

## **Getting Beyond Yucca Mountain – 12305**

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### **ABSTRACT**

The U.S. Department of Energy has terminated the Yucca Mountain repository project. The U.S. Nuclear Regulatory Commission has indefinitely suspended the Yucca Mountain licensing proceeding. The presidentially-appointed Blue Ribbon Commission (BRC) on America's Nuclear Future is preparing a report, due in January 2012, to the Secretary of Energy on recommendations for a new national nuclear waste management and disposal program. The BRC Draft Report published in July 2011 provides a compelling critique of the past three decades failed efforts in the United States to site storage and disposal facilities for spent nuclear fuel (SNF) and high-level radioactive waste (HLW). However, the BRC Draft Report fails to provide detailed guidance on how to implement an alternative, successful approach to facility site selection. The comments submitted to the BRC by the State of Nevada Agency for Nuclear Projects provide useful details on how the US national nuclear waste program can get beyond the failed Yucca Mountain repository project. A detailed siting process, consisting of legislative elements, procedural elements, and "rules" for volunteer sites, could meet the objectives of the BRC and the Western Governors Association (WGA), while promoting and protecting the interests of potential host states. The views expressed in this paper are the personal views of the authors, and do not represent official positions of the State of Nevada, the WGA, or the Western Interstate Energy Board (WIEB).

### **INTRODUCTION**

The Blue Ribbon Commission (BRC) on America's Nuclear Future published a Draft Report to the Secretary of Energy, dated July 29, 2011. Regarding selection of sites for future nuclear waste storage and disposal facilities, the BRC recommended an approach that is "adaptive, staged, consent-based, transparent, and standards- and science-based." The core difficulty, according to the BRC, remains "finding a way to site these inherently controversial facilities and to conduct the waste management program in a manner that allows .....host communities, states and tribes to conclude that their interests have been adequately protected and their well-being enhanced - not merely sacrificed or overridden by the interests of the country as a whole." [1]

### **STATE OF NEVADA COMMENTS ON THE BRC DRAFT REPORT**

The State of Nevada Agency for Nuclear Projects (Nevada) submitted detailed comments to the BRC on the Draft Report in October 2011. [2] Nevada's comments reflect more than 30 years of experience with the U.S. Department of Energy (DOE) repository program, and more than 10 years experience with the U.S. Nuclear Regulatory Commission (NRC) licensing process. Nevada's comments addressed the BRC recommendation for "consent-based" siting of disposal

and storage facilities; the BRC recommendation for reorganization of the national nuclear waste program; the BRC characterization of the WIPP siting process; repository regulatory requirements for retrievability; the BRC recommendations regarding early progress on repository siting; and the BRC recommendations regarding transportation.

### **BRC Recommendations Regarding Consent-Based Siting**

Nevada strongly supports the BRC Draft recommendation that a consent-based siting and development process for storage and disposal facilities should be a central feature of any new waste management policy for the United States. After the long and contentious attempt to first site a storage and disposal system under the NWSA of 1982, and then under the NWSA Amendments Act of 1987, the most apparent lesson from America's nuclear past, is that national nuclear waste storage and disposal facilities cannot be sited successfully over the persistent objection of the potential host state and its constituents. The U.S. is the latest in the list of nations attempting to develop a nuclear waste management system to confront this lesson.

Nevada suggests that the BRC further define the term "consent-based" siting to include three prerequisites: 1) the host state and Indian Tribal governing authority must agree to the decision to initiate or continue consent (how that is done would be within the purview of that authority); 2) the most locally affected governing authority must agree with the host state and Tribal governing authority from the outset and at each decision stage (with the process for that being within its purview); and 3) the State, Tribal and local governments must have the guaranteed ability to opt out at any stage up to submission of a license application to the NRC.

Nevada urges the BRC to apply the Western Governors' Association (WGA) position on consent-based siting of interim storage facilities to all future nuclear waste siting activities, requiring the written consent of the governor for geologic disposal and storage siting decisions, and prohibiting the implementing entity from conducting any siting activities in a potential host state, including contact with local or tribal governments, without prior written consent by the governor of the affected state.

