letter sent via email.

The Honorable Phil Sharp
Co-Chairman
Blue Ribbon Commission
Transportation and Storage Subcommittee
1800 K Street, N.W., Suite 1014
Washington, D.C. 20006

The Honorable Richard A. Meserve
Co-Chairman
Blue Ribbon Commission
Transportation and Storage Subcommittee
1800 K Street, N.W., Suite 1014
Washington, D.C. 20006

Dear Representative Sharp and Commissioner Meserve:

The members of the Nuclear Waste Strategy Coalition (NWSC) are encouraged that the Blue Ribbon Commission Transportation and Storage Subcommittee, continues to hear from Federal, State and local officials, industry representatives and others, of their expertise in siting interim storage facilities and transportation relating to the shipment of spent nuclear fuel (SNF) and high-level radioactive waste (HLRW) currently stranded in 121 sites in 39 states.

Again, we are encouraged that the Transportation and Storage Subcommittee, is learning first-hand the issues operating reactor sites and decommissioned plants are faced with on a daily basis.

As stated previously, the NWSC believes that an effective disposal program should consist of a permanent repository; an integrated transportation plan; and centralized interim facilities that advance and complement the permanent repository while addressing near-term needs. The NWSC reiterates though that centralized interim storage is not a substitute for a permanent repository and should be considered as a short-term solution only.

Therefore, we call upon the Transportation and Storage Subcommittee to immediately recommend to the DOE to re-implement its transportation plan to remove nuclear waste currently stranded at decommissioned reactor sites and operating reactor sites for consolidation at locations that volunteer to host SNF and HLRW storage facilities.

We also urge the Transportation and Storage Subcommittee to recommend the construction of a centralized interim storage facility or facilities, involving consensus among the Federal government, state and local officials, stakeholders and local communities, as well as sustainable support for the siting and operation of such an interim facility. We should learn from history and ensure that the nuclear waste disposal program funds are fully utilized and directed at solving the nation's nuclear waste problem.

Meanwhile, the nation's ratepayers are paying more than $770 million annually into the Nuclear Waste Fund (NWF). Ratepayers from 41 states have already paid more than $34 billion, including interest, into the NWF, for the removal of SNF and HLRW during this generation, and we should not pass this problem on to future generations – action can and should be taken in the near term to address the nation's nuclear waste problem.

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The Department of Energy (DOE) has the responsibility to initiate and carry out its mandate as directed by the 1982 Nuclear Waste Policy Act, as amended. The Federal government has already proved that since 1957 it can safely and successfully move SNF and HLRW throughout the United States.

Since 1983, the nation ratepayers from 41 states have paid more than $34 billion, including interest, into the NWF, and they are paying more than $770 million annually into the Nuclear Waste Fund (NWF) for the removal of SNF and HLRW during this generation - we should not to pass this problem on to future generations, action can be and should be taken in the near term to address the nation's nuclear waste problem.

The Department of Energy (DOE) has the responsibility to initiate and carry out its mandate as directed by the 1982 Nuclear Waste Policy Act, as amended. The Federal government has already proved that since 1957 it can safely and successfully move SNF and HLRW throughout the United States.

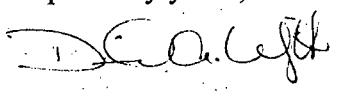
According to the Nuclear Regulatory Commission, NUREG-0725, Revision 14, 2.1.3., ***"The safety record for spent fuel shipment in the U.S. and in other industrialized nations is enviable. Of the thousands of shipments completed over the last 30 years [or so], none has resulted in an identifiable injury through release of radioactive material."***

The DOE has already developed and issued a National Transportation Plan for nuclear waste, (DOE/RW 0603 – 2009), that describes how DOE intends to develop and implement a safe, secure and efficient transportation system, and how stakeholder collaboration will contribute to the development of that transportation system. It is long past the time when a national transportation plan for commercial and defense spent nuclear fuel and high-level radioactive waste be implemented. The success of the WIPP program demonstrates that there are not any technical or safety constraints to doing so.

The members of the NWSC thank you for the opportunity to submit our input. We look forward to the opportunity to continue working with and providing further input to the Blue Ribbon Commission Transportation and Storage Subcommittee.

The NWSC is an ad hoc group of state utility regulators, state attorneys general, electric utilities and associate members representing 49 organizations in 32 states. The NWSC was formed in 1993 out of frustration at the lack of progress the Department of Energy had made in developing a permanent repository for SNF and HLRW, as well as Congress's failure to sufficiently fund the nuclear waste disposal program.

Respectfully yours,



David Wright
Commissioner, South Carolina Public Service Commission, and
Chairman, Nuclear Waste Strategy Coalition

C: Mr. Timothy A. Frazier, Blue Ribbon Commission, Department of Energy, Nuclear Energy.

Executive Committee Officers:

David Wright, Chairman
Vice Chairman, SC Public Service Commission

Renze Hoeksema, Vice Chairman
Director of Federal Affairs, DTE Energy

David Boyd, Membership
Chairman, MN Public Utilities Commission

Robert Capstick, Finance
Director of Government Affairs, Yankee Atomic/Connecticut Yankee

Greg White, Communications
Commissioner, MI Public Service Commission

NWSC
Nuclear Waste Strategy Coalition

September 20, 2010 **Letter sent by email.**

Mr. Timothy A. Frazier
Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Re: Comments Submitted to the Blue Ribbon Commission on America's Nuclear Future.

Dear Mr. Frazier:

The members of the Nuclear Waste Strategy Coalition (NWSC) are encouraged that the Blue Ribbon Commission (BRC) continues to hold hearings covering broad areas such as nuclear waste program governance; international perspective and implications of U.S. decisions regarding the back-end cycle of the nuclear fuel cycle; the ethical foundations for nuclear waste management; and experiences and perspectives on public engagement in the facility siting process.

The NWSC is an ad hoc group of state utility regulators, state attorneys general, electric nuclear utilities and associate members representing 49 organizations in 32 states. The NWSC was formed in 1993 out of frustration at the lack of progress the Department of Energy (DOE) had made in developing a permanent repository for spent nuclear fuel (SNF) and high-level radioactive waste (HLRW), as well as Congress's failure to sufficiently fund the nuclear waste disposal program (Program) on an annual basis.

Until Congress amends the 1982 Nuclear Waste Policy Act, (NWPA), we advocate that an effective disposal program should consist of a permanent repository at the Yucca Mountain site; an integrated transportation plan; and centralized interim facilities that advance and complement the permanent repository while addressing near-term needs.

The NWSC reiterates though that centralized interim and recycling facilities are not a substitute for a permanent repository and should be considered as a short-term solution only. Regardless of U.S. decisions concerning the back-end cycle of the nuclear fuel cycle, a permanent repository will be still needed to dispose of commercial SNF and HLRW from across the nation, as well as DOE facilities.

Because the nuclear waste disposal programs in the international arena are managed in cooperation with their government, it is difficult to make comparisons with other countries since their government systems are entirely different from that of the United States.

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www.thenwsc.org

However, in the Canadian model, the 2002 Nuclear Fuel Waste Act that established the Nuclear Waste Management Organization (NWMO) should be considered by the BRC. The NWMO mandated the Canadian nuclear utilities to create separate trust funds to finance the long-term management of spent fuel, investigate approaches for managing and implementing interim facilities, recycling and final disposition of SNF and HLRW in Canada.

The DOE has the responsibility to initiate and carry out its mandate as directed by the NWPA. It is highly unethical for the nation's ratepayers to continue paying into the Nuclear Waste Fund (NWF) for the disposal of SNF and HLRW, while the Administration provided no scientific or economic bases for the withdrawal with prejudice of its license application from the Nuclear Regulatory Commission (NRC), but the pretext of a change in "policy."

Consequently, numerous motions and lawsuits were filed against the DOE that are pending before the NRC and in the U.S. Courts. These lawsuits are in addition to lawsuits that have been and continue to be filed against the DOE due to its failure to fulfill its January 31, 1998, statutory and contractual obligations to remove SNF and HLRW from decommissioned and nuclear plant sites. It is estimated that the 1998 lawsuits will cost the nation's taxpayers more than $11 billion and could mount to as much as $50 billion.

Meanwhile since 1983, the nation ratepayers from 41 states have paid more than $34 billion, including interest, into the NWF, and they continue to pay more than $770 million annually into the NWF for the removal of SNF and HLRW - we should not to pass this problem on to future generations; action can be and should be taken in the near term to address the nation's nuclear waste currently stranded in 121 sites in 39 states.

Accordingly, we urge the BRC to recommend the construction of a centralized temporary storage facility or facilities, involving consensus among the Federal government, state and local officials, stakeholders and local communities, as well as a sustainable support mechanism for siting and operating such a temporary facility or facilities.

We should learn from history that funds paid into the NWF, and not appropriated for the Yucca Mountain project, are being used for other purposes. Therefore, in order to insulate the Program from the annual budget and appropriations process, and to ensure that funds from the NWF are being used for their intended purposes, we urge the BRC to make recommendations for the creation a quasi-government corporation as suggested by Senator Voinovich's proposed legislation, S.3322.

The members of the NWSC thank you for the opportunity to submit our input. We look forward to the opportunity to continue working with and providing further input to the Blue Ribbon Commission.

Respectfully yours,

David Wright
Commissioner, South Carolina Public Service Commission, and
Chairman, Nuclear Waste Strategy Coalition

Department of Energy
Washington, DC 20585

September 20, 2010

ATTN: Document Control Desk
Director, Office of Nuclear Safety and Safeguards
U.S. Nuclear Regulatory Commission
EBB-2B2
11545 Rockville Pike
Rockville, MD 20852-2738

POINT-OF-CONTACT FOR YUCCA MOUNTAIN REPOSITORY LICENSE APPLICATION (LA) FOR CONSTRUCTION AUTHORIZATION

Our transmittal letter for the subject application dated June 3, 2008, specified the Director, Regulatory Authority Office, Office of Civilian Radioactive Waste Management, as the point-of-contact for any questions regarding NRC staff review and acceptance of the application. Because of the Administration's decision not to pursue development of a repository at Yucca Mountain, the Office of Civilian Radioactive Waste Management will cease to exist as of September 30, 2010. Any future correspondence or questions regarding the license application should be directed to the Department of Energy's outside counsel at the following address:

Michael R. Shebelskie, Esq.
Hunton & Williams LLP
Riverfront Plaza, East Tower
951 East Byrd Street
Richmond, VA 23219
Telephone: (804) 788-8716
Facsimile: (804) 788-8218
Email: mshebelskie@hunton.com

Sincerely,

David K. Zabransky
Acting Principal Deputy Director
Office of Civilian Radioactive
Waste Management

cc:
J. C. Chen, NRC, Rockville, MD
J. R. Davis, NRC, Rockville, MD

Printed with soy ink on recycled paper

Exhibit A

Blue Ribbon Commission on America's Nuclear Future
Meeting Agenda

September 21-22, 2010
Washington Marriott, 1221 22nd Street NW
Washington, DC

Tuesday, September 21, 2010

8:30 a.m.	Open meeting/review agenda	Tim Frazier, DOE DFO
8:35 a.m.	Opening remarks	Honorable Lee Hamilton General Brent Scowcroft Commission members
	Review of the MIT study "Future of the Nuclear Fuel Cycle"	Commissioner Ernest Moniz w/Drs. Charles Forsberg and Andy Kadak, MIT
9:30 a.m.	Advisory thoughts on the US nuclear future; Opportunities for US leadership	Dr. Vic Reis, Senior Advisor, Office of Science, DOE
9:45 a.m.	International perspectives and Implications of US decision regarding the back-end of the nuclear fuel cycle	Dr. Charles McCombie, Arius Association (Switzerland)
10:00 a.m.	Break	
10:15 a.m.	International implications of US fuel cycle decisions	Jim Timbie, Senior Advisor, US Department of State
10:30 a.m.	International impact of US spent fuel Policy	Dr. Frank von Hippel, Princeton University
10:45 a.m.	TBD	Dr. Steven Miller, Belfer Center for International Affairs, Harvard University
11:00 a.m.	Panel discussion on international perspectives and implications	Reis von Hippel McCombie Timbie Miller

