

Introspective Examination of the Issues Associated with the Nuclear Waste Disposal Confidence Situation - 14462

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ABSTRACT

Since January 2009, political and management actions by the Office of the President, the Department of Energy and the Nuclear Regulatory Commission have significantly altered the framework within which, and the course on which, the program to develop disposal capability for spent nuclear fuel and high-level radioactive wastes had been proceeding for nearly thirty years. A concomitant result of this action was placing in jeopardy the underpinnings of the Waste Confidence Decision, itself a nearly thirty year old policy that allowed the continued licensing and operation of civilian nuclear energy production reactors. This situation precipitated lawsuits in 2010 and 2011 by states, counties, and government agencies affected by the actions, seeking a writ of mandamus to force the Federal government to follow the directives of Congress as legislated in the Nuclear Waste Policy Act. The lawsuit specifically identified the Nuclear Regulatory Commission, and Gregory B. Jaczko, Chairman of the United States Nuclear Regulatory Commission, as respondents.

The U.S. Court of Appeals for the District of Columbia Circuit has recently issued its findings and a decision in favor of the plaintiffs in this case that could have significant implications about the legality of the actions taken. An earlier lawsuit, also decided in the plaintiff's favor by the U.S. Court of Appeals for the District of Columbia Circuit in 2012 found that the Nuclear Regulatory Commission had violated the National Environmental Policy Act in issuing its 2010 update to the Waste Confidence Decision and accompanying Temporary Storage Rule in its attempt to argue for a lengthened time for safe storage at reactor sites and defer indefinitely the country's commitment of a date specific for the capability to accept wastes at a repository for disposal. The Court vacated both the decision and the rule, and remanded the case for further proceedings. These findings will likely provide significant support to any future briefs filed by the anti-nuclear groups that are interested in limiting the Nuclear Regulatory Commission's ability to license reactors.

Initial reactions in the media reflect an understanding of the significance of the actions taken by the Senate Majority Leader and the President of the United States. They also show less sympathy with the Nevada state situation and greater concern for the citizens in the states where the spent nuclear fuel now resides. This may in fact indicate a change in public opinion regarding the implementation of a solution to providing nuclear waste disposal capability.

The paper provides an analysis of the various aspects of the situation at the end of 2013, and perspectives on what is likely to unfold in the coming years. It also supplements previous work addressing the role of Congress in the development high-level radioactive waste programs in the U.S., in particular, what has been referred to as "the Wisdom and Will of the Congress." The actions taken by the current administration may be interpreted as a lack of political will to solve the problem and place the licensing of new or refueling of existing nuclear power plants on hold.

INTRODUCTION

The federal government has attempted for the past 35 years to establish the disposal capability for high level radioactive waste [1]. The result of personally motivated political actions of two individual, the

President of the United States and the Majority Leader of the Senate, have set the stage for, and may intensify the consequences of, the approval of the latest version of the Waste Confidence Decision (WCD). Table 1 illustrates the basic requisites that appear to be the most prudent to follow in establishing high level radioactive disposal capability.

Table 1 Requisites for Achieving Nuclear Waste Disposal Capability

<p style="text-align: center;">Institutional Accountability</p> <ul style="list-style-type: none">- Abiding and Engaged Collective Congress :: Multiple Aspects<ul style="list-style-type: none">- Creation of Waste, Subsequent Remediation- Representative of the Body Politic <p style="text-align: center;">Institutional Responsibility</p> <ul style="list-style-type: none">- U.S. Department of Energy (Executive Branch)- Nuclear Regulatory Commission (Independent Agency) <p style="text-align: center;">Sense of Urgency</p> <ul style="list-style-type: none">- Competent, Quality Leadership- Integrity and Credibility of Institution<ul style="list-style-type: none">- Clear Vision of Success- Serious Commitment to Solve the Real Problem <p style="text-align: center;">Ability to Finish</p> <ul style="list-style-type: none">- by Institutions Responsible for Solutions- by Institution Accountable for Policy

The most important requisite, from an operational hierarchy perspective, is the institutional accountability for the issue. The accountable institution is the one that implemented the "root cause actions" that precipitated the issue. A federal government body, whose action is the root cause action, needs to remain in existence and engaged until the issue is effectively resolved. With regard to high level radioactive waste, the Collective Congress is that institution. Due to the long term nature of the resolution process, the institution must have an abiding character with the irrefutable authority to mandate, direct, and modify the necessary corrective actions.

The next most important of the four requisites is the ability to finish the effort once initiated. Too many times, action taken by the U.S. government never comes to fruition; they just don't finish. The DOE is rich with efforts that were great in concept with significant expectations, but evolved into ones that were terminated for a variety of reasons. Examples include the Isabella Project at Brookhaven, the Super Conducting Super Collider, the New Production Reactor, and the restructuring of the Weapons Complex. In the nuclear waste disposal capability arena, finishing is the imperative.

Recognizing the need for selective support in the siting and developing of the disposal capability for high level radioactive waste, the Collective Congress has taken a number of actions, illustrated in Table 2, to facilitate progress.