### **BRC Characterization of the WIPP Siting Process**

The BRC Draft Report points to the successful operation of the Waste Isolation Pilot Plant (WIPP) facility in New Mexico as "an affirmative demonstration that with adequate patience, flexibility, and political and public support, success is possible." The BRC largely attributes the success of WIPP to the presence of "a supportive host community" and "a state government that was willing to remain engaged." Nevada believes the WIPP program would not have been successful had DOE and New Mexico not entered into a formal agreement very early in the siting process that established the state's willingness to work with DOE on the project. If DOE had sought to move ahead in the face of outright state opposition, WIPP would not have been successful regardless of the support evinced by the local community. The BRC Final report must reflect the importance of obtaining state consent, even if local governments and/or tribes within those states are supportive.

Nevada believes that there are limits to the applicability of the WIPP model to a future national system for management of spent nuclear fuel and high-level radioactive waste. Transuranic wastes, even the remote-handled portion, are considerably less radioactive than spent nuclear fuel and high-level radioactive wastes, and are perceived to be less dangerous. The wastes shipped to WIPP are owned by DOE and shipped from sites owned and managed by DOE. Although the WIPP site has mainline railroad access nearby, trucks have been used for all WIPP shipments to date. Reliance on truck transport allows more flexible routing than rail shipments, and DOE has selected highway routes in consultation with the affected states and tribes, and with state regional organizations, thus reducing concerns about shipments through highly populated areas and other transportation impacts. Perhaps most importantly, acceptance of WIPP and shipments to WIPP, by the public and by public officials, are enhanced by strongly positive attitudes towards national defense and environmental remediation of nuclear weapons facilities in the West. The BRC Final Report should recognize these differences between WIPP, and the SNF and HLW storage and disposal facilities that will be needed in the future.

### **BRC Recommendation Regarding Early Progress on the Repository Siting Front**

Nevada's agreement with the BRC Draft Report recommendations and rationale for consent-based siting is contingent on generic siting criteria and standards and regulations being in final form prior to initiating a siting process. Nevada agrees with the statement on page 104 that "there is no reason to wait to start the process of developing generic regulations for future geologic repositories." Nevada generally agrees with the BRC Draft Recommendations for Developing Future Disposal Facility Standards on pages 102 through 106, with the exception noted below. And Nevada agrees with the need for coordination between the NRC and EPA in a widely inclusive standard and regulation setting process.

Nevada specifically does not agree with the following statement on page 104: "Given that we are recommending a flexible process for finding new sites, standards development need not delay early progress on the siting front." The siting process should not be initiated until the recommended new organization has completed a public process resulting in acceptable site selection criteria, and the NRC and EPA have final standards and regulations in place. To do otherwise risks, once again, precluding any level of confidence that site selection has safety as its principle goal, and once again invites political interference at the very inception of a program meant to restore and instill confidence in decisions made about safe long-term management and disposal of nuclear waste. The "flexible process for finding new sites" noted above should not include conditional consideration of a site without all potential interests involved knowing and understanding the "rules" for screening, and later decisions which apply to all voluntary candidates. To do so invites one or more of at least three undesirable consequences: 1) the criteria, standards and rules could be calibrated to best accommodate the early offered or politically chosen site; 2) political forces will be brought to bear to declare "success" before a defined deliberative process has even begun; and 3) sites of real merit may never be offered for consideration since the perception will be that "the fix is in." This is a formula for a safety failure, not just another policy failure.

The nuclear waste management organization, in its authorization statute, should be given the broadest possible scope to negotiate and fund oversight participation, and mitigation and

compensation agreements, as discussed in the BRC Draft Report. Funding should also be authorized for participation by citizen groups and other interested non-governmental organizations.