12:00 noon	Lunch	
12:45 p.m.	It's Not Just a Technical Problem: Human and Ethical Considerations in Radioactive Waste Management	Dr. Robert E O'Connor, Social and Economic Sciences Program Director, National Science Foundation
1:00 p.m.	Ethical foundations of Canada's nuclear waste management program	Dr. Wes Cragg, York University (Canada)
1:15 p.m.	Intergenerational equity considerations of nuclear waste management	Dr. Andrew Kadak, MIT
1:30 p.m.	Ethical aspects of radioactive waste disposal	Dr. Charles McCombie, Arius Association (Switzerland)
1:45 p.m.	Panel discussion on ethical and societal foundations for nuclear waste management	O'Connor Cragg McCombie Kadak
2:45 p.m.	Break	
3:00 p.m.	Siting Process for a centralized storage facility in Spain	Dr. Tom Cotton for Alvaro Rodriguez Beceiro, ENRESA (Spain)
3:15 p.m.	Siting of Radioactive Waste Disposal Facilities – A Synthesis of International Learning	Dr. Claudio Pescatore, OECD Nuclear Energy Agency
3:30 p.m.	Siting Challenges in the Context of Integrated Nuclear Waste Management	Dr. Chuck Powers, Vanderbilt Univ./Consortium for Risk Evaluation with Stakeholder Participation
3:45 p.m.	Experiences with a voluntary waste facility siting process	David Leroy, former U.S. Nuclear Waste Negotiator
4:00 p.m.	Panel discussion on siting considerations including public and community engagement	Cotton Pescatore Powers Leroy

5:00 p.m.	Adjourn	

Wednesday, September 22, 2010

8:30 a.m.	Open meeting/review agenda	Tim Frazier, DOE DFO
8:35 a.m.	Options for financing and managing the US nuclear waste program	Joe Hezir, EOP Group
8:50 a.m.	Thoughts on the needed governance structure for the high-level waste program	Ward Sproat, fmr. Director, DOE Office of Civilian Radioactive Waste Management
9:05 a.m.	A utility executive perspective on nuclear waste program management	Brew Barron, Constellation
9:20 a.m.	Governance for trust and confidence	Dr. Don Kettl, Dean, School of Public Policy, University of Maryland
9:35 a.m.	On considering governance regimes for national nuclear operations	Dr. Todd LaPorte University of California-Berkeley
9:50 a.m.	Panel discussion – nuclear waste program governance	Sproat Barron Hezir Kettl LaPorte
10:50 a.m.	Coffee break	
11:00 a.m.	Commission discussions	Commissioners
11:30 a.m.	Oral statements	Public
12:30 p.m.	Adjourn meeting	

Ethical Aspects of Radioactive Waste Disposal

C. McCombie, Switzerland

Addressing radiation protection responsibilities within the scope of most current waste management practices requires a philosophical or ethical basis that is primarily concerned with the issue of **intra-generational equity**. Are we being fair and equitable to our present society? Key questions are whether we are making the best use of society's resources and whether we are involving all segments of society properly in the decision making. The situation is different when we consider the case of disposal of long-lived radioactive waste. The key issue is then whether we are being fair to future generations – i.e. it is a question of **inter-generational equity**. Properly designed and sited repositories will present only low levels of risk - but these risks are predicted to peak only after many thousands of years. It is obvious, therefore, that this disposal involves the present and immediately following generations investing resources into the protection of far-future individuals and that any negative impacts are more likely to affect far-future generations who will not directly benefit from the activities producing waste and who will not have shared in the relevant decision making.

There are, in fact, other activities today for which the same dilemma arises. Global warming due to CO_2 is the most topical subject, but there are numerous older examples for which the issue of fairness to future generations has not been recognised explicitly enough. A clear case is the exploitation of natural resources in the earth's crust. The fact that our current voracious consumption of fossil fuels will exhaust in centuries valuable resources which have been built up over millions of years, leaving future generations a fundamentally altered planet, deserves more emphasis in ethical debates.

At a national level there have been numerous meetings and position papers on ethical issues. The ideas developed in national programmes and many others have fed into international efforts aimed at achieving consensus on the ethical aspects of waste disposal. As a result, the IAEA produced in 1995, following a long period of iterative comments, an important document entitled "The Principles of Radioactive Waste Management". A further important document is the "Collective Opinion on the Environmental and Ethical Basis of Geological Disposal" produced by the NEA/IAEA/ EEC in 1995.

In the IAEA paper on waste management, the following 2 principles are most directly related to issues of ethics: Principle 4: Protection of future generations; Principle 5: Radioactive waste shall be managed in a way that will not impose burdens on future generations.

In the background text to the Collective Opinion, it is recognised "that each generation leaves a heritage to posterity involving a mix of burdens and benefits and that today's decisions may foreclose options or open new horizons for the future". Two issues are strongly emphasised. One is that "a waste management strategy should not be based on a presumption of a stable societal structure for the indefinite future, nor of technological advance". This principle leads to rejection of indefinite storage strategies in favour of geologic disposal concepts offering permanent protection. The second issue in the Collective Opinion is the wish to ensure that one does "not unduly restrict the freedom of choice of future generations". It is judged that an incremental process, involving development of deep repositories in a stepwise fashion over decades, meets this requirement - even when disposal facilities have no deliberate provisions for waste retrieval following repository closure.

Deep geological disposal can ensure safety for all future generations without imposing significant burdens on society after the closure of a well engineered and well sited repository. There is no other currently feasible way to ensure safety for future generations. Every responsible nuclear programme should have a **credible geological disposal strategy** that ensures safety at all times and leaves choices open as far as is consistent with this safety goal. One key component of such a strategy is the existence of a technically and societally acceptable site or sites.

To maintain a credible and ethically correct future programme, the USA could take the following actions:

- Initiate a new siting programme that is broad based and that includes willingness of a local community to host a deep repository. The NAS report, "One Step at a Time" gives guidance.
- Continue work on advanced technologies that might positively affect the nature or the volumes of the long-lived radioactive wastes to be disposed of in the future.
- Consider more closely the relative importance of inter- and intra-generational equity – and reallocate resources if necessary.

Ethical foundations of Canada's nuclear waste management program
Wesley Cragg

The under riding postulate of my analysis of Canada's nuclear waste management program is that the fundamental principle of nuclear waste fuel management is:

- ***Ensure that ALL research, ALL activities, ALL decisions, ALL recommendations are framed by explicitly articulated ethical values***

Implementing a waste disposal program by implication then requires:

- ***The articulation of the ethical values that will frame ALL aspects of the nuclear waste disposal process***

The reason for this is that the fundamental challenge of successfully managing the safe disposal of nuclear waste is building, winning and earning justified trust. Trust is simply the belief that those in whom one trusts will be guided in all relevant respects by shared ethical values. For nuclear waste disposal this means:

- All relevant decisions regarding the disposal of nuclear waste
- All aspects of the knowledge creation and application process relevant to the disposal of nuclear waste.

What this requires is that the pursuit of scientifically grounded solutions to the disposal issue should be guided by explicitly articulated ethical values, a huge challenge in our "enlightenment" scientific culture.

Although challenging, this is the path that the NWMO chose to follow in developing a road map for solving the Canadian nuclear waste disposal dilemma. Following its creation the NWMO did two things:

1. It created an ethics Roundtable (2003)

- to identify the ethical standards that should guide all aspects of the operations of the NWMO
- To organize those standards into a coherent ethical and social framework

2. It undertook extensive public consultation and engagement with a view to:

- identifying the values that the public believed should guide the disposal of nuclear waste
- organizing those values into a set of objectives that the public would recognize as reflecting what was heard in the consultation process

The result was

- an ethical framework constructed around a series of questions focused on both procedural and substantive ethical values
- A set of eight objectives to be to guide all aspects of the decision making process:

fairness	*economic viability*
public health and safety	*community well-being*
worker health and safety	*environmental integrity*
security	*adaptability*

Examples of values relevant to procedures:

Q 1 Is the NWMO conducting its activities in a way appropriate to making public policy in a free, pluralistic and democratic society?

Q 2 Are those making decisions ... impartial?

Q 3 Are groups wishing to make their views known ... being provided with forms of assistance they require to present their case effectively?

Q 4 Is the NWMO committed to basing its deliberations and decisions on the best science, the best aboriginal knowledge and the best ethics?

Examples of substantive values:

Q 8 Do NWMO's recommendations reflect respect for life ...?

Q 10 If implemented would NWMO's decisions be fair?

Q 11 Do the recommended provisions protect the liberty of future generations to pursue their lives as they choose not constrained by unresolved problems caused by our nuclear activities?

To approach the management of nuclear waste disposal in this way requires values based management which builds into the organizational culture a process of continuous, on-going moral reflection. The challenge for the NWMO is to persuade the organization to endorse an unconventional management model and then is to build values based into a vastly expanding and diverse organizational system and culture comprised of highly trained individuals whose approach to both research and management will require fundamental reorientation.

SITING PROCESS FOR A CENTRALISED STORAGE FACILITY FOR SPENT FUEL AND HIGH LEVEL WASTE IN SPAIN.

Alvaro Rodriguez Beceiro
ENRESA (Spain)

In Spain radioactive waste is generated mainly in installations of the nuclear fuel cycle and, at a much smaller scale in the use of radioisotopes in different branches of industry, medicine or research. The nuclear power programme consists of ten nuclear power plants, eight of which are presently in operation and the other two have already been shutdown. There are also installations in the front end of the nuclear fuel cycle, mainly a fuel fabrication plant in operation and Uranium mining and milling facilities already shutdown.

On creating ENRESA (Empresa Nacional de Residuos Radiactivos, S.A.) in 1985, it was decided to concentrate all radioactive waste management activities under the responsibility of only one organization. ENRESA is a state-owned limited liability company with responsibilities in the long-term management of all kind of wastes and in the decommissioning of nuclear installations.

The radioactive waste management strategy is approved by the government through the Radioactive Waste Plan (GRWP), ENRESA having the obligation to submit a proposal every four years. This Plan contains not only the strategies and technical actions, but also the financial related aspects.

At present, the policy for spent fuel management is based on an open fuel cycle. Reprocessing of spent fuel was stopped in 1983, except for the spent fuel from Vandellos 1, a gas-cooled graphite reactor, which was totally reprocessed in France. These reprocessing activities generate obligations to return some HLW/MLW to the country.

One strategic objective for the SF/HLW management programme is to develop a centralized storage facility to accommodate, not only the spent fuel unloaded from the nuclear power plants and the reprocessing waste to be returned to the country, but also the intermediate level waste that will arise as a consequence of the decommissioning and dismantling of the nuclear power plants. With the hypotheses of the current RWMP, a total amount of some 13.000 m^3 of SF/HLW is estimated. This objective has been included and remained through the several Plans approved by the Governments, but its implementation successively failed, due to the lack of a site.