**Table 2 Congressional Actions to Promote Achievement of Nuclear Waste Disposal Capability
“Wisdom and Will of the U.S. Congress”**

<ol style="list-style-type: none"> 1. Established NRC and required independent scientific and technical review of proposed high level radioactive waste repository as a basis for construction authorization (1974) 2. Increased financial and personnel resources to conduct repository program (1974) 3. Maintained WIPP as a separate defense waste only repository and sited the facility through the established politically legitimate process (1980) 4. Through the NWPA, established the politically legitimate process for siting a repository for civilian high level radioactive waste (1982) 5. Conserved resources by early selection of a single site (Yucca Mountain) for characterization as the high level waste repository (1987) 6. Overrode the Nevada Notice of Disapproval of the Department of Energy’s Recommendation; President subsequently signed bipartisan Joint Resolution as Law (2002)
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One might ask why item three above is important to the disposal of high level radioactive waste. The answer to that question is that the WIPP project, the first mined geologic disposal facility built, followed closely the requisites noted in Table 1. Table 3 is a summary of the conditions that allowed that effort to be successful.

Table 3 Implementation of Requisites for WIPP

WIPP – Success in the Geologic Repository Siting Odyssey Following the Politically Legitimate Process	
Essential Element for Achieving Waste Disposal Capability	As Implemented in WIPP
Institutional Accountability	Collective Congress <u>HASC</u> <u>SASC</u> Mel Price John Stennis Pete Domenici
Institutional Responsibility	AEC/ERDA/DOE ORNL / SNL(after 1975)
Sense of Urgency * Serious Commitment to the Task * Competent Quality Leadership * Integrity of Institution	1972 – 1980 – 1987 – 1990 – 2000 (1980/1985/ promise) Wendell Weart (SNL 25 years) George Dials (DOE) Sen. Frank Church/ Gov. Cecil Andrus Sec. of Energy Bill Richardson
Ability to Finish	Critical Finishing Actions - Physical Facility Ready to Open - Resolution of Regulatory Requirements - Implementing the Transportation System

The critical element in the success was the degree to which the Chairman of the House Armed Services Committee (HASC) withstood all efforts to change the mission [2,3]. The radioactive waste that was to go to WIPP was created in producing nuclear weapons at the direction of the Congress. The HASC accepted accountability, and resisted efforts of the Secretary of Energy to convert the facility to a civilian high level waste repository, and the President's effort to terminate the project.

CONFIDENCE IN THE AVAILABILITY OF WASTE DISPOSAL CAPABILITY

The next critical question is, "Since the effort will take twenty plus years, how does the government establish and maintain confidence that the effort will be successful, that a facility to provide disposal capability will be delivered?" There are two fundamental requisites that the government has to ensure: 1) a competent scientific and technical solution; and, 2) the political will of the government to facilitate and implement the solution (regulatory decision). These are obvious in the first two congressional actions noted in Table 2. Additional details of what is expected within those two requisites for confidence in achieving waste disposal capability are as follows:

Requisite 1. Competent Scientific and Technical Solution (involves two parts by different government institutions)

- Proposal for the disposal facility and its implementation (DOE)
 - i. Adequate attention and support from the accountable institution, the Congress
 - ii. Identifying a suitable site
 - iii. Thorough characterization of the site
 - iv. Analysis and effective understanding of the site
 - v. Definition of the waste isolation system within the natural geology
 - vi. Development of an adequate subsurface and surface facility design
 - vii. Submission of a competent license application
 - viii. Complete the facility and operate it once construction authorization is received

- Independent Scientific and Technical Review of the License Application (NRC)
 - i. Adequate attention and support from the accountable institution, the Congress
 - ii. Established technical requirements vetted through a public review process
 - iii. Thorough review of the scientific and engineering features of the site and facility
 - iv. An effective representation of the case for safety developed and presented by NRC staff
 - v. Conduct public and transparent hearings before an administrative law court
 - vi. Make a regulatory decision providing a construction authorization

Requisite 2. POLITICAL WILL of the U.S. Government to implement the regulatory decision

- Measured but relentless political and societal implementation of the regulatory decision
- Congress cannot absolve itself of its accountability; it has to achieve the greatest good for the most citizens within the limits of real resources and real risks
- Follow the politically legitimate selection process outline in the NWPA
- Congress implements its policies that are manifest in statutes

There is a great significance to the first requisite for achieving confidence. The DOE and NRC are the responsible institutions that have the mission to propose and subsequently check the solution to the disposal capability dilemma. This evaluation must be absolutely free of political coercion. Buried in the execution of the first requisite are some very challenging requirements. The first is the requirement that

both the DOE and NRC establish and agree on the basis for fulfilling the criteria that there is confidence the facility will provide the specified protection for one million years. Nothing so draconian has ever been asked of the scientific and engineering community.

Next is the significant difference in the nature of the facility to be licensed. All previous facilities licensed by NRC have started with a flat surface and a facility for which the design and construction was under the complete control of man. The NRC historically has focused entirely on the control of the conception and creation of the structures, systems, and components that make up the facility. The repository is different in that a major portion of the facility, the waste isolation system, is in existence at the outset. The performance to be evaluated is, for the most part, on the molecular or atomistic scale. Understanding that existing system and its performance will require a significant level of scientific investigation and analysis. The dominance of the role of science in the license application for a repository truly is a first in the licensing effort and the regulatory decision. The toughest reality may be the fact that when NRC and DOE jointly enter the venue of the public hearings on the license application, they will have to execute that effort perfectly the first time.