Nevada offers an additional thought regarding the development of disposal standards and the application of disposal standards in repository site selection and licensing. The BRC should acknowledge a tension between maintaining, on the one hand, that there is reasonable confidence that spent nuclear fuel (which is potentially dangerous for tens of thousands of years) can be disposed of safely and, on the other hand, drafting disposal regulations that limit safety evaluations and performance assessments to ten thousand years (or possibly less) because predicting the performance of a repository over longer time periods is too speculative. One cannot have things both ways -- if we have confidence spent fuel can be disposed of safely in geologic repositories, it follows logically that we must also have equivalent confidence that the safety of geologic repositories can be evaluated and judged over the long time periods while the materials pose a threat to man and the environment. If performance assessments of up to one million years, as now required by Part 63 of the Code of Federal Regulations, Title 10 (and the National Academy of Sciences) are too speculative, then the challenge to regulators and standard-setters is to develop another way to judge safety over very long time periods up one million years.

#### **BRC Recommendation Regarding Repository Regulatory Requirements for Retrievability**

Nevada agrees with the statement on page 35 that regulatory requirements for retrievability until closure should be retained, and that they “are intended to ensure that emplaced waste can be removed if the repository is not behaving as anticipated or if its performance is called into question for any reason prior to permanent closure - they are not intended for the purpose of retaining easy access to emplaced materials for possible later recovery and reuse.” But, it should be noted that the NWPA, in Section 122, includes a requirement for retrievability also “for the purpose of permitting the recovery of the economically valuable contents of such spent fuel.” This provision should not be included in a revision of national waste management policy. If the intent is to keep the spent fuel for possible “reuse” purposes, it should not be emplaced in a geologic repository in the first place. This provision was written into the NWPA before dry cask storage was readily available, and could have been a response to concerns prevalent at the time about spent fuel pools approaching their design capacity, with uncertainty about whether commercial reprocessing would become available. In any event, it has no place in a revised nuclear waste management policy.

#### **BRC Recommendation Regarding Waste Program Reorganization**

The institutions responsible for implementation of the waste management policy must be seen by all affected by the policy to be consistently trustworthy, both in their words and their actions. Trust in the DOE’s Office of Civilian Radioactive Waste Management began evaporating in the affected states within a few months of signing of the NWPA of 1982, and the trend never reversed. The BRC Draft Report recommends that a new, single purpose organization (i.e., a public/private corporation) be chartered by Congress to manage implementation of a revised U.S. nuclear waste management policy. Nevada generally agrees with this recommendation as

described and discussed in the BRC Draft Report, but an important aspect of this single purpose organization concept that gets little attention is the prospect that it could need to be sustainable for a century or more.

With the nuclear waste issue essentially “parked” in this organization, there is a danger that Congress could turn a deaf ear to concerns from various interests about the organization’s activities, and through time could have declining interest even in how the organization spends the Waste Fund, once it has full access to the fund reserve. Some further thought should be given by the BRC to the long-term Congressional oversight of the proposed new organization, and to the means whereby ratepayers who contributed to the Nuclear Waste Fund would have some assurance that the funds are prudently invested and spent.

### **BRC Recommendations Regarding Transportation**

The BRC Draft Report brief discussion of transportation issues (pages 53-55) does not adequately reflect lessons learned from the past 25 years of failed planning for transportation of spent nuclear fuel (SNF) and HLW to NWPA facilities. Future SNF shipments will likely be dramatically different than current shipments. Assuming no new reactors, and license extensions for all operating reactors, the current inventory will grow by about 2,000 MTU per year. Once regular shipments to centralized storage and/or geologic disposal begin, annual shipments of at least 3,000 MTU seem likely. At that rate, assuming mostly rail (95 percent) transportation of commercial SNF, and all rail transportation of DOE SNF and HLW, there would likely be about 7,000 train shipments (3-5 casks per train) and 5,000 truck shipments (one cask per truck) over about 50 years.

Nevada urges the BRC to expand its discussion of transportation issues into a separate chapter in the Final Report, and adopt the following recommendations:

1. The implementing entity should give equal consideration to transportation, with storage and disposal, in planning and designing the national nuclear waste management system.
2. The implementing agency should address transportation requirements for storage and disposal facilities, such as mainline rail access and interstate highway access, in the earliest stages of site selection.
3. The implementing entity should adopt all of the National Academies 2006 recommendations for transportation risk management; [3] early adoption of the NAS recommendations regarding full-scale cask testing and social impact management would be especially helpful for early facility site selection efforts.
4. The implementing entity should follow the WIPP transportation model in developing a national transportation plan in cooperation with States, tribes, local governments, and state regional groups.
5. The implementing entity should insist upon full NRC regulation of all shipments to storage and disposal facilities.