In 2004, the Congress through its Commission for Industry, requested the government to take action to develop the procedures to site a centralized storage facility for SF/HLW. As a consequence, a new GRWP, including this facility as an strategic objective, was approved in 2006 and, at the same time the government decided to set up and Interministerial Commission with the objective of defining the siting criteria, supervise the siting process and to elaborate a proposal of potential candidate sites for the Government.

The Commission, formed by high rank officials of different Ministries, commenced their work in late 2006 by developing the siting criteria report, as well as some other reports containing explanations on the need of the installations, the international references,

radiation protection and nuclear safety general aspects and SF/HLW transport means and experience. All this reports, along with general project information, were made public through a dedicated Web site established for such purpose. Also, the minutes of all the Commission meetings are made public. For this work, the Commission is assisted by a Technical Advisory Committee.

Based on the dedicated Web site and information distributed through different media, an information campaign took plan in 2007, allowing the municipalities, interested stakeholders and public at large to make questions and to request the information they would need. Site visits to other countries installations, mainly to the HABOG vault type facility in the Netherlands, with politicians and concerned stakeholders took place during all this time.

In this background, an open call for voluntary candidate municipalities was officially launched at the end of 2009. The Resolution includes a brief description of the project as well as the procedure and basis ruling the process. Fourteen voluntary candidate municipalities have sent proposals, six of which were disqualified either for not complying with the requirements established in the basis of the process or due to the application of the exclusion criteria.

Within this process, a public information and inquiry process was conducted, giving rise to some fifteen thousand inquiries. The final list of candidates includes eight municipalities located in five different regions.

The Commission, taking into account the sites information provided by the candidate municipalities and the basis of the open call, is now elaborating the report to be proposed to the Government, who will finally decide the site, after a Cabinet meeting.

The project includes not only the reception, treatment and storage facilities, but also a Technological Centre which will be equipped with different research laboratories and the infrastructures needed to facilitate the participation of companies and organizations, both during construction and operation phases

SUMMARY: International impact of U.S. spent-fuel policy

Statement to the Blue Ribbon Commission on America's Nuclear Future

Frank von Hippel, Professor of Public and International Affairs, Princeton University and Co-chair, International Panel on Fissile Material, 21 September 2010

The U.S. was for reprocessing before we were against it. We were for it because our Atomic Energy Commission grossly overestimated the rate at which nuclear power would grow, grossly underestimated how much uranium would be found and grossly underestimated the cost of reprocessing. This led the AEC to propose fast-neutron breeder reactors that would convert the abundant but non-chain-reacting isotope of uranium, U-238 into chain-reacting plutonium. From the 1960s through the 1980s, the U.S., France, Germany, Japan, Russia, U.K. and other countries spent about $100 billion in today's dollars on research, development and demonstration projects.

The primary legacy of all the breeder-development efforts is 240 tons of separated plutonium – enough for 30,000 first-generation nuclear weapons – stored in the U.K., France, Russia, Japan and India. Another legacy is a group of national laboratories and companies that continue to advocate for more expenditures on fast-neutron reactors.

The U.S. government began to rethink the wisdom of promoting reprocessing after India used plutonium separated as part of its breeder reactor R&D program in a "peaceful nuclear explosion." Secretary of State Henry Kissinger worked hard to block the transfer of reprocessing to other countries and managed to derail France's transfer of reprocessing plants to South Korea and Pakistan and to stall the transfer from Germany to Brazil. All three countries were pursuing nuclear weapons at the time. The U.S. adopted the position, "we don't reprocess and you don't need to either."

In the 1980s, France and the U.K. built modern reprocessing plants financed with prepaid contracts from foreign utilities that were having trouble with anti-nuclear movements focused on the spent-fuel issue. The utilities bought themselves respite by exporting their spent fuel to France and the U.K. The respite was only a temporary, however, because France and the U.K. insisted that the high-level waste from reprocessing return to the countries of origin. As a result only one reactor renewed its reprocessing contract. The United Kingdom is expected to end its reprocessing program.

Électricité de France was forced by the French government to renew its reprocessing contract with Areva. France is currently recycling its plutonium once in "mixed oxide" (MOX) fuel but most of the plutonium remains unfissioned and Areva has acknowledged that this does not simplify the radioactive waste disposal problem.

Today, Japan is the only non-weapon state that reprocesses. South Korea is insisting, however, that its new agreement of nuclear cooperation with the U.S. include the same prior consent to reprocess as Japan received from the Reagan Administration.

Looking back over this history, the U.S. has done rather well by not reprocessing: Our nuclear utilities have been able to save perhaps a $100 billion and our influence, backed by our example, has helped constrain the spread of reprocessing. Finally, countries that reprocess have had no more luck in siting repositories than countries that do.

International perspectives and implications of US decisions regarding the back-end of the nuclear fuel cycle

Charles McCombie, Switzerland

US policies, decisions and actions in all matters concerned with the back end of the nuclear fuel cycle have had significant impacts, both positive and negative, on the programmes of many nations. The two activities that I wish to highlight here concern reprocessing and geological disposal.

The USA first attempted to influence national policies on reprocessing when it itself ceased working on commercial reprocessing, arguing that the proliferation risks outweighed potential benefits in uranium utilisation. In practice, this argument did not affect international activities in a very significant way. France, Russia and the UK continued with commercial reprocessing and most of their customer countries continued to send fuel for reprocessing until it became clear that the activity was uneconomic given the continuing low price of fresh uranium. The only countries that were really directly impacted by the US anti-reprocessing position were those whose fuel was US flagged, so that US permission would be needed to reprocess indigenously or at a service provider. Examples are South Korea and Taiwan.

When the Administration decided that nuclear power should be expanded, reprocessing again became a topical issue. Original ideas to build a French style plant in the USA and reprocess fuel using the PUREX method were quickly recognised to be nonsensical (no demand, no major advantages for disposal) and attention sensibly turned to developing advanced methods in the national labs. Meanwhile, for non-proliferation reasons, efforts were still being made to prevent or discourage other nations from reprocessing (and enrichment). In return for a commitment to forego the right to such technologies (if employed for peaceful purposes), the USA offered help with establishing nuclear power programs. It even proposed at one stage in the GNEP program that the USA might take back spent fuel from new nuclear countries – but this politically sensitive proposal was dropped even before GNEP as such met its end.

Today, an appropriate approach to enhancing the safe use of nuclear power without unduly increasing global security risks would indeed be for reprocessing to be concentrated in the few countries that have full fuel cycle facilities, for new reprocessing facilities to be built only when the need has been established (which means when the advent of fast reactors appears certain) and for them to use advanced, more proliferation resistant technologies. One incentive for other countries to desist from reprocessing might be that the major nuclear nations help them with the challenging task of geological disposal, i.e. by helping with "cradle to grave" support rather than focussing only on security of fuel supply.

Concerning geological disposal, the implications of developments in the USA over the past decades have been more often negative than positive. The positive aspects are mainly related to the large reservoir of US scientific and engineering skills that have been put to work on many aspects of geological disposal. Work on waste forms, engineered containers, contaminant transport, performance assessment modelling etc. has benefited many programs around the world. Examples of developments in the repository implementation program that have been negatively perceived by other nations include:

- A siting process that appeared - in its final stages - to have been strongly driven by political rather than scientific or societal criteria (The DOE sponsored NAS staging report had more impact outside the USA)
- An overly expansive site characterisation program that required funding far beyond the reach of most other countries – thus setting a dangerous signal
- An engineered barrier program in which new concepts kept appearing after previous assertions that a safe system was already proposed (e.g. the sudden appearance of the immensely expensive titanium drip-shield) – thus reducing the credibility of specialists in the disposal field
- Dropping the on-going Yucca Mountain project without awaiting an NRC judgement on the safety.

The most valuable services that the USA could do for the global nuclear community now are:

- Make clear that the Yucca Mountain decision is a policy choice and NOT a generic judgement on the feasibility, safety or ethical justifiability of geological repositories
- Acknowledge that, although safe surface storage of spent fuel can be carried out for many decades, it is not a final solution to the disposal of long-lived radioactive wastes.
- Start up a modern, adaptively staged siting program taking full account of societal issues.
- Continue to support the position that geological disposal will be a necessity for all nuclear countries and that small countries will need help to achieve this individually or in concert.

SITING OF RADIOACTIVE WASTE DISPOSAL FACILITIES - A SYNTHESIS OF INTERNATIONAL LEARNING

Dr. Claudio Pescatore's Summary Remarks to the Blue Ribbon Commission on America's Nuclear Future (21 September 2010)

Main Points

Successful disposal-facility siting implies creating the conditions for *continued ownership* of the facility over time. Acceptance of the facility at a single point in time is not good enough. Continued ownership implies the creation of conscious, constructive and durable relationships between the (most affected) communities and the waste management facility. Continued ownership by host communities follows from being comfortable about safety; feeling that they are not condoning a dubious practice, but one that is in tune with the broader interests of society in general; and that the facility will be contribute to the quality of life of the community and region across generations.

Being comfortable about the technical safety of the facility requires a degree of familiarity and control; having peace-of-mind about the (safety of) facility requires trust in the waste management system and its actors as well some control over the decision making. Regulators are especially important players that need to be visible in the community. Their role in the service of people needs to be professed, verified and understood. Communities and regions that are familiar with nuclear power and have had a long, constructive relationship with its actors require less time for acquiring familiarity and control and for achieving trust, provided there is willingness to allow them some continued forms of influence.

The ideal site selection process is a stepwise process, which combines procedures for excluding sites that do not meet pre-identified criteria with procedures for identifying sites where near-by and more distant residents are willing to discuss acceptance of the facility. The Regional authorities are just as important as the local authorities.

Before approaching a potential siting region or community, there ought to have been clear results of national (and state) debates establishing the role of nuclear power in the energy mix, the magnitude of the ensuing waste commitment and its management end-points, as well as the allocation of the financial and legal responsibilities until the closure of the project (and even beyond, as the closure of the repository does not necessarily equate to the closure the issue, at least when siting is taking place). Once the waste inventories and type of facilities have been decided upon, there should be agreement that all significant changes will require a new decision making process. Successful siting is thus embedded in a larger system of decision making that includes nation- and/or state-wide debates on nuclear and waste management approaches, as well region-wide debates on the types of facility, the tolerable negative impacts and the desirable positive impacts.

Any proposed project has much better chances to move forward positively if the affected populations can participate in its definition, including, at the appropriate time, its technical details. The waste-disposal technical approach, safety standards, monitoring and mitigation measures, etc. ought to be finalised only after deliberations with the host community/region during the siting phase. This way, refinement of the proposed technical approach is shared and iterative. A voluntary

process, in which communities may withdraw from consideration for some time, improves the chances for community willingness to participate and for a sustainable outcome.

A partnering approach is generally best for developing the project with a host community. A variety of partnership organisations (which may incorporate NGOs, local government associations, units within or around local/regional governments) have been or are being set up in an increasing number of countries. Most often such organisations build their own expertise and influence the implementer's work. They collect, process and disseminate information on the facility and its impacts, monitor other players' performance and advise local governments. They also help identify socio-economic benefits aimed at compensating for potential losses and generally for supporting the well-being of the host communities. The result of collaboration builds social capital, which is good for the quality and sustainability of decisions. The whole process takes time and may be seen as overly lengthy by some. Time is however necessary to the non-technical parties to understand their interests and build the relevant competences. Not-rushing to a technical solution is also capital for ensuring a safe solution. Respect of the time dimension, both technical and societal, is fundamental for sustainable decision making. Decision making in discrete, well identified steps is recommended to help deal with the time dimension. During the whole process *openness, transparency, technical competence* and *procedural equity* are key conditions for credible discourse and for public acceptance of waste management programmes.