THE SITUATION IN 2008

In 2008, the situation with regard to actually achieving the required and expected disposal capability was improving significantly. The Yucca Mountain License Application was filed in June 2008 [4] and subsequently docketed by the NRC in September 2008 [5]. This sent a message that the License Application was sufficiently complete that the NRC staff was willing to begin their detailed review. Importantly, because the staff had a limited time to prepare their Safety Evaluation Reports, there was also an indication that the staff had no obvious remaining significant technical issues with the site. However, there were political indications that were not positive. [6]

With regard to the WCD situation, the position articulated by NRC in the 1999 WCD document was that there was reasonable assurance at least one mined geologic repository would be available in the first quarter of the 21st century. With the license application in hand, the NRC was in a position to have improved confidence that the federal government would deliver on its scheduled projection in the Total System Life Cycle Cost Report of July 2008 [7].

IMPACT OF POLITICIAN'S INTERVENTION

In 2007, Senator Barack Obama made the decision to run for President of the U.S. Looking forward to the implementation of the campaign, Senator Obama's strategy focused on the leading Democrats in Congress. The Senate, with Harry Reid as Majority Leader was the obvious choice. For political negotiations to gain the Senator's initial backing, the tactic was simple, a promise to terminate the Yucca Mountain project in exchange for Senator Reid's support in the Nevada Primary and his Presidential Campaign if nominated by the Democratic Party. Senator Obama has articulated few thoughts about his concern about the situation with regard to Yucca Mountain; however in a letter to the Las Vegas newspaper [8] he stated: "I believe a better short-term solution is to store nuclear waste on-site at the reactors where it is produced, or at a designated facility in the state where it is produced, until we find a safe, long-term disposal solution that is based on sound science." In an October letter [9] to Senators Reid and Boxer he again stated his belief: "In short, the selection of Yucca Mountain has failed, the time for debate on the site is over and it is time to start exploring new alternatives for safe, long-term solutions based on sound science" (emphasis added).

The critical point in both letters is his unshakable belief that the current long-term solution, mined geological disposal was neither scientifically sound nor safe. The outfall of this belief became the basic justification for his orchestration of the termination of the Civilian Radioactive Waste Management

Program and attempts to annihilate Yucca Mountain as a viable repository site. Based on this simplistic and erroneous understanding of the situation, he would obliterate \$15 Billion in valuable intellectual investments and concomitant physical assets. Senator Obama's actions ultimately would call to attention the fundamental lack of integrity of the leadership in both the legislative and executive branches of government, and highlight unbelievable management incompetence. In an interview [10] in November after he met with Senator Obama and introduced him at a rally in Henderson, Reid was asked about the project's fate in an Obama administration. "Listen, Yucca Mountain's gone. Obama's president, Yucca Mountain's history," Reid said. Senator Reid had finally found a potentially powerful ally. The deal was sealed. Together, both would cause major damage to the repository program. Despite the fact that they were acting against established statutes, they projected the perspective that there would be no negative consequences of their actions.

Subsequently, Senator Obama was elected President in 2008. Upon taking office he did not hesitate to initiate his blitzkrieg to rid the Executive Branch of any vestiges of the Civilian Radioactive Waste Management Program. Carol Browner, a former Administrator of the EPA under President Clinton, and then the White House energy and climate "czar," was given the assignment to ramrod the execution of the President's beliefs. She noted "...as the president has said many times, we're done with Yucca and we need to be about looking for alternatives." According to national publication, "when asked why the administration has taken Yucca out of consideration, Browner said it was the president's choice and they were carrying out his decision." [11] Sounds much like WWII, "We are just following orders!" This is truly surprising for a former Administrator of EPA, the agency that took a strong stand against the Retrievable Surface Storage Facility (RSSF) in 1974 and instead insisted on a focused effort on permanent disposal [12], and the agency that established the radiation safety guidelines for repositories. [13]

Secretary Chu was directed to initiate efforts to eliminate the program in concert with a strategy that there would be no funding for the program in FY2011. By the end of September 2010, the federal government had no program for developing high-level radioactive waste disposal capability. While dismantling the program, Secretary Chu approached the NRC with a request to withdraw the License Application with prejudice [14]. A footnote to the filing indicated that DOE had no intention of resubmitting the application for Yucca Mountain. Fortunately, the Atomic Safety and Licensing Board (ASLB) determined there was no provision for such action in the statute and refused the request. So Yucca Mountain narrowly missed annihilation [15].

In May 2009, President Obama nominated Gregory Jaczko Chairman of the NRC. This was a demand of Senator Reid [16], that his former staff assistant, a PhD particle physicist, who was made an NRC Commissioner five years out of graduate school, with no real-world experience related to the nuclear energy industry or nuclear technology, be made Chairman of the Commission. Apparently, the new Chairman had but one mission and that was to make sure that the License Application review was not to be allowed to be completed. The tactic was to prevent the NRC staff from formally articulating their Regulatory Position regarding the Yucca Mountain site. Within that mandate, Chairman Jaczko was successful, but not without significant and observable institutional ineptitude and Kafkaesque circus. The Chairman of the NRC is an individual who is supposed to consider the total mission of the institution. Their dominant effort is regulating and assuring the safety of the nuclear reactors licensed to produce electric energy. An important ancillary effort is to make sure that there is work underway to provide disposal capability for the high-level radioactive waste generated by the reactors for which they are accountable. This has been an established requirement since 1979. From the initial formal WCD in 1984, the NRC could point to a real, ongoing government managed program with a real, but unfortunately changing date of availability. The attention to disposal capability was initiated by the pressures of the Natural Resources Defense Council (NRDC) with its petition in 1976 [17]. Its focus was very definitive:

to ensure that no additional high level radioactive waste was created by licensed nuclear reactors until disposal capability was at hand.