### **IMPLEMENTATION GUIDELINES FOR A NEW NUCLEAR WASTE PROGRAM**

In its Draft Report, the BRC makes several key recommendations designed to get the nation’s nuclear waste program “back on track”--a new, single-purpose organization with greater access

to the Nuclear Waste Fund and less detailed oversight by Congress, and with the driving objectives to expeditiously establish one or more consolidated storage and geological disposal facilities. We believe that the BRC's key recommendations should be combined with three sets of implementation guidelines for the new organization (and Congress). There are several reasons—all firmly grounded in experience over the past quarter century—why these guidelines are important to the future of the nation's nuclear waste program:

- First, since experience shows that powerful federal agencies are not self-motivated to share authority or control—even if such sharing is instrumental to achieving larger goals--specific implementation guidelines are needed to *help* the new implementing agency adhere to key aspects of process as it pursues its siting goals.
- Second (and related to the first), since the new implementing agency --facing conflicting pressures as it pursues its driving goals over extended periods of time--will be tempted to short-cut other obligations, specific guidelines are needed as a bulwark for the agency (and Congress) to resist the inclination to short-cut critical elements of process.
- Third, while the BRC itself is not a siting body, its recommendations will be implemented in a regional political process. If the BRC cannot specify guidelines for regional equity, it can and should present guidelines for development of an integrated national strategy reflecting (among other things) regional fairness and equity.
- Finally, consider that, in the quarter century since 1987, permanent disposal or consolidated storage sites have been sought in Nevada, Arizona, New Mexico, Wyoming and Utah, but not in the thirty-five states east of the 100<sup>th</sup> Meridian where over 90% of the nation's SNF has been generated. Western states understand that one or more of its number may eventually host sites for storage or disposal of SNF and/or HLW. But the West insists that the decision processes should be consent-based, specific, rigorous, and transparent, supported in legislation, and, in some sense yet to be determined, fair and equitable.

### **Guidelines for Development of an Integrated Waste Management Strategy Addressing Principles of Regional Fairness**

In the debate leading to adoption of the NWPA in 1982, questions regarding an integrated national strategy reflecting principles of regional fairness were painstakingly negotiated by Congress, with conclusions reflected in several legislated criteria or authorities:

- A first repository was to be sought in the West, a second in the East.
- Each repository was to be selected from several candidates presumed suitable.
- Capacity limits were placed on a first repository until the second is in operation.
- The first consolidated storage facility was presumed to be in the East, and was linked to the development of permanent disposal.
- The Secretary was authorized (in Section 135) to provide short-term/near-site storage capacity for limited amounts (up to 1900 MT) of SNF.

Much of the mistrust generated during the past 25 years can be attributed to Congress' abandonment in 1987 of the criteria for regional fairness painstakingly negotiated in 1982. The abandonment raised the following types of questions regarding a national waste management strategy in a federal system of government:

- Might a consolidated storage facility, once sited, be expanded indefinitely in its capacity, and/or extended, possibly indefinitely, in its license term?

- Might a permanent disposal facility, once licensed, be expanded in its capacity? Expanded to the extent that no other state need share the burden?
- Might the safety concerns encountered be “worked around” rather than fully addressed, due to the perceived difficulties of finding an alternative site?
- Granted that, among 75 generation sites, many have now stored SNF for 4-5 decades. But how does that legitimize cross-country transfer for consolidated storage in any state?
- Is the regional transfer involved, with its own extensive transportation impacts, “fair”? If not, what are the bases for a determination of fairness?

