

Resuming Yucca Mountain Licensing in a Post-Blue Ribbon Commission World – 14560

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ABSTRACT

It has been over 3 years since the Department of Energy (DOE) terminated the Yucca Mountain project. To many, this has been an agonizingly long period. But in geologic time, it is merely the blink of an eye. An August 2013 ruling by the US Court of Appeals has raised the intriguing possibility that the world's eyes might again be coming open to look anew at the potential for disposal of used nuclear fuel and other high level radioactive wastes in the Nevada desert.

In the wake of the Court decision, proponents of the Yucca Mountain project have called for the resumption of the Nuclear Regulatory Commission (NRC) licensing process. However, there is considerable uncertainty as to just how this could be done. The NRC appears to have sufficient funds to complete and publish its final Safety Evaluation Report (SER) – documenting the regulatory conclusions of NRC's technical staff. However, before a licensing decision can be reached, the second phase of the licensing process, involving the adjudication of nearly 300 contentions must also be completed. This is seen as likely to be time consuming and expensive as Yucca's opponents, most prominently the State of Nevada, vigorously pursue their contentions – protracting the litigation beyond what Congress is likely to fund. Furthermore, an adversarial legal proceeding, in which DOE seeks to overcome the objections of the host State would appear to be entirely inconsistent with the Recommendations of the President's Blue Ribbon Commission for "consent based" repository siting.

But what if these contentions could be treated as something more than just points of dispute? What if they could form a platform for defining research and development (R&D) programs to confirm long-term safety and improve the repository? In such a model, DOE and the intervening parties could negotiate settlements to many of the contentions by forging mutual commitments to R&D programs designed to further address the fundamental safety questions at issue in each dispute. If both parties to the settlements had the authority to judge the satisfactory completion of these R&D programs, the State of Nevada would have a much stronger role in assuring the safety of its citizens – something that is very much needed for the process to achieve "consent". NRC could proceed towards making its initial licensing determination – an authorization to construct the repository – while these R&D programs were underway. R&D program would then inform subsequent licensing decisions to receive and possess nuclear materials or to close the repository.

NRC's existing regulations (10 CFR Part 63.21(c).16) already provide for such an approach, allowing for R&D programs "to resolve safety questions, including a schedule indicating when these questions would be resolved". The current license application does not utilize this provision, instead including, as Chapter 3, only a placeholder stating that DOE "pursuant to 10 CFR Part 63.21(c).16, has not identified any safety questions". However, taking a second look at

the safety questions embedded in the intervening parties licensing contentions could offer a better way forward.

INTRODUCTION

There has been longstanding scientific consensus that permanent disposal in a deep geologic repository represents the most appropriate and safest approach to the long term management of used nuclear fuel and other high level radioactive waste. Since 1957, when the National Academy of Sciences (NAS) concluded “radioactive waste can be disposed of safely in a variety of ways and at a large number of sites in the United States” [1], the nation has been actively working to develop a geologic repository to do this. These efforts began with the investigation of a salt site in Lyons, Kansas in the 1960s, progressed through the consideration of 9 sites in 6 states in the 1980s [2], and for the past 25 years have focused on the Yucca Mountain site in Nevada. During this time, mankind has sent a man to the moon, invented the personal computer, and refined digital technology to the point where the average teenager now has more computing power in the palm of his or her hands than the Apollo 11 astronauts had in their entire spaceship. So why, if all of this can be accomplished through continued advances in science, is something for which the science has been firmly established for so long been so hard to accomplish? While pointing to any single factor may be an oversimplification, the success with which repository opponents have been able to use political processes to delay and eventually stop proposed projects has certainly been a key factor. Upon observing this history of state and local government opposition, a 2012 study of the problem by the President’s Blue Ribbon Commission America’s Nuclear Future recommended “a new consent-based approach to siting future nuclear waste management facilities.” [3]

The Blue Ribbon Commission (BRC) recommendations came in response to the Department of Energy’s 2010 declaration that “Developing a Repository at Yucca Mountain, Nevada is not a workable option” [4]. Since then, policy-makers have been debating the topic of exactly how to launch a “consent-based” process to replace the Yucca Mountain option. Unfortunately, neither the BRC nor anyone else who has studied its recommendations has been able to come up with a well-defined process to accomplish this, hence the concept of precisely what is meant by “consent” remains elusive. DOE is currently focused on trying to embark on a path that will be “governed by legally-binding agreements between the federal government and host jurisdictions” [5].