By 2008, when the Yucca Mountain License Application was submitted to NRC [18], the capability to dispose of high-level radioactive waste was becoming a reality. Over the next three years the NRC reviewed the documentation of the proposed site and its waste isolation capabilities. Based on the three Technical Evaluation Reports subsequently issued, many readers individually concluded there was every indication that the NRC staff considered the site to be acceptable. If the NRC would have been allowed to issue the remaining Safety Evaluation Reports, which would establish the NRC staff's Regulatory Position regarding the Yucca Mountain site, the position of the NRC in approaching the WCD process would have been stronger. With the termination of the repository, however, waste confidence, the confidence that there would be available disposal capability, became tenuous. Once the public hearings, in which the NRC technical staff would have to make the argument to grant a construction authorization before the ASLB, were successfully completed, the action remaining for providing waste disposal capability would be to construct the facility. This was well within the capability of the industry in the U.S.

The Chairman, despite the looming requirement to justify the continued operation of the nuclear power plants in the U.S., chose to scuttle the effort to complete the preparation and issuance of the SER documents [19]. Now, the NRC, without the ability to reference a real repository program, since it had been completely obliterated by September 2010, was faced with no potential site or existing program to reference. For the last twenty years, while the Yucca Mountain program was struggling to solve a variety of technical issue and address congressional direction, the NRC still was able to make the following finding (2): There is reasonable assurance that at least one repository will be available in the first quarter of the 21st century. Table 4 provides a comprehensive picture of the situation.

Table 4 Performance of Accountable and Responsible Institutions

<p>Legislative Branch Leadership</p> <ul style="list-style-type: none"> - Senate - Majority Leader prevents funding of DOE's and NRC's efforts <p>Executive Branch Leadership</p> <ul style="list-style-type: none"> - White House - President - Orchestration of Destruction Strategy <ul style="list-style-type: none"> * Staff Management - Ramrod Destruction - Integrity in Question * President's FY2011 Budget - No Funding Requested - No Intention to Support - Department of Energy Secretary - Strategy Implementation - Integrity in Question <ul style="list-style-type: none"> * Terminate Program and Staff * Annihilate Site (\$15 Billion Investment and Assets) * Pursue BRC Proposals - Large Unacknowledged Transfer of Risk <ul style="list-style-type: none"> + Consent-Based Siting Gambit - Actual Siting Unlikely + Non-government Institutional Responsibility - Poor Provision for Science <p>Independent Agency Leadership</p> <ul style="list-style-type: none"> - Nuclear Regulatory Commission Chairman Intervention <ul style="list-style-type: none"> * Single Personal Mission - Terminate License Application Review * Primary Institutional Mission - WCD - Apparently not important to Chairman * NRC Political Leadership - Institutional Loyalty and Integrity in Serious Question <p>Significance</p> <ul style="list-style-type: none"> - The entire U.S. Government is on formal record as being against completing the effort to establish nuclear waste disposal capability when its ability to do so was quite possible. - In the Court's review of the WCD, this sends a message that the judges cannot fail to see

This summary illustrates two fundamental elements of destruction. First, it shows the complete elimination of the federal government's (DOE's and NRC's) efforts to provide disposal capability. Second, it shows that an alternative form of institutional accountability in the personalities of Reid and Obama was put in place. These two do not, however, constitute an abiding accountable institution in the context of the Collective Congress of the U.S. Reid and Obama constitute an ephemeral, ad hoc political coalition addressing only their personal political agendas. A pressing, significant question remains: after they have disappeared from the political scene, which institution can be held accountable and have the authority to direct corrective action. Once the accountability has been wheedled away from the Collective Congress, what official federal government body will be able to set the policy and delegate responsibility?

The consequences of individuals taking control of decisions that are rightfully those of the Collective Congress are far reaching. Within the concept of Consent-Based Siting advocated by the Blue Ribbon Commission, this model allows states to acquire absolute veto authority. In the days during which the NWPA was being developed and passed, the absolute veto was viewed by both the Senate and House as a fatal provision. Even its advocate, Senator Proxmire, the most strident proponent of the absolute veto, when confronted with the consequences of the issue, agreed to retreat to the dual override provision.[20, 21] So the concept that currently is in such political favor, Consent-Based Siting, was once considered and rejected in deference to preserving the Congress' authority to solve the real problem. The recent actions will provide the Appeals Court with a very bleak picture regarding the ability to have confidence that the federal government will have the ability to provide nuclear waste disposal capability.

THE BLUE RIBBON COMMISSION CONJURATION

On January 29 2010, the President directed Secretary Chu [22] to establish the Blue Ribbon Commission on America's Nuclear Future (BRC) to consider alternative solutions to creating the disposal capability for nuclear waste. With regard to membership of the Commission, the Secretary was instructed to select members that "include recognized representatives and experts from a range of disciplines and with a range of perspectives and may include participation of appropriate Federal Officials." [23] The Commission established by Secretary Chu does not appear to be well matched to the subject to be considered. The Commission comprised four politician that served in the U.S. Congress (two representatives and two senators), three individuals that served in top level administrative positions in the federal government, five individuals from academia (two administrators, two professors and one associate professor), two from private industry and one labor organizer. [24]