The reformulated nuclear waste program should include a legislated process by which the new, single-purpose implementing agency should develop an integrated national waste management strategy. This process should address the current and projected inventory, the several generic methods of storage or disposal, and the application of these methods, geographically and over time. Key steps in this process include:

- The implementing federal agency should identify reasonable alternative configurations of the generic storage and disposal methods, and should assess the configurations regarding their estimated implementation cost, the scale of transfer, required legislative authorizations, and application of current state authorities.
- An independent federal commission should be formed to review the alternatives, and to make recommendations. The review should be conducted over a one-year period, and in various parts of the country. Based on the review, the commission should make its recommendations to the implementing agency, which should use the recommendations as the basis for describing an integrated national waste management program reflecting (among other criteria) principles of regional equity and fairness.
- The integrated national strategy, with a reasonable estimate of the implementation funding required, as well as key program milestones, should be submitted to Congress for its approval or disapproval, on an up or down vote.
- Agency actions to identify sites for consolidated storage or permanent disposal should be conducted in the context of the approved integrated national strategy. To avoid skewing development of the larger integrated national strategy, the new implementing agency should consider options for short-term, near-site storage of small amounts of SNF from shutdown reactor or other priority sites.

### **Authorities and Processes for Host State Interactions with Implementing Federal Agencies**

There are several reasons why specific authorities for prospective host states of consolidated storage or disposal facilities are appropriate:

- The U.S. is a federal system of government; federal political traditions are perhaps more prominent among the thirteen western states than among the thirty-five states to their east.
- Without a true partnership role with prospective host states, “the erosion of trust in the federal government’s nuclear waste management program” noted by the BRC is unlikely to be reversed, and trust restored.
- The history of the program since 1987 shows that, without the mutual obligations of partnership, federal implementing agencies are tempted, in the words of the BRC, “to force a top-down, federally mandated solution over the objections of a state or community (which)

far from being more efficient, will take longer, cost more, and have lower odds of ultimate success.”

- The management of SNF/HLW is unique among “national” programs: While SNF and HLW has been generated and is now stored at 75 sites in 40 states, and while 40 or more states could be affected by a long-term transportation campaign, only 3 or 4 sites (selected from perhaps 5 to 7 candidates) in perhaps 2 or 3 states are required for consolidated storage and/or disposal. For those few states that agree to be considered, the federal government can and should be willing to make special partnership arrangements.

The recommended guidelines include legislative elements:<sup>1</sup>

- Authorizing legislation should clarify that the implementing federal agency is required to comply with federal environmental laws, such as the Clean Water Act, the Clean Water Act, the Resource Conservation and Recovery Act, and the National Environmental Policy Act. The question whether the Atomic Energy Act exempts the implementing federal agency from such compliance should be clearly resolved.
- Authorizing federal legislation should clarify that the implementing federal agency is required to comply with state environmental laws, such as the laws regarding groundwater allocation and use in many western states.
- Authorizing legislation should provide funded monitoring and oversight authority to a prospective host state. The authority should enable the host state to conduct its own evaluation whether the project as proposed meets NRC/EPA standards and complies with federal environmental laws, and to submit its contentions in licensing.
- Authorizing legislation should enable a prospective host state to conduct an assessment whether (considering short and long-term economic, fiscal, social, transportation, health and safety and other relevant factors) the proposed consolidated storage or disposal facility is, on balance, good or bad for the host state.<sup>2</sup> The judgment should be made by the state legislature (each house) and Governor, and should be subject to review in the federal circuit court.

The recommended guidelines include procedural elements:

- The implementing federal agency should contact the Governors of all 50 states, stating that it seeks sites for consolidated interim storage and/or disposal, that it seeks a partnership with prospective host states in the siting process and any subsequent implementation process, and that it wishes to discuss the terms of such a partnership with no preconditions.
- If a prospective host state decides to discuss terms of partnership, the vehicle should be an enforceable agreement, based on phases of the siting and implementation process for consolidated storage or disposal facilities. The agreement should state what each party intends to do in the upcoming phase and outline the information sharing and consultation/decision process.
- Once an enforceable agreement is signed, it may be dissolved (or not renewed for the next phase) on specified grounds.

The implementing agency may dissolve the agreements:

- If it finds it no longer needs a site in the host state;

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<sup>1</sup> The authors have drawn on suggestions by Earl Potter and Geoff Fettus in this section.