The OECD/NEA literature

National radioactive waste management programmes are in various phases of siting final management facilities and rely on different technical approaches for different categories of waste. In all cases, it is necessary for institutional actors and the potential or actual host communities to build a meaningful, workable relationship. The OECD/NEA created its Forum on Stakeholder Confidence (FSC) in 2000 to explore means of ensuring an effective dialogue amongst all stakeholders and to strengthen confidence in decision-making and governance processes. The FSC promotes the sharing of international experience through topical sessions and studies and through national workshops and community visits. Lessons have been distilled with the concourse of practitioners, the involved stakeholders and social/political science experts. FSC's many publications are all germane to the subject of siting and sustainable decision making and are available on the FSC website www.nea.fr/fsc. Four FSC studies, in particular, warrant special attention:

The 2004 report *"Stepwise Approach to Decision Making for Long-term Radioactive Waste Management"* reviews the large accumulated experience and the results of the academic studies in the field of siting, both within and outside the nuclear field, over the previous 20 years. It distils the basic recommendations for sustainable decision making that the FSC still sponsors today.

The 2004 report *"Learning and Adapting to Societal Requirements"* synthesises countries' experience of relationship-building. In this report the **partnership approach** is cited further as a practical method for effective collaboration with local communities and informed consent.

The 2007 study *"Fostering a Durable Relationship between a Waste Management Facility and its Host Community"* summarises the expectations for sustained improvements to the quality of life of the affected communities and host regions, beyond the endowment of immediate economic benefits. The study highlights innovations in siting processes and in facility design that add value to the facility both in the short- and in the long-term.

Finally, the 2010 study *"Partnering for Long-Term Management of Radioactive Waste"* (based on a 2008-09 survey), documents the approach taken in 13 countries and the evolution of partnership arrangements. The study defines further the basic components of the partnership approach: various administrative formats of *collaboration with communities, community benefits, volunteerism, and veto arrangements.*

Two-page FSC flyers, available online, summarise the main findings of each of the above studies (www.nea.fr/fsc , see rubric "FSC Flyers").

SUMMARY STATEMENT OF DAVID H. LEROY FORMER

UNITED STATES NUCLEAR WASTE NEGOTIATOR

BEFORE THE COMMISSION ON AMERICA'S NUCLEAR FUTURE

SEPTEMBER 21, 2010

From 1987 to 1994, the United States sponsored a novel and significant initiative to explore the voluntary siting of facilities for the temporary or permanent storage of high-level, spent nuclear fuel. The Office of the United States Nuclear Waste Negotiator, acting as an independent agency reporting directly to the Congress and the President, solicited interest in May of 1991 from all the states, territories and recognized Indian tribes.

Within nineteen months, twenty potentially interested host jurisdictions had applied for exploratory grants to self-evaluate the risk and reward of such a proposition. This unpredicted level of interest was generated by the conceptualization and use of a unique, staged process giving the volunteer entity exclusive control over its own participation. The then announced principles of this dialogue were:

* The process must and will be truly voluntary;

* Requests for information and preliminary dialogues will not be viewed as a commitment to proceed any further;

* Any dialogue is terminable at the will of the prospective host;

* Indian tribes and states will be provided with resources to obtain independent and credible information upon which they may make their own decisions;

* All discussions should begin with the thoughtful evaluation of issues concerning health, safety, and the protection of our environment;

* Choices of technology and participation in oversight controls should be utilized to

assure compliance with safety and operating standards;

* There are no irrelevant issues;

* A prospective host is entitled to achieve an equity for helping to solve a national problem. The nature and means of achieving that equity should represent the individual needs, concerns and desires of the host;

* The process should encourage broad public participation, and seek and credibly consider the views of all affected stakeholders;

* This process can work only with participation.

Despite the level of interest generated by the proposal, the Office of the Negotiator expired upon the non-renewal of its authorizing legislation in January, 1994. Several of the interested jurisdictions continued to explore siting possibilities without federal support, although none has been ultimately successful.

The art and science of public facility siting has continued to evolve over the past decade and one half. However, the basic concepts and unique process utilized by the Office of the Negotiator remain viable and could be usefully employed in future federal projects. In fact, participatory, information-driven and collaborative sighting processes are likely to be the only initiatives by which new nuclear waste facilities will be established within the United States during the twenty first century. The Commission should consider linking the establishment of a new generation Negotiator's Office to any of its other proposals which require a federally driven siting process.

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DONALD F. KETTL
DEAN

Governance for Trust and Confidence

Blue Ribbon Commission on America's Nuclear Future
September 22, 2010

1. It's essential to restore trust, but the program is broken
   a. Trust is the product of relationships shaped by past behavior
   b. Nuclear waste and storage issues are rife with the grist of distrust: begin with an inherently scary substance, add enormous technical uncertainty about the best options, stir in the fact that the solution has to last longer than recorded history of humankind
   c. Nuclear waste and storage issues are plagued by distrust shaped by decades of broken promises, mistakes in communication
   d. New organizations cannot wipe away deep distrust: new mechanisms cannot replace old , damaged relationships

2. Organizational structures, funding can help create the preconditions for trust
   a. Effective structures provide: strong leaders, clear and honest communication, recognition of scientific uncertainties, engagement with citizens' concerns, consistent messages that don't change with administrations or Congresses
   b. Predictable funding streams increase citizens' confidence that promises will be met

3. No organizational form is ideal
   a. Government corporations can insulate process from politics
      i. FannieMae and FreddieMac, however, proved expensively unaccountable
   b. Some organizations have long histories of high performance and high trust
      i. Coast Guard (Katrina, BP spill)
      ii. Navy Nuclear Power Program (long, distinguished history)
      iii. Nuclear Regulatory Commission ("best places to work in the federal government")
      iv. Federal Deposit Insurance Corporation (stood fast as other regulators stumbled)
   c. No one organizational form is a model
      i. These cases present: Traditional bureaucracy, independent regulatory commission, quasi-governmental corporation

4. Trust
   a. Comes to those who behave in trustworthy ways
   b. Is the product of strong leaders who build a top-to-bottom culture of consistent behavior and high performance
   c. Is supported by stable resources to ensure long-term results

NARUC Statement on Governance Issues Pertaining to Used Nuclear Fuel Management

Presented by Brian O'Connell, P.E.
Before the
Blue Ribbon Commission on America's Nuclear Future
September 21, 22 2010

When Commissioner Greg White, representing the National Association of Regulatory Utility Commissioners (NARUC,) spoke before the Commission at its meeting on May 25, 2010 he covered a broad range of issues pertaining to what has been labeled in legislative and executive descriptions as the civilian radioactive waste management program under the Department of Energy. The Office of Civilian Radioactive Waste Management (OCRWM) was established by the Nuclear Waste Policy Act of 1982 to manage the waste program. I would like to supplement certain of the points Commissioner raised as the Commission considers "governance" issues.

Commissioner White made clear our view that "the Nuclear Waste Fund is a mess" and needs fundamental overhaul if it or a similar fund is to be used to finance in some manner in whatever nuclear waste disposition strategy the Commission recommends to the Administration and Congress. He was pleased by the recognition of that point by one of the Commission members who said, "We hear you." Financing used fuel management needs to be part and parcel with any proposed consideration of an organizational change. The NWPA even anticipated (Section 303) that there might be other alternative means of financing and managing the program and DOE submitted reports evaluating those alternatives in 1984 and 2001.

It appears that the Obama Administration has effectively disbanded OCRWM and that the intention of the Secretary of Energy, as part of the direction to terminate the Yucca Mountain repository project, is to reassign any residual functions previously managed within OCRWM elsewhere within DOE. It was also the intent, as we understand it, that the revised radioactive waste program would be managed within the Office of Nuclear Energy. We read the President's Memorandum to the Secretary as calling for this Commission to consider financial and management issues of each alternative for storage, processing and disposal of civilian and defense nuclear waste.

So, if OCRWM is *de facto* removed from the waste program management, then there will be a new management scheme in whatever disposal strategy is recommended by the Commission and which is presumably to be accepted by the Secretary and the President as well as the Congress.[1] So, if we are starting over it is fair to ask should the federal government play a more

[1] As we view it, the NWPA as amended in 1987 and 2002 narrows the disposal policy as geologic repository at Yucca Mountain, subject to NRC authorization, and to do otherwise requires legislative concurrence. This issue is presently before the NRC for resolution.

limited role or should DOE be the lead agency for implementation. There were even some different views expressed in the September 1 meeting of the Disposal Subcommittee over consolidating regulatory responsibilities now split between the NRC and EPA.

We recommend a review of the 2001 DOE report on *Alternative Means of Financing and Managing the Civilian Radioactive Waste Management Program.* The report was quite direct in describing the "dysfunctional" situation with the Nuclear Waste Fund and made the appeal that at least would protect the annual fee revenue stream—intended solely for waste disposal—from the habitual diversion for unrelated uses by Congress. A modest proposal to "reclassify" the fees as offsetting collections in 2005 and 2006 was considered in Congress, but the common understanding on Capitol Hill was that no legislation that would help the Yucca Mountain repository would pass the Senate, so the House stopped trying. It was our view that Congress had become so accustomed to using the fee revenue for other purposes that, whether members of Congress were for or against Yucca Mountain they were not about to stop the diversion of the "trust" fund. Nor was there any particular concern that with the lawsuits leading to damage awards stemming from DOE's breach of contracts on disposal that the taxpayers liability continued to mount.

We have reviewed the legislative proposal of Senator Voinovich, for "United States Nuclear Fuel Management Corporation Establishment Act," calling for creation of a "FedCorp" to manage all options of the nuclear fuel cycle. It is quite comprehensive and has many attractive features. One that we especially like is that the United States Nuclear Fuel Management Corporation Fund the bill would create is taken out of the government and would not be subject to appropriations. While it may be realistic, we object to the provision that transfer of the purported balance in the present Nuclear Waste Fund (presently reported to be $25 billion) to the new Capital Reserve Account as an "unfunded asset." That continues to make it seem doubtful that the $25 billion "corpus" Congress borrowed will ever be returned. The bill also sets up an NFMC operating account into which the fee revenue would be deposited and later drawn out by the FedCorp as the FedCorp determines is needed.

The 2003 National Research Council report *One Step at a Time* recommends that an independent technical oversight group be set up (such as the NWTRB) and a stakeholder advisory board. The advisory board could help improve public trust as well as scrutinize the financial soundness of the disposition strategy.

The FedCorp bill compares well with the Nuclear Waste Management Organization (NWMO) in Canada set up by federal design and law, but managed by the nuclear power plant owners. The NWMO has the authority to determine fee requirements, collect, invest and disburse funds as the organization determines to be needed. Several European countries have similar organizations.

Without knowing yet what alternative fuel cycle strategy will be chosen and whether implementation would proceed better than in the Yucca Mountain experiment, some pessimists may be fearful that similar results may beset the new strategy and that all that may change is that a new organization retraces a similar, politicized path. We don't think it need be that way. We have hope that Commission will present a compelling argument for creating a safe, fair and unpoliticized path to success for the timely and certain disposition of nuclear waste that has no further economic value.