In the subsequent effort to conceptualize a serious path to success, the Commission held hearings around the U.S. and traveled to Europe to gather information, insights and practical perspective from firsthand experience. However, it is not obvious that any profound understanding was gained; rather, their conclusions appear to be based on only the superficial aspects of the topics they examined. Based on an attentive reading of the final Report [25] prepared by the Commission, a number of unsettling characteristics are obvious. With regard to their two flagship recommendations, 1) Consent-Based Siting, and 2) Alternative Method of Management, they were seriously inadequate in the context of the significance they held for the country's future. This conclusion was reached considering the following, 1) the imbedded assumptions not articulated, 2) the subjects that were inadequately or not addressed, and 3) outright misrepresentations. Possibly the most egregiously misrepresented claim in the report is related to the site selection process for WIPP. The BRC's definition of consent-based is: "affected communities have an opportunity to decide whether to accept facility siting decisions and retain significant local control" [26]. The focus is on the opportunity for the host state to accept or reject the action. It is clear that there was local (in Carlsbad) support for the facility. However, the facility was defense related and the authority for selecting such sites rested solely with the Congress under provisions of the constitution. The single person most responsible for the selection of the site was the Chairman of the HASC,

Congressman Mel Price. Formally, the state government had no say in the process; this point is very well documented [27]. Apparently this important fact was not noticed in the BRC's research into the history of the situation or the point was intentionally manipulated. Furthermore, there is also no real discussion of the reaction of the state when the DOE attempted to change the mission to include civilian high level waste; the state's political leaders and its Congressional delegation, including Senator Domenici, objected with outrage. This point was not emphasized; potentially because it would show consent-based siting would not be of help in siting a high-level radioactive waste repository, or possibly an interim spent fuel storage facility.

There is an intriguing and fatal inconsistency associated with the definition of Consent-Based Siting. In the definition, the focus is on the authority of the local government; there is no acknowledgement of the sovereign state government's role. According to the 10th Amendment of the Constitution, authority not given to the federal government is assigned to the sovereign state government. Therefore the primary responsibility to participating in Consent-Based siting belongs to the state government, unless they delegate it to a lower level of government authority. First, it definitely appears as though the BRC is skirting the idea of state government involvement. Secondly, they provide the following and not so subtle guidance buried later in the report: "... and local support, however, has not been sufficient to overcome state-level opposition. This suggests that to be successful, a new waste management organization must find ways to address state concern while at the same time capitalizing on local support for proposed facilities" It is telling the new organization to be created that the BRC concept of starting at the local level is imaginative, but in no way guarantees success. This is, in effect, a latent admission that their proposal has no more chance of success than the one undertaken by ERDA in the fall of 1976.

It is obvious to anyone that has managed an effort to select and justify the technical attributes of such a site that the Commission members lacked experience in the political and technical aspects of siting a controversial facility or the technical competence with regard to management of the scientific organization that would have to build and defend the case for site acceptability. It should be recollected that failure to understand the significance of technical information and rushing forward to satisfy a political agenda was the basis for the selection of, and failure at, Lyons, KS. It is not uncommon that those that fail to understand history are likely to repeat it. One might ask the question, "Why not involve someone that understood the position of the governors of the states?" The National Governors Association (NGA) was involved in the previous siting efforts in 1976 through 1987. An individual such as Holmes Brown, who was the point person for the NGA in the 1978 to 1982 period, could have been solicited to provide critical insights and help vet the proposal.

In establishing the scientific and technical basis for the site and repository design, a very broad spectrum of scientific, technical, and engineering expertise is required. Because of the contentious nature of the issue and the seriousness of the final licensing review, the justification for the site and design will be challenged rigorously. The review that is to come is expected to be filled with suspicions, contentions, and thoroughness under the formal rules of evidence before an administrative law court, with cross examination by competent and hostile adversaries. For the discipline needed in the planning, execution, documentation, and review of the work that is the basis for the decision, a very competent and experienced scientific organization will be necessary. This is not likely to be readily solicited in a standard Request for Proposals aimed at engineering and construction firms. It would have been instructive for a former director of a major laboratory to have been on the Commission. The head of a university department is not comparable to the director of the disciplined operation of a scientific laboratory that is continuously involved in contentious and high profile issues.

With the only recommended path forward on the table being Consent-Based Siting, it appears that the Obama Administration has accepted this highly questionable paradigm. The Department of Energy issued a plan to implement the recommendations of the Blue Ribbon Commission [28]. The Department's plan

included a pilot-scale interim storage facility operational in 2021, a consolidated interim storage facility operational in 2025, and a geologic repository, sited using a consent-based process by 2026, designed and licensed by 2042, and operational in 2048. An evaluation of the potential time needed to accomplish even the first phase [29] concluded that even under optimistic estimates of the time needed to change U.S. disposal policy and enact it in law; promulgate new regulations; identify a site(s) using a consent-based process; and build the facility is probably closer to twenty years than the eight in the DOE plan. More than a year, one-eighth of the time projected by DOE, has passed, and nothing has happened. Given the impasse between the House and Senator Reid, nothing is likely to happen soon, rendering this plan meaningless.

LEGAL ACTION AND CHANGES IN MEDIA PERSPECTIVE

While the Administration and Senator Reid boldly assumed their success in destroying the Yucca Mountain program was assured and set out to create a new path forward oblivious to existing law, a number of government and citizen entities were seriously outraged by the federal government's attempt to withdraw the license application and cease work on the Yucca Mountain program. The actions they took and the responses of the Court are described in detail elsewhere [30]. The ultimate result, of the series of significant legal actions on the variety of issues that were filed and addressed, was the conclusion by the Court of Appeals for the District of Columbia Circuit [31] that *we therefore have no good choice but to grant the petition for a writ of mandamus against the Commission*. In doing so, the Court ordered the NRC to move forward with the licensing process and approve or disapprove the DOE's license application for the Yucca Mountain nuclear waste repository. The decision noted that regardless of any underlying policy debate, the NRC could not continue "flouting the law," and that "the President may not decline to follow a statutory mandate or prohibition simply because of policy objections."