<sup>2</sup> In other words, the host state should have authority in federal law to determine whether “their interests have been adequately protected and their well-being enhanced.” (BRC Draft Report, p. xiv)



- If it finds that the state has misused federal funds provided under the agreement.
- The prospective host state may dissolve the enforceable agreement:
- If the impact assessment discussed above indicates that the project is not, all in all, good for the host state.
  - If the state makes a finding (reviewable in federal circuit court) that the implementing federal agency, in its dealings with the state, has not acted with competence, transparency, and integrity.

### **Specific Guidance for SNF and HLW Transportation System Design**

The authorizing legislation for the new implementing agency should include specific guidance for SNF and HLW transportation. Specific guidance for transportation system design is needed for several reasons:

- SNF and HLW transportation within a national nuclear waste management system would have significant, widespread and long-term impacts. The public concern regarding the safety of SNF and HLW transport, combined with decades of cross-country shipments across many states and local jurisdictions, requires specific federal guidance in the authorizing legislation.
- Legislative guidance must also recognize the role of states and tribes in regulating and assuring transportation safety, and the increasing challenges of that role, given the nation's aging infrastructure systems, the difficulties in maintaining these systems, and their increasing congestion with other traffic.
- The reformulated program should make use of 25 years of collaborative effort by states working with DOE through state regional groups on the transport of transuranic wastes, spent nuclear fuel, and other radioactive materials. State agency expertise in transportation should be specifically recognized and systematically incorporated in a reformulated national program.

Guidelines for SNF and HLW Transport should include:

- Regulation of all SNF and HLW shipments by NRC and U.S. DOT, under the same safety and security regulations that would apply to shipments by utilities and other NRC licensees.
- A commitment to “best practice” in all aspects of transportation system design. In “best practice,” regulatory requirements are a benchmark, not a target. The system design objective is to identify the safest and most effective combination of modes, equipment, sequencing, routes, and operations. Factoring in the prospects for contention, lawsuits and delay, “best practice” is probably also the most efficient and least-costly basis for system design and operation. As in the WIPP transportation program, extra-regulatory requirements may be necessary to achieve public acceptance.
- A partnership with states, working through state-regional groups, and with Indian tribes, in transportation system design, similar to the WIPP transportation program. The objective is to enable corridor states and tribes to join the federal agency in saying to corridor communities, “This is the best way we know to do this job.” Partnership will present difficult but resolvable decision-making challenges for all parties. But resolution is required in order to provide the federal agency with needed partners in addressing the concerns and objections that will be encountered in hundreds of affected communities over decades.
- Adoption of the transportation safety and security recommendations of the National Academies in their 2006 report “Going the Distance?” [3] These recommendations reflect the

views of sixteen national experts, and are based on extensive input and public review over a two-year period. A newly-formed federal agency, working in close coordination with states, tribes and other key stakeholders, should be expected to implement these recommendations, or to persuasively explain why not.

## CONCLUSIONS

The recent termination of the proposed Yucca Mountain repository provides both an opportunity and a need to re-examine the United States' nuclear waste management program. The BRC Draft Report published in July 2011 provides a compelling critique of the past three decades failed efforts in the United States to site storage and disposal facilities for SNF and HLW. It is anticipated that the BRC Final report in January 2012 will recommend a new general course of action, but there will likely continue to be a need for detailed guidance on how to implement an alternative, successful approach to facility site selection.

Getting the nation's nuclear waste program back on track requires, among other things, new principles for siting—principles based on partnership between the federal implementing agency and prospective host states. These principles apply to the task of developing an integrated waste management strategy, to interactions between the federal government and prospective host states for consolidated storage and disposal facilities, and to the logistically and politically complicated task of transportation system design. Lessons from the past 25 years, in combination with fundamental parameters of the nuclear waste management task in the US, suggest new principles for partnership outlined in this paper. These principles will work better if well-grounded and firm guidelines are set out beforehand and if the challenge of maintaining competence, transparency and integrity in the new organization is treated as a problem to be addressed rather than a result to be expected.

## REFERENCES

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3. National Research Council of the National Academies, Committee on Transportation of Radioactive Waste, Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States (Washington, DC: The National Academies Press, 2006).