What we need to convince all parties is that whichever organizational entity is responsible for waste management and disposition will be choosing a safe and appropriate path forward that the public and especially those in vicinity of the proposed nuclear facilities can have confidence in. Whether it is the federal government or a new specially created organization like a FedCorp, the organizations involved—be it in planning, regulating or implementation—need to endeavor to earn the public trust. Further, there should an openness to the site search and develop as well as receptivity to providing incentives to the host communities that reflects that there are burdens from certain aspects of these facilities that can be mitigated to some degree with funds collected from users of nuclear power, as was provided for but never seriously explored under Subtitle F of NWPA. Other federal projects have invested in community infrastructure that can be shown to be burdened by the new project.

Since we don't know at this stage what disposal strategy the Commission will recommend, it is unlikely that the Commission will be able to venture to put a price tag on each alternative. Therefore, it seems unlikely that Co-chair Hamilton will be able to hold to his statement at the first meeting that the Commission would review and determine the fee requirements. We suggest instead a postulation that the current one-mill fee is adequate and should continue to be reviewed annually for adequacy (in more realistic methodology than has been the practice at DOE.)

Of greater importance, we feel, would be for the Commission to urge upon Congress is to turn the fee determination, collection, investment and disbursement over to the waste management organization, subject to whatever audits and reporting Congress may require. Further, the Commission should include in its recommendation the challenge to Congress to commit to a Nuclear Waste Fund "Repayment Plan" that would return the $25 billion it borrowed from the Fund corpus. It could be repaid in annual amounts. It would be a sign of commitment from Congress that the disposal program is real and it must be taken seriously.

We close with a statement from the 2001 National Research Council report, *Disposition of High-Level Waste and Spent Nuclear Fuel:*

"Today the biggest challenges to waste disposition are societal."

Blue Ribbon Commission on America's Nuclear Future
Transportation & Storage Subcommittee Meeting
September 23, 2010

Washington Marriott, 1221 22nd Street NW
Washington, DC

Final Agenda

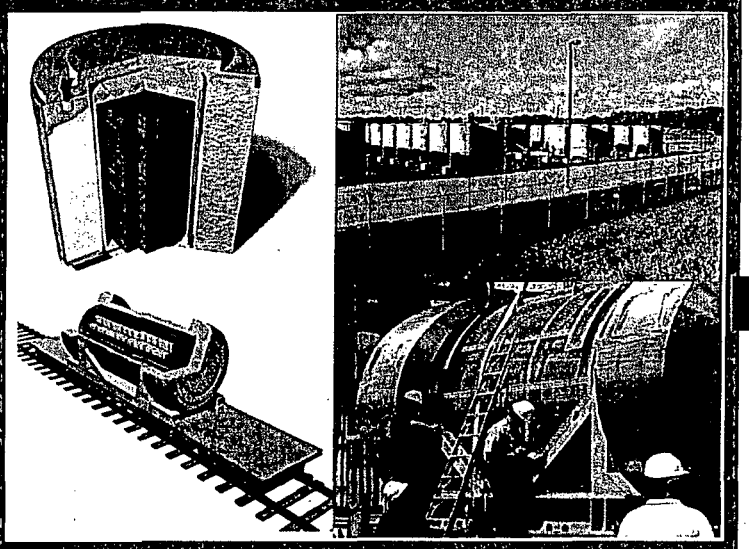
Thursday, September 23, 2010—Ballrooms A and B

8:30 a.m.	Open meeting, review agenda	Tim Frazier, Designated Federal Officer
8:35 a.m.	Welcome, opening remarks	Co-Chairs Meserve, Sharp Subcommittee members
8:45—10:30 a.m.	Panel on "hardened" on-site storage; implications for siting, operations, public and worker safety. Discussion about general transport and storage security	Philip Brochman, NRC Gordon Thompson, Institute for Resource and Security Studies Charles Pennington, NAC International, LLC Christopher Earls, Nuclear Energy Institute Bob Halstead, State of Nevada Capt. Tamara Baker, SC State Law Enforcement Division
10:30-10:45 a.m.	**Break**	

10:45-12:30 p.m.	Transportation and storage risk, analysis, and risk perception; managing risk in planning and executing transportation operations	Ken Sorenson, Sandia National Laboratories Philip Brochman, NRC Jack Edlow, Edlow International Judith A. Holm, DOE manager for transportation institutional programs (retired) Chris Wells, Southern States Energy Board Cash Jaszczak, Nye County, NV
12:30-1:30 p.m.	Public Comments	
1:30 p.m.	**Adjourn public session**	

NAC INTERNATIONAL

Storage and Transportation of Used Fuel: Does Storage/Transport System Hardening Enhance Safety and Security



Blue Ribbon Commission on America's Nuclear Future
September 23, 2010

A SPENT FUEL STORAGE/TRANSPORT SAFETY SUMMARY

Charles W. Pennington
NAC International

Storage and Transportation of Used Fuel: Does Storage/Transport System Hardening Enhance Safety and Security

Topics

- What is hardening?
  - Design basis (DB) vs beyond-design-basis (BDB) events
- Why do some feel it necessary?
  - Not aware of current system design margins for BDB events?
  - Fear of large radiological risk to public?
- Reasonable, objective standard for hypothetical BDB doses
- Liabilities of over-structure hardening
  - Benefit/cost ratio for hardening
- Conclusions

What Is Hardening?

- First consideration: used fuel storage/transport systems do not fail under DB events; system designs exceed regulatory requirements
- Hardening of used fuel storage/transport systems is usually related to BDB events and typically means methods that
  - increase system resistance to failure (release of radioactivity)
  - reduce likelihood of successful attack or sabotage
- There are various approaches to hardening and the "HOSS concept" is but one
- Appropriate safety and security may be better achieved, not by further hardening, but by effective, tiered deterrence/resistance: effective security systems, national and local; effective security forces; and conservative, robust and resistant technology

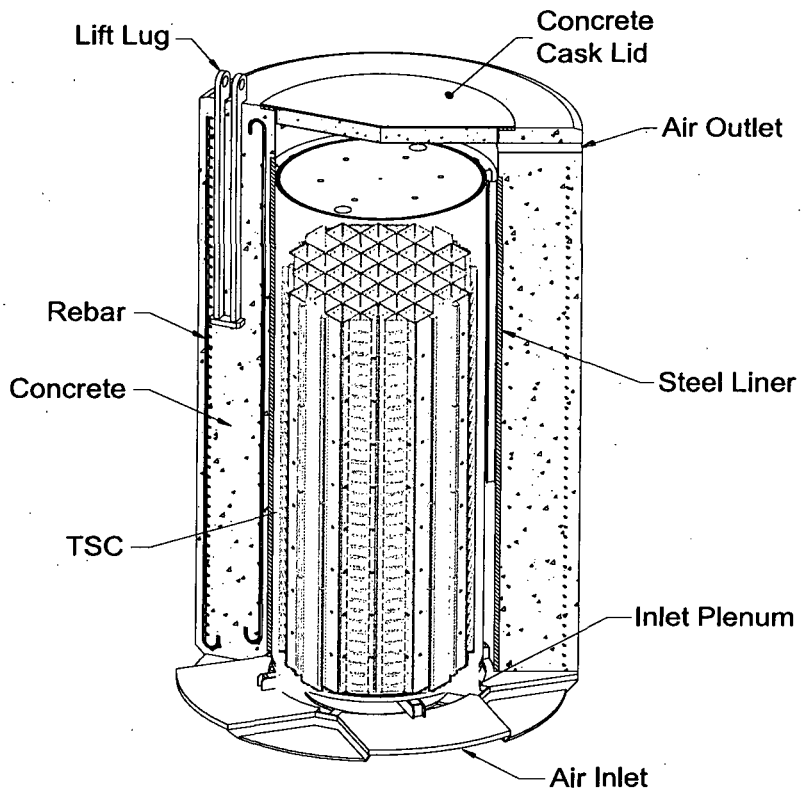
Why Do Some Feel Hardening Necessary?

- Not aware of current system design margins for BDB events?
  - Use of conservative codes and standards – materials have greater energy absorption before true failure than codes, standards, regulations allow credit for
  - Systems designed with layered external shells of materials for shielding and protection – external shells not fully challenged structurally for DB events; results from gamma shielding materials
  - NAC evaluation of Boeing 747 impact on storage cask at 500 mph (both aircraft body and turbine rotor, with fire) shows no release
- Look at typical NAC dry storage system design that uses vertical concrete cask (VCC)

NAC Dry Storage System Design

System design features:

- concrete
- aggregate
- rebar
- steel liner (canister armor)
- transportable storage canister (TSC)
- basket



NAC INTERNATIONAL

Why Do Some Feel Hardening Necessary?
(continued)

- Fear of large radiological risk to public?
  - No DB events cause releases
  - Many analyses of BDB events show no, or very limited, releases
  - DOE assessed releases from transport package sabotage in FSEIS for YM – low and high population densities
    - Conservative models and assumptions
    - Used research from a number of tests
    - Results - high densities: 47,000 person-rem; low densities: 92 person-rem
  - Storage results would be similar for low density populations
  - Other conservative, more realistic analyses show < 10,000 person-rem for high density populations
  - Applying credible sabotage probabilities shows very small risk
- What is a reasonable, objective standard for acceptability of BDB hypothetical population dose risk?

Reasonable, Objective Standard for Hypothetical BDB Population Doses

- A reasonable standard arises from non-nuclear industry population doses; these industries are not regulated to control their population dose characteristics
- Industries such as aviation, agriculture, building design/construction, potable water supply, construction material, tobacco supply, medical diagnostics produce *actual,* lognormally distributed, annual and 50 year collective effective dose equivalents (CEDE) to the public well above any hypothetical U.S. nuclear fuel cycle event
- Comparative standard for hypothetical dry storage and transport BDB event population dose outcomes based on actual population doses from non-nuclear industries is an objective method to assess society's true risk from such hypothetical BDB events
- DB events would still meet regulatory standards; hypothetical BDB dose consequences would be evaluated against some fraction of what society accepts today for unregulated population doses from non-nuclear industries

Reasonable, Objective Standard for Hypothetical BDB Population Doses (continued)

This shows a comparative assessment with non-nuclear industries

Industry	Current Annual CEDE (Person-cSv)	Estimated Previous 50 Year CEDE (Person-cSv)	Projected 50 Year CEDE (Person-cSv)
Aviation	>0.6 million	>12 million	>28 million
Building Design/Construction	>15 million	>430 million	>750 million
Potable Water Supply	>1.5 million	>38 million	>75 million
Agriculture	>1.3 million	>52 million	>65 million
Construction Materials	>2 million	>78 million	>100 million
Tobacco Supply	>44 million	>3 billion	>2.2 billion
CT Medical Diagnostics	>44 million	>1 billion	>2.2 billion
Total for 7 Non- Nuclear Industries	>108 million	>4.6 billion	>5.4 billion
Commercial Used Fuel Storage and Transport, supporting growth to 300 reactors over next 50 years	<0.00008 million	<0.002 million	No Breach Events: <0.008 million 10 Breach Events: <0.07 million