Several journalists have been willing to call out Senator Reid as the perpetrator of this current disruption of the development of nuclear waste disposal capability. A very insightful article, just after the mandamus decision was announced [32], brought to the surface the true nature of Harry Reid's obsession with Yucca Mountain, noting, "[a]ccording to Senate Majority Leader Harry Reid, the Yucca Mountain nuclear-waste repository in his home state of Nevada is dead, dead, dead, and no amount of huffing from the judiciary changes that. Don't believe it." The article also focused on the degree of politicization Reid pursued to get a member of his staff in a place of authority in the NRC. The effort to manipulate one of the most important safety regulatory agencies in the U.S. government was laid bare. "It was Mr. Reid who in 2009 demanded President Obama elevate Mr. Jaczko to chief of the NRC, where his puppet would go on to withhold and manipulate information about Yucca (according to an inspector general report), bully staff, and unilaterally run the place. When Mr. Jaczko last year resigned in disgrace, Mr. Reid installed as chief another anti-Yucca partisan, Allison Macfarlane, and he has used his Senate power to deny the project money." Senator Reid remains set on control of the License Application review effort. The article also made clear the degree of opposition that is just below the surface and potentially growing, "[a]nd this is Mr. Reid's second problem: There is huge support to do just that. The House in July voted overwhelmingly—335 to 81—to block Nevadan Joe Heck's attempt to strip from an appropriations bill \$25 million for Yucca. A whopping 118 Democrats voted with Republicans, including Democratic Whip Steny Hoyer and Assistant Democratic Leader James Clyburn." This article presented two points, the degree to which Senator Reid is contemptuous of major government institutions including the judicial system, and especially, the integrity of the regulatory agency as an institution responsible for the protection of the public's health and wellbeing. Also noted was the latent unhappiness with the Senate Majority Leader to destroy the solution to the problem from 34 states that have the waste. In describing the essence of Harry Reid, who has taken on the role of "Vigilante Regulator," the article notes "Mr. Reid isn't the nation's nuclear regulator, and he isn't a law unto himself. The D.C. Circuit Court has given Congress a new chance to remind him of that." There is only so long that one can tickle the tiger's tail.

Several days later another article got at the sense of lawlessness that the current administration and congress is pursuing [33], noting, “[t]he court, which was concerned only with the law, not the mountain, said “the president must follow statutory mandates so long as there is appropriated money available and the president has no constitutional objection to the statute.” He has none, and Reid has not yet quite succeeded in starving the NRC.” With regard to the brash and unpalatable action of the NRC Chairman, Gregory Jaczko, the article emphasizes, “[t]o be fair to him, he was put there to disrupt. He was put there by Nevada’s Sen. Harry Reid, on whose staff he had served.” The article further chastises the integrity of the NRC political leadership, “[t]he court noted that, ‘as a policy matter,’ the NRC may want to block the Yucca project but ‘Congress sets the policy, not the commission.’ And the court said there is no permissible executive discretion to disregard ‘statutory obligations that apply to the executive branch.’” Here, the article captured the essence of the incompetence and lack of integrity that exist in the effort to prevent the U.S. government from implementing nuclear waste disposal capability at a site that is appropriate for the task: “[t]his episode is a snapshot of contemporary Washington -- small, devious people putting their lawlessness in the service of their parochialism, and recklessly sacrificing public safety and constitutional propriety. One can only marvel at the measured patience with which the court has tried to teach the obvious to the willfully obtuse.” This situation has never been so eloquently stated. Reporting clearly that the courts have made a conclusion that the culprits in the situation are the Senate Majority Leader and the President, they are in effect “selfies” looking out after their own private interest, not the citizens they are supposed to represent. When one finishes reading these two commentaries, one can readily comprehend Obama and Reid in the context that neither has anything constructive to offer that would contribute to the solution of the problem. Their focus is to maintain the status quo, there is no evidence of movement since the BRC completed its report. These commentaries, by two accomplished and respected journalists, represent a significant breath of fresh air from the normal anti-nuclear, anti-Yucca Mountain stance of the media. They clearly point out who the villains are in this odyssey. It might be an omen that the media is beginning to understand the issue and the self-centered interventionists.

NRC POSITION PURSUANT TO THE WRIT OF MANDAMUS

The significance of the Court of Appeals Writ of Mandamus [34] against the NRC is that it not only directs the NRC essentially to reset its position with regard to reviewing and approving the License Application, it also potentially has a significant impact on the findings in the WCD. The simple fact is that the Chairman of the NRC was the sole reason that the License Application review was terminated. His action threw the situation with regard to near term achievement of disposal capability into chaos; the action changed drastically the picture of disposal capability achievement. Finding (2) could have read as “repository is in the final phase of regulatory approval for construction authorization. If successful, it can be expected to be operational by the first quarter of the 21st century.” Instead it reads as (2) the required disposal capability will be available when needed [35]. In historical context, it is a shame faced excuse for the complete failure of the political will of the federal government. This position will be likely to have all of the substance and credibility before the Court with regard to real expectation of disposal capability availability as a grade school kid’s plea to a teacher that, “The dog ate my homework.” In the decision regarding the Writ of Mandamus, the Court of Appeals recognized and remediated the inappropriateness of Gregory Jaczko’s actions as NRC Chairman [36]. The NRC now has a second chance to do it properly with perceptive attention to the appropriate set of priorities.

Now, the current Chairman has the opportunity to change the actions that can favor the NRC position with regard to the WCD. While it may not be possible with carry-over funding to complete the entire License Application review through public hearings before the ASLB with a regulatory decision to grant construction authorization, the NRC can complete and formally issue the remaining three SERs. This will establish the NRC formal Regulatory Position on the Yucca Mountain Project. It will allow for an improved level of confidence regarding the technical ability (Requisite 1) to provide actual waste disposal capability. It definitively places the solution of the funding issue clearly in the lap of the US Senate since

the bipartisan House is definitively on record (335 to 81 vote) as wanting to fund the effort. It should clearly focus attention on Harry Reid's intransigence and the government's political will (Requisite 2).

Now the NRC Chairman is in a difficult situation. Chairman Macfarlane is caught between the Court's mandate to restart the license application review and the expectations of Senator Reid to prevent issuance of the SERs. Such would constitute public announcement of the NRC's willingness to argue before the ASLB that the Yucca Mountain meets the regulatory requirement for safety and that a construction authorization should be granted. The path forward will depend on how the Commission votes on the issue. On November 18, 2013 the Commission voted 4-0 to move forward with restarting the License Application Review [37]. The Commissioners outlined a list of three actions that needed to be addressed, although the adjudication remained suspended. While the Chairwoman voted to restart, her expected strategy and practice is to proceed with *all deliberate slowness*. While the completion of the SERs is noted as top priority, with the need to restaff following reassignment of the technical staff, much time will be required to review and approve the SERs even if there is sufficient funding to get them completed. Judge Garland provided her with great advice, follow the law, be diligent in meaningless detail so you look proper; thereby, Senator Reid's mandate will nonetheless be achieved in following the law.

The consequence is that there will be no official regulatory staff position regarding the capability of the site to provide the disposal capability required for the spent fuel. So there will be no evidence that the two government agencies involve, DOE and NRC, are competent to execute the responsibility that was assigned to them by Congress. Success in demonstrating the technical capability of disposing of high level radioactive waste noted above is a competent solution to the issue and the political will of the Federal government to implement the regulatory decision. In this situation, both will be missing.

POTENTIAL "PERFECT STORM" CONDITIONS FOR ANTI-NUCLEAR ORGANIZATIONS

There is a clear nexus between the conduct of the federal program to deliver the disposal capability for high level radioactive waste and the confidence that the NRC can have that the waste they allow to be created through the approved operation of the country's nuclear power plants can be disposed. In a previous paper [38], the nature of the actions by the government, over a significant period of time to put that capability in place, were summarized. It was a series of actions that were not well conceived and had many shortcomings. It was certainly inefficient and required more resources than proposed or expected. Significant new scientific and regulatory challenges had to be overcome. Yucca Mountain was identified as the site to be first to be fully characterized and presented for review by the authorized regulator. Yucca Mountain was first considered in 1978 and formally approved in 2002 (24 years later) by both Houses of Congress following the politically legitimate siting decision process specified in the NWPA [39]. Six years later, the License Application was presented to the NRC in June of 2008 [40], which, after careful preliminary review, was formally accepted and docketed in September 2008 [41]. The NRC had been following the Yucca Mountain project carefully after they assigned their first on-site representative to the project in 1984. Their attention was focused to a greater extent on Yucca Mountain when the other two repository projects were discontinued by Congress in 1987. In 2001, as required by the NWPA, the NRC sent a letter to the DOE indicating, in their technical and regulatory judgment, sufficient at-depth site characterization analysis and waste form proposal information, although not available now, will be available at the time of a potential license application such that development of an acceptable license application is achievable [42]. So, by all indications, it appeared that the stage was set to have the final independent technical review of the proposed site, a transparent review fully open to the public, and if the process came to completion and the NRC's ASLB was convinced that all requirements were satisfied, formal approval could be given to initiate construction of the repository that would provide the necessary disposal capability.

The adversaries to nuclear energy will attack the position of the federal government that has changed so drastically and incredibly in a short period of time. A bizarre picture of a convulsing federal government will be paraded before the Court of Appeals; one that can only cause the Court of Appeals to question the rationality and integrity of the federal government. The actions of the Senate Majority Leader and the President will give the adversarial organizations great encouragement because now they will have an unusual opportunity with new leverage to make the strongest possible case against nuclear power.