NAC INTERNATIONAL

Liabilities of Over-Structure Hardening

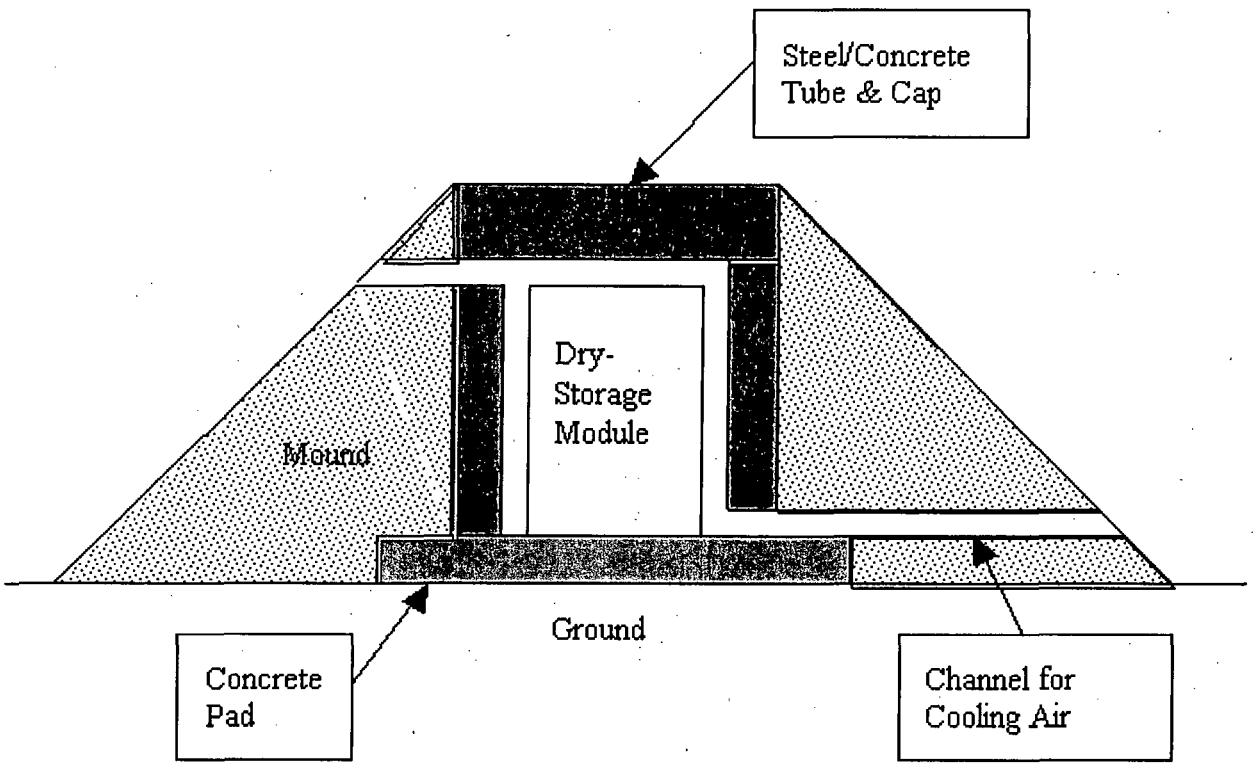
- System inspections/maintenance?
- Reduced system capabilities for spent fuel storage?
- Much larger ISFSI?
- Off-site transportation impairment?
- Hardening over-structures need multiple cooling openings – jet fuel or explosive ingress from sabotage may cause furnace or reflected overpressure conditions; over-structure collapse a credible outcome
- Storage technology will not fail from collapse; storage systems may loose cooling or be inaccessible
- Public health and safety not significantly threatened, with or without hardening
- Recovery staff may experience higher doses, delayed access, injury from collapse of unstable or weakened over-structure, etc.: real health and safety concerns
- Over-structure benefit-cost ratio does not appear attractive

Conclusions

- Additional over-structure hardening likely an expensive undertaking
- Little or no discernable public health and safety benefit
- Liabilities for efficient dry storage are likely higher
- Liabilities for recovery staff likely higher for BDB event
- Benefit-cost ratio for over-structure hardening likely approaches zero, perhaps is negative
- Reasonable conclusion is that further hardening of dry storage does not produce clear, discernable enhancement of public or worker health and safety for BDB conditions

Appropriate safety and security best achieved, not by further hardening, but by effective, tiered deterrence/resistance: effective security systems, national and local; effective security forces; and conservative, robust and resistant technology

Schematic of One Approach to Hardening a Dry Storage Module



Spent Nuclear Fuel Transportation Security Concerns

Robert Halstead
Transportation Advisor
Nevada Agency for Nuclear Projects

Blue Ribbon Commission on
America's Nuclear Future
Transportation & Storage Subcommittee Meeting
Washington, DC
September 23, 2010

Overview

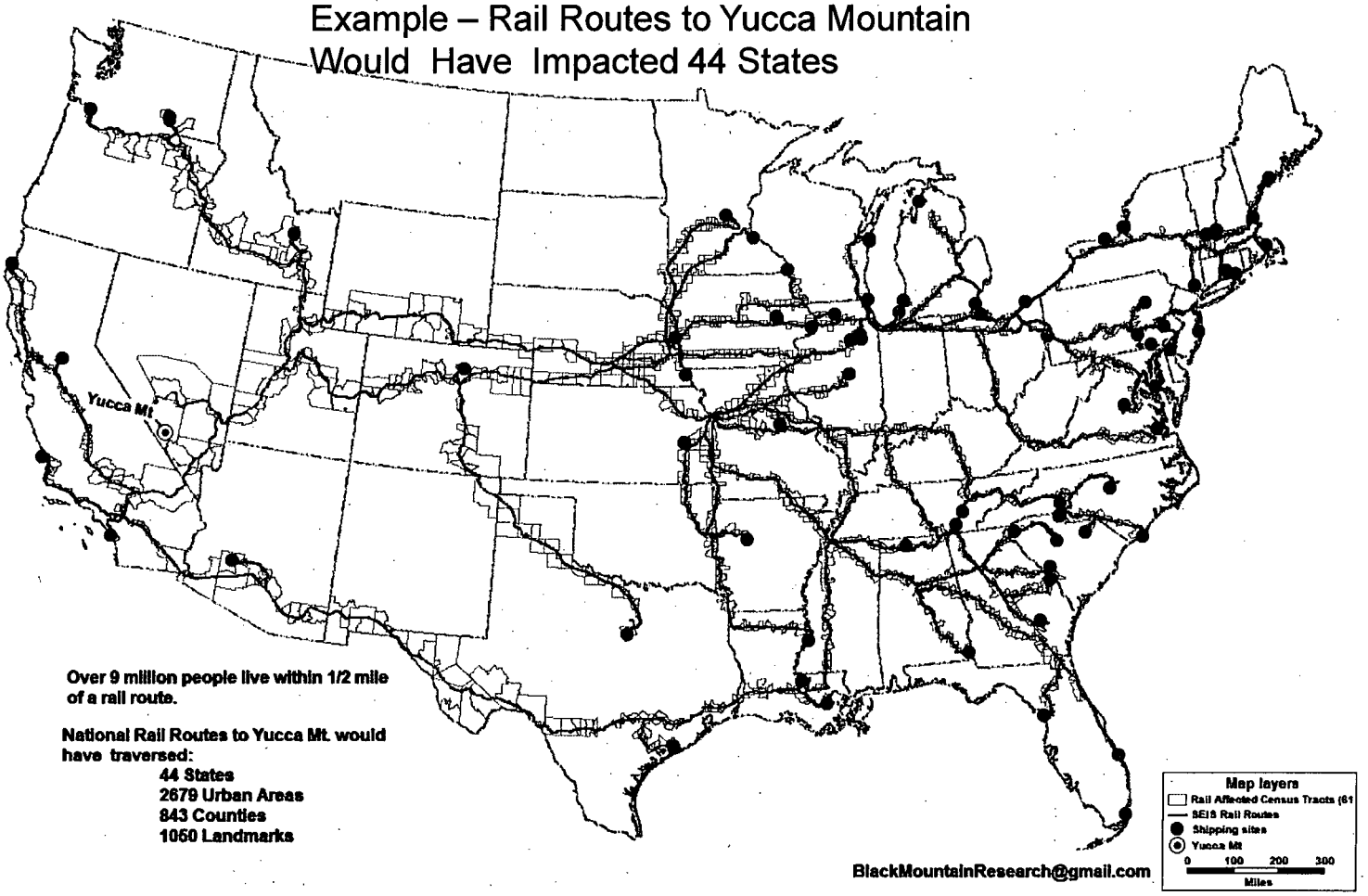
- Focus on radiological sabotage
- National impact of repository shipments
- Cask vulnerability to attack
- Consequences of attacks
- Recent regulatory developments
- Recommendations for managing and reducing risk

Three Decades of Debate Radiological Sabotage

- 1977 - Sandia: Transportation of Radionuclides in Urban Environs
- 1979 - NRC interim requirements for physical protection
- 1980 - NRC physical protection requirements (10 CFR 73.3)
- 1984 - NRC proposal to modify physical protection requirements
- 1987 - NRC proposed rule "terminated"
- 1999 - PRM 73-10 Nevada petition for rulemaking
- 1999 - DOE Draft EIS for Yucca Mountain
- 2001 - September 11 Terrorist Attacks, NRC guidance to licensees
- 2002 - NRC: DOE shipments exempt from 10 CFR 73.37
- 2008 - DOE Final Supplemental EIS for Yucca Mountain
- 2008 - TSA and PHMSA promulgate rail security rules
- 2009 - NRC CAB admits contentions on sabotage consequences
- 2010 - NRC to develop proposed rule based on SECY-09-0162

Impacts of Storage and Disposal Transportation

Example – Rail Routes to Yucca Mountain Would Have Impacted 44 States



Over 9 million people live within 1/2 mile of a rail route.

National Rail Routes to Yucca Mt. would have traversed:

- **44 States**
- **2679 Urban Areas**
- **843 Counties**
- **1050 Landmarks**

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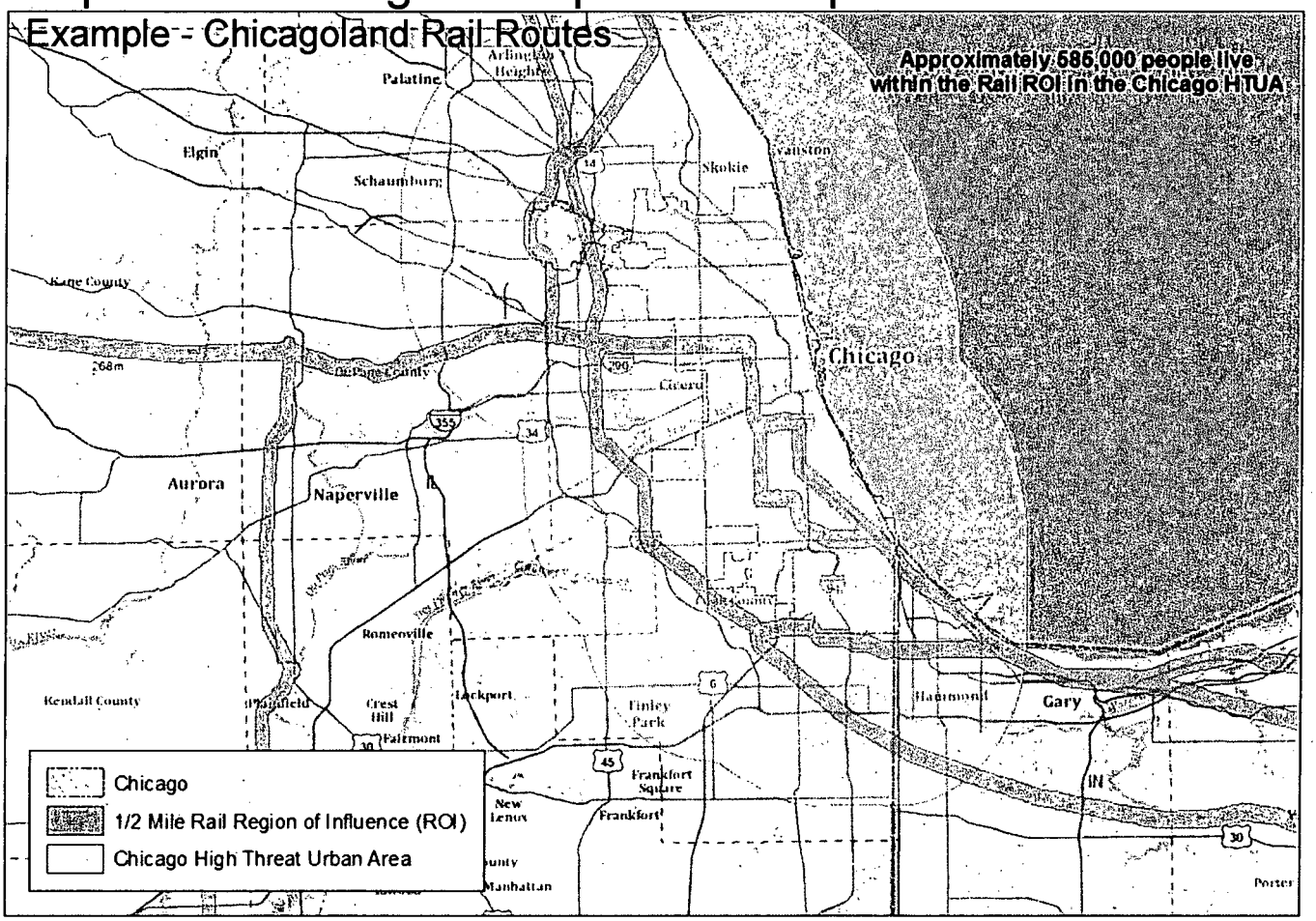
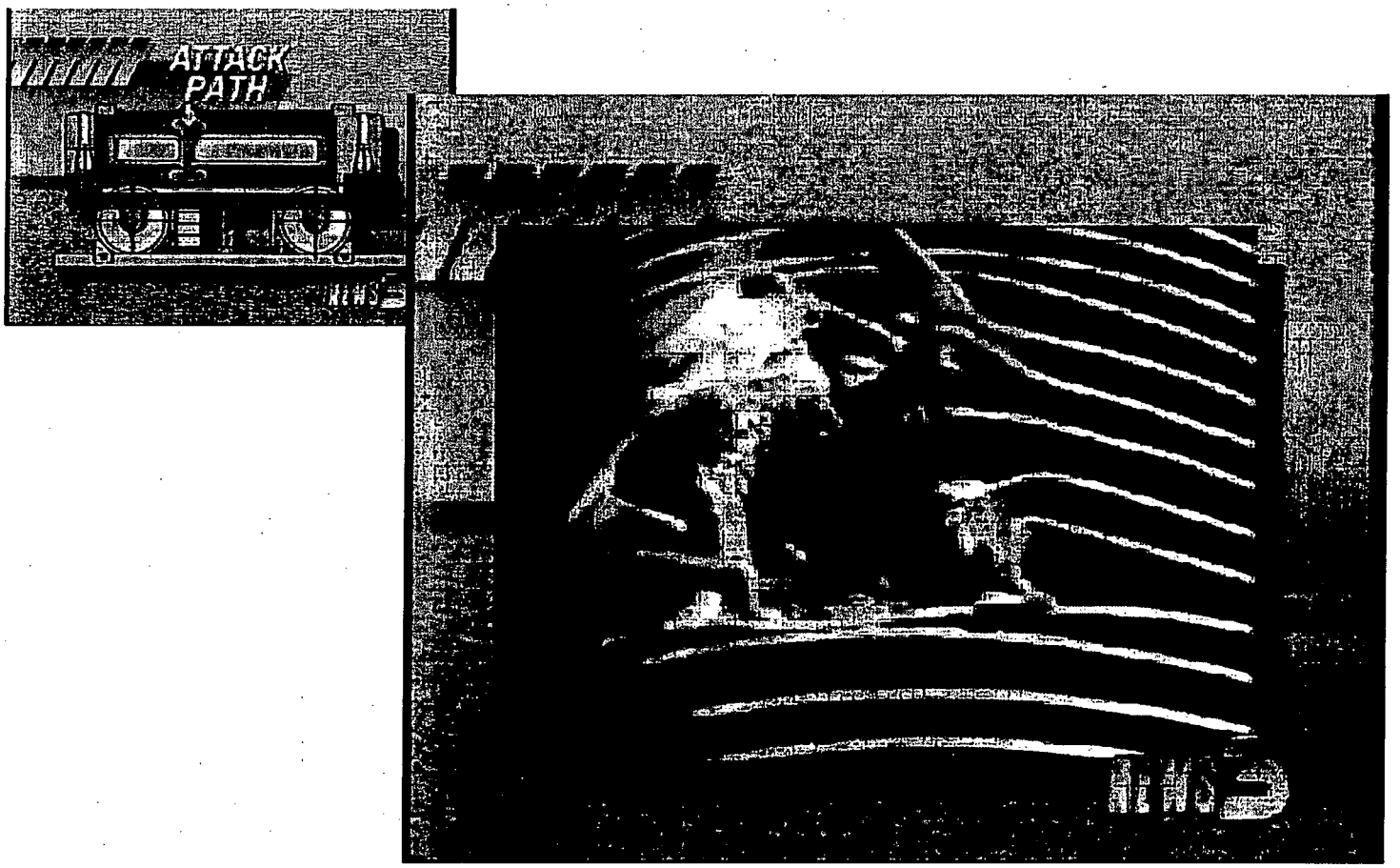
Impacts of Storage & Disposal Transportation

Example - Chicagoland Rail Routes



Blackmountainresearch@gmail.com

Truck casks are vulnerable to attack:
DOE test, Sandia National Laboratories, 1982



Rail casks are vulnerable to attack:
IFCI test, Aberdeen Proving Ground, 1998

DOE Acknowledges Cask Vulnerability to Sabotage

- DOE 2008 SEIS evaluated range of weapons
- DOE estimated consequences of sabotage events in which a high-energy-density device penetrated a rail or truck cask, for urban and rural locations
- Truck cask in urban area: population-dose of 47,000 person-rem and 28 latent cancer fatalities
- Rail cask in urban area: population-dose of 34,000 person-rem and 19 latent cancer fatalities
- No specific estimate of cleanup cost; SEIS implies same cost as for severe transportation accident in which radioactive material was released: "could be in the range of $300,000 to $10 billion" [CR-467]

Sabotage Consequences Could Be Significantly Greater

- DOE failed to consider reasonably foreseeable attack scenarios that could completely perforate casks, significantly increasing releases and consequences
- DOE failed to consider reasonably foreseeable attack scenarios that could significantly increase releases and consequences, without fully perforating casks
- DOE failed to specifically assess economic impacts of sabotage events
- DOE failed to assess social impacts
- DOE failed to assess health effects other than latent cancer fatalities

NRC Proposed Rule Would Enhance Physical Protection

- NRC proposed rule (10 CFR 73.37) expected in 2010
- Responds to post 9/11 experience, NRC consequence analyses, and PRM 73-10: "there have been significant changes in the threat environment"
- Addresses PRM 73-10: definition of radiological sabotage, advance route approvals, equal armed escorts in urban and rural areas, planning and coordination
- Major NRC initiatives: Coordination with affected states, continuous monitoring, telecommunications systems, status and event reporting, enhanced response training including use of deadly force, near-site shipments
- Major unresolved Issue: DOE shipments remain exempt

DHS & DOT Rules Protect Urban Areas and Iconic Targets

- DHS (TSA) and DOT (PHMSA) adopted regulations in 2008 to enhance safety and security of rail shipments of hazardous materials, including SNF (49 CFR 172, 179, 209, 1520, 1580)
- Designate 46 High Threat Urban Areas (HTUAs) requiring chain of custody and control procedures
- Require rail route evaluations using 27 risk factors, including proximity to densely populated areas, iconic targets, and places of congregation
- Potential implications for cross-country rail shipments of SNF (For example, rail routes to Yucca Mountain would have impacted 30 HTUAs in 25 states, 20 other major cities, and required coordination among 18 railroads)

Manage and Reduce Risks

- Select sites and design system to minimize numbers of shipments & shipment-miles
- Ship oldest fuel first
- Maximize rail, require dedicated trains
- NRC regulation of all shipments
- Assess TSA-PHMSA regulations
- Require Full-scale testing of casks
- Adopt WIPP transportation protocols
- Human Factors management

Storage and Transportation Safety and Security Assessments

Presentation to:

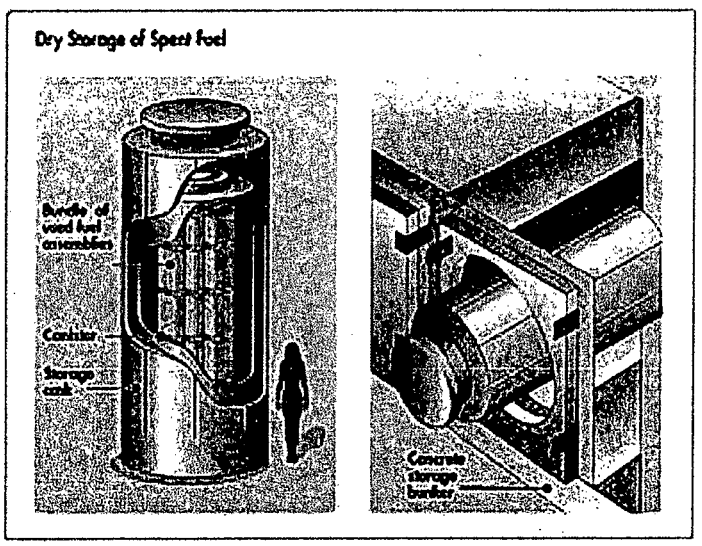
The Blue Ribbon Commission on America's Nuclear Future
Sub-committee on Transportation and Storage

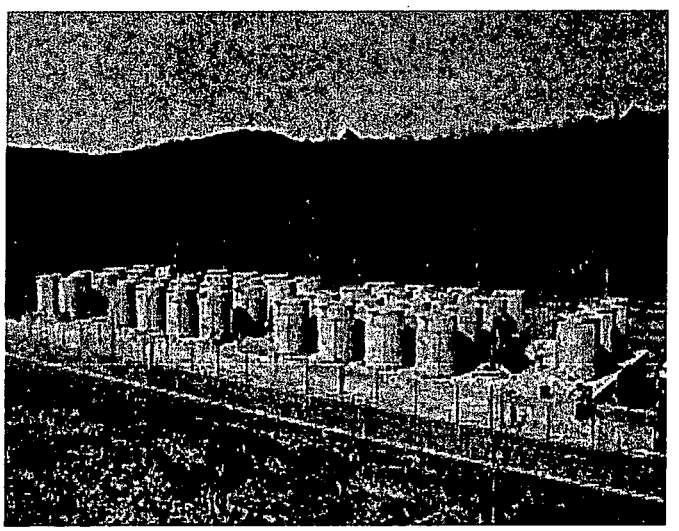
Ken B. Sorenson
Sandia National Laboratories

September 23, 2010
Washington DC

Contents

- Some History
- Observations
- Applying past experience to current and future operations





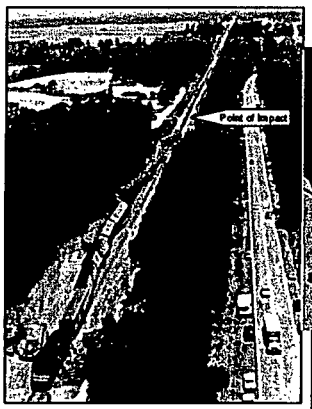
History

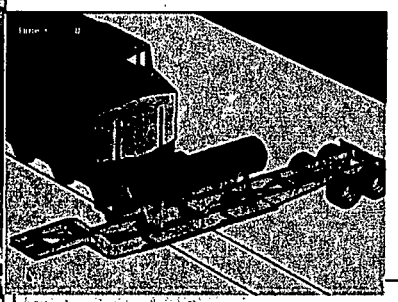
- Since the '70s, substantial analytical and experimental work has been conducted to assess the adequacy of storage and transportation regulations to protect the public and environment from harmful consequences that could result from a radioactive material release stemming from an accident or terrorist event.

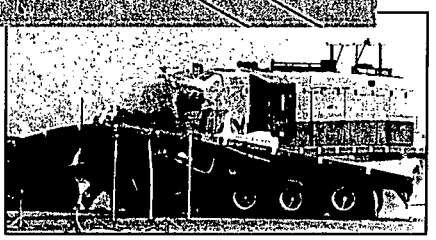
- This work can be categorized in two broad areas:
  - Safety
  - Security

History – Safety Assessments

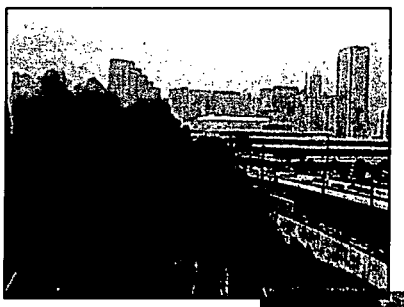
- Three NRC publications demonstrate the progress that has been made in transportation safety risk assessments over the last 30 years.
  - NUREG-0170 (1977): original transportation EIS for transportation of radioactive materials
  - NUREG/CR-4829: aka; The Modal Study (1987)
  - NUREG/CR-6672: "Re-examination of Spent Fuel Shipment Risk Assessments" (2000)
- These assessments have been refined with the evolution of advanced computer modeling and analysis, more detailed Federal accident databases, more sophisticated routing models, and expanded experimental databases.
- Much of this work focuses on severe mechanical and thermal loadings that may arise from severe accident conditions.





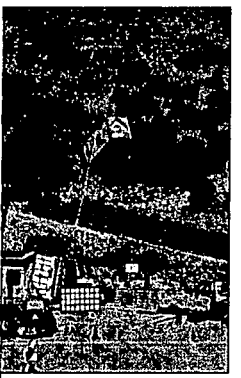


South Carolina 1995 Train/Tractor-Trailer impact



Baltimore 2001 Howard Street Tunnel Fire

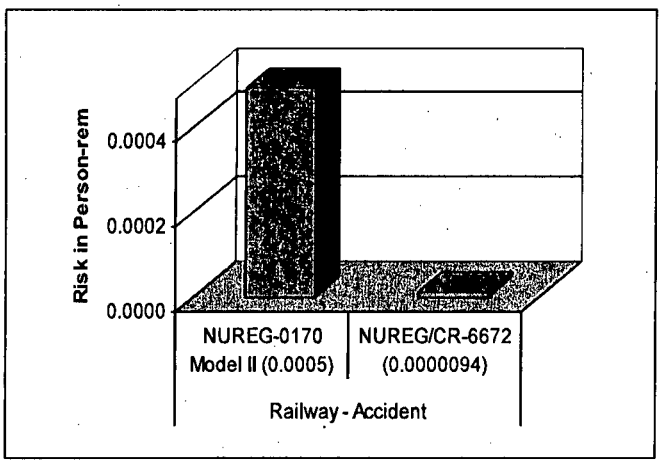
Calorimeter Test

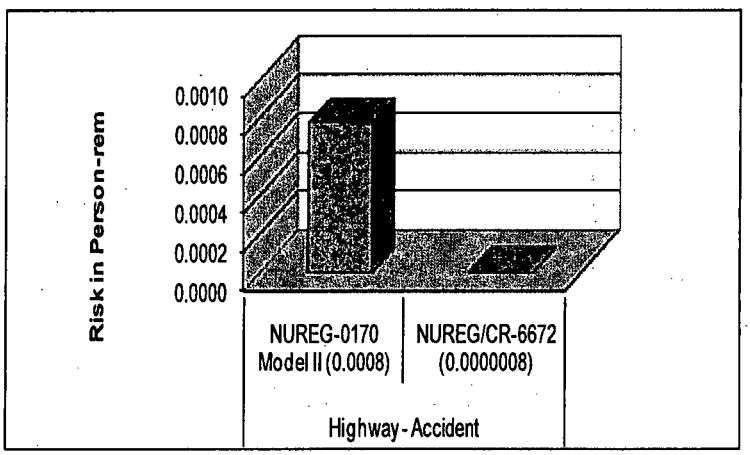


Full-scale drop test of TRUPACT III

History – Safety Assessments

- From NUREG-0170 to NUREG/CR-6672, estimated transportation risks under accident conditions have been reduced significantly.
  - Rail: reduced 2 orders of magnitude
  - Truck: reduced 3 orders of magnitude





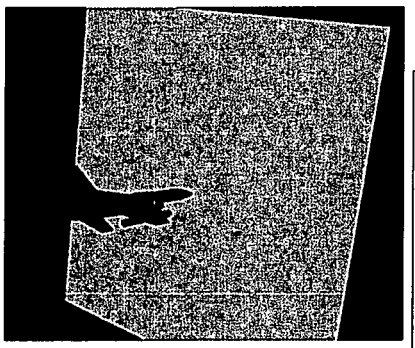
History – Security Assessments

- Security assessments published in the late '70s and early '80s estimated consequences from specific types of attacks on transportation casks.
- For example, NUREG/CR-0743 (1980), referred to as the Urban Study, estimated dose consequences from a terrorist attack on a truck cask in a densely populated urban environment.
- Wide variability of results in these early reports led to experimental testing to better understand release mechanisms and subsequent dispersal of radioactive materials. These experiments provided valuable data for further analytic studies as well as data for EIS development, such as the Yucca Mountain FEIS.
- After 9/11, the NRC conducted a comprehensive assessment of consequences stemming from different types of attacks on a wide range of fuel cycle assets and facilities.

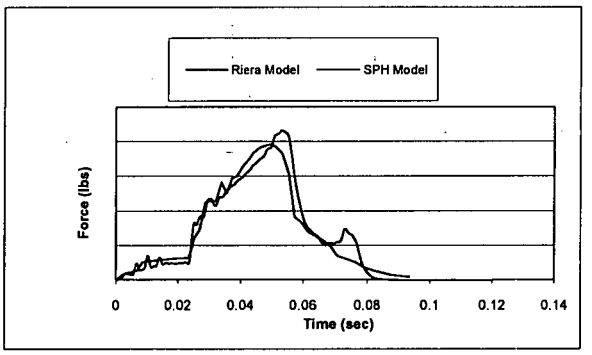
History – Security Assessments

- In aggregate, consequence assessments and tests have been conducted on of a wide range of types of attacks and different types of facilities and materials.
- This experience has expanded our understanding of how engineered components respond to a variety of severe loading conditions and how spent fuel disperses if it can be released.
- These analyses and data can then be used as a technical basis for assessing the physical protection of licensed facilities against specific types of threats.

F-4 Load Cell Test



Impact into an unyielding, flat surface



Force vs. time plot from analysis

Observations

The amount of work that has been done in the area of spent fuel storage and transportation safety and security assessment is substantial.

- Transportation of spent nuclear fuel is safe.
- The robust nature of spent fuel casks (storage and transport) acts to mitigate potential consequences from a terrorist attack.
- Lack of openness with security assessments can inhibit public acceptance of spent fuel transportation and storage.

There is also a substantial amount of work that has been done internationally in assessing safety and security of spent nuclear fuel transportation and storage.

Applying past experience to current and future operations

- Based on comprehensive assessments coupled with security up-grades as warranted, the NRC has a functional process to assess operational practices to ensure that the storage and transportation of spent fuel is safe, secure, and compliant with the regulations.

- Issues associated with consolidated storage, removal of spent fuel from orphaned sites, and security up-grades at existing sites are all worthy of careful consideration. However, they should be evaluated making full use of the studies already available and in a systems context that considers the full range of risks and benefits.

UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
2300 Clarendon Boulevard, Suite 1300
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September 28, 2010
For Immediate Release

Karyn D. Severson
External Affairs

NWTRB to Discuss Technical Lessons Gained from High-Level Nuclear Waste Disposal Efforts to Date

The U.S. Nuclear Waste Technical Review Board will meet in Dulles, Virginia, on October 26, 2010, to discuss technical aspects of the U.S. Department of Energy's (DOE) activities over the last 20 years related to managing and disposing of spent nuclear fuel and high-level radioactive waste. The Board will consider technical lessons that can be gained from those experiences that may be useful in informing future waste management and disposal efforts.

Former managers, contractors, and scientists associated with the Yucca Mountain program have been invited to discuss their experiences at the meeting. The Board also has invited representatives from affected units of governments in Nevada to provide their perspectives on technical oversight, and representatives from several countries with nuclear waste programs have been invited to discuss their own programs and their views of the U.S. experience to date.

The Board meeting will be held at the Marriott Washington Dulles Airport, 45020 Aviation Drive; Dulles, VA 20166; (tel.) 703-471-9500, (fax) 703-661-8714. A block of rooms has been reserved at the hotel for meeting attendees. *To ensure receiving the meeting rate, reservations must be made by October 6, 2010.* For directions to the hotel or to make reservations, go to http://www.marriott.com/hotels/travel/iadap?groupCode=nucnuca&app=resvi or call 800-228-9290.

A detailed meeting agenda will be available on the Board's Web site at www.nwtrb.gov approximately one week before the meeting. The agenda also may be obtained by telephone request at that time. The meeting will be open to the public, and opportunities for public comment will be provided.

The meeting will begin at 8:30 a.m. on Tuesday morning. Time has been set aside at the end of the day for public comments. Those wanting to speak are encouraged to sign the "Public Comment Register" at the check-in table. A time limit may have to be set on individual remarks, but written comments of any length may be submitted for the record.

Transcripts of the meeting will be available on the Board's Web site, by e-mail, on computer disk, and on library-loan in paper format from Davonya Barnes of the Board's staff no later than November 22, 2010.

The Board was established as an independent federal agency to provide objective expert advice to Congress and the Secretary of Energy on technical issues and to review the technical validity of DOE activities related to implementing the Nuclear Waste Policy Act. Board members are experts in their fields and are appointed to the Board by the President from a list of candidates submitted by the National Academy of Sciences. The Board is required to report to Congress and the Secretary no fewer than two times each year. Board reports, correspondence, congressional testimony, and meeting transcripts and materials are posted on the Board's Web site: www.nwtrb.gov.

For information on the meeting agenda, contact Karyn Severson. For information on lodging or logistics, contact Linda Coultry; 2300 Clarendon Boulevard, Suite 1300; Arlington, VA 22201-3367; (tel) 703-235-4473; (fax) 703-235-4495.

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