The “perfect storm” is brewing on the horizon, due to the lack of POLITICAL WILL to move forward with the mandated solution that had the chance of meeting the regulatory requirements. The Court will find that there is no competent technical disposal solution confirmed by independent regulatory review, and supported by official records. The Court will see that the Congress, the accountable institution, has for several years refused and has no intention to fund the execution of its legislation. The Court will see that the Executive Branch, beginning at the level of the President, took great care to destroy every vestige of the program. The Court will see that the Executive Branch attempted to annihilate the \$15 billion of intellectual investment and physical assets by withdrawing the License Application with prejudice. The really unusual action that the Court will see is the fact that the Chairman of the NRC, the person with the ultimate responsibility for achieving waste disposal capability, was singularly responsible for the premature and unjustified termination of review of the Yucca Mountain License Application. The Court will see that the NRC’s political leadership, given a second chance with adequate resources, to establish their independent judgment regarding the Yucca Mountain site will have failed to accomplish this essential objective. The Court will see that the sister Appeals Court has determined that both the President and the Chairman of the NRC had violated the statutes in the process of pursuing their bizarre course of actions. The Court will see in another Appeals Court of the DC Circuit determination that the DOE has failed, on remand, to respond competently to its direction and did not comply with the statutes related to the repository development. This failure of the current Administration’s political leadership precipitated a stiff rebuke from the judge who subsequently stated: “Because the Secretary is apparently unable to conduct a legally adequate fee assessment, the Secretary is ORDERED to submit to Congress a proposal to change the fee to zero until such a time as either the Secretary chooses to comply with the Act as it is currently written, or until Congress enacts an alternative waste management plan.” The significance is that the Court, based on material evidence, determined that the Federal government has no real intent and no real capability to fulfill its mandate. They will see that the Executive Branch had pursued a political course of action that has little chance of succeeding in producing disposal capability. They will see that the government has pushed out the delivery of the disposal capability by at least another 35 years. The Court will see absolutely no material evidence on which to establish a foundation for confidence; there is no doubt that they will see a petitioner’s demand for that material evidence demonstrating confidence that disposal capability can be provided by a totally dysfunctional Federal government. Since the petition regarding the issue in 1976 by the NRDC, the Federal government, despite the successes of the DOE and NRC scientists and engineers in offering and confirming a sound solution, has continued to conduct a “bait and switch” gambit. It has neither intent nor political will to provide the required disposal capability!

However, the greatest advantage for the adversaries to nuclear energy is the proposal of the Administration to pursue Consent-Based siting. Table 5 presents the interrelationships that exist between repository Consent-Based siting and the requirements for establishing confidence that disposal capability will be achieved. The pivotal factor is, “Who gets to make the decisions?” In one case it is the court; in the second it is the state government. Neither have a responsibility in achieving disposal capability. The critical point is that the same adversarial organizations opposed in the past likely will strongly oppose a repository siting effort at state level. This is incredible new leverage that has been provided to those that oppose nuclear power. The same group of adversarial organizations will continue to demand that nuclear power can only continue to operate if there is material evidence that the federal government is capable and willing to provide regulated disposal capability. With the efforts of the current Administration and

the Senate Majority Leader, there can be little in the way of material evidence, presented to the court, that disposal capability can be a reality.

Table 5 Framework for the anti-nuclear activist to ensure that disposal capability will not be achieved

The Potential Ideal Storm As Delivered to Anti-Nuclear Activists For Eliminating the Nuclear Option		
Repository Related Action	Decision Making Institution	Expected Institutional Opposition
Whatever/Whenever Don't Worry, Be Happy Strategy NRC Confidence Rulemaking	Courts	NRDC et. al.
Consent – Based Interim Storage Facility Siting Consent – Based Repository Siting	State Government Media as Agitator	NRDC et. al.

CONCLUSIONS

It is abundantly clear that the process of disposing of high-level radioactive waste is one that has both scientific and technical elements, as well as political and societal components. The “political will” to implement, or even allow the technical solution to be openly validated is the major stumbling block to success. Here, politics, no matter how ill informed, will always trump science, no matter how valid and compelling. Despite the numerous bogus arguments it presented, the BRC did the country one service when it validly acknowledged that other nations in the world have established that mined geological disposal is a safe disposal practice based on sound science. This unquestionably repudiates the bogus belief of the President that was his basis for terminating the U.S. repository program.

The paper has presented a basic model that defines the framework for establishing confidence that disposal capability will be provided. It provides the basis for identify the elements of the requisites that are being abused.

The original WCD and the first two updates shared an attribute that made them meaningful as a response to the NRDC petition and the Minnesota lawsuit; it could be said that the Federal Government at least endeavored to be responsive to the situation that led to the petition and lawsuit. As long as there was a meaningful commitment to disposal, plagued as it was by inefficiency and missteps, a defensible argument could be made that there was evidence of a solution pathway. With the third update of the WCD, in 2010, however, that commitment and evidence was erased.

The NRC’s “Whatever, Whenever – Don’t Worry be Happy Strategy” is not likely to have any more credibility in its inevitable appearance before the Court of Appeals than an elementary student’s whimpering “the dog ate my homework.” It is difficult to understand how top government officials, supposedly well-educated with excellent experience, can approve what is basically an excuse and not a

viable path forward. This is possibly the best chance the NRDC et. al. have in prevailing before the Court. The overarching question remains, “What are the sanctions the Court will likely impose?” The Court is in an incredibly complex and delicate position when concerned only with its mandate and not the consequences of its most obvious remand.

Within a very diverse framework, the Court will be presented with a troubling picture of a Federal government that is totally dysfunctional with regard to the issue of executing the laws for protecting the population from a significant, persistent (centuries) and technically mitigable radiological hazard. Under the Administrative Procedure Act, the public can ask for assistance of the Court to clarify the actions that will protect their interest and well being as a citizen when administrative agencies fail in their assigned responsibilities. With no credible material evidence of a solution to the problem currently available, should the Court continue to sanction making the hazard and concomitant risk larger on a daily basis? Or, should the Court send a message to the Federal government that it needs to take prudent and timely action to implement the known solution that is currently available? If not, should the process of continual creation of the risk be stopped? Should there be consequences capable of motivating the accountable political body to get engaged?

The most newsworthy sound-bite regarding this continually evolving odyssey is from Pogo Possum (circa, 1970), “We have met the enemy and he is us.” Stay tuned; film at 11!

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