DOE’s current path appears to be based on the widely accepted belief that consent must be secured at the outset of the repository development process. But the experience at Yucca Mountain offers an interesting counter-example. In 1975 the Nevada State Legislature passed a resolution in supporting the “storage and processing” of used nuclear fuel in the vicinity of Yucca Mountain [6]. But over time things changed – and Nevada’s political leaders continued to shift towards ever more staunch opposition until they were eventually able to use their growing influence in national politics to gain DOE’s 2010 reversal of course on the project. If there is anything that can be learned from this, it is perhaps that consent may not be something that can be given or acquired at the beginning of a process. Lasting consent must be supported by actions that, over time earn and continually build trust. In this construct the building blocks of consent are found less in agreements signed at the beginning of repository development, but

more in the never ending work of establishing and maintaining confidence in the hearts and minds of those who are most concerned with the project's safety. And, if consent is, indeed, something that can be, and in fact must be, earned over time, then perhaps it is not too late for Yucca Mountain.

BACKGROUND

In 1983, the Nuclear Waste Policy Act (NWPA) [7] provided for the owners and operators of the United States' commercial nuclear power plants to enter into contracts with the federal government for disposal of the used nuclear fuel arising from the operation of these plants. These contracts obligated the US Department of Energy (DOE) to provide disposal services to every one of the nation's commercial nuclear reactors and, even today, companies seeking to license new commercial nuclear plants are still entering into such agreements with DOE. In 1987, the NWPA was amended to focus DOE's disposal program solely on a proposed repository site at Yucca Mountain Nevada. In 2002, the Yucca Mountain Development Resolution (YMDR) [8] codified in federal law DOE's determination that the Yucca Mountain site was suitable for the development of a repository and directed the Department to proceed with the process outlined in the NWPA by which DOE would seek licenses from the US Nuclear Regulatory Commission.

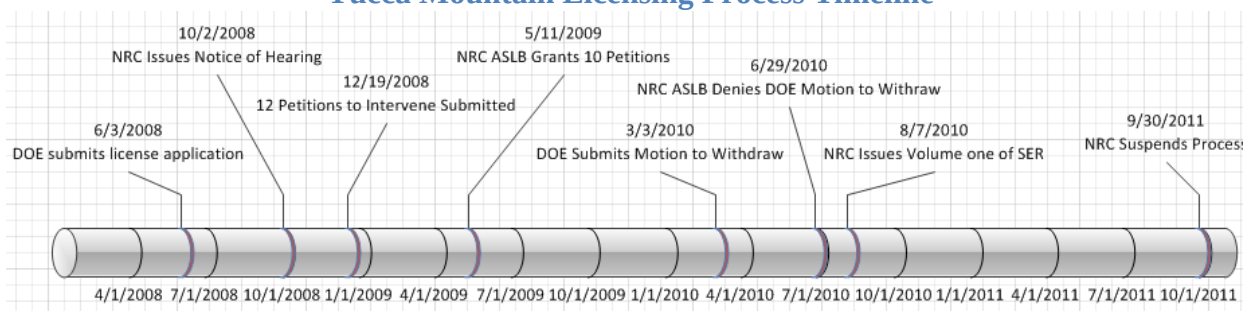
In accordance with the NWPA, the Nuclear Regulatory Commission (NRC) established regulations governing the "Disposal of High-Level Radioactive Waste at Yucca Mountain, Nevada". In 2001, these regulations were promulgated as 10 CFR Part 63[9]. Under this regulation DOE would need to obtain three separate NRC approvals to develop the repository in stages – a Construction Authorization, a License Amendment to Receive and Possess Nuclear Material at the Repository, and a License Amendment for Permanent Closure of the Repository. 10 CFR 63.21 outlined requirements for DOE to submit a license application that would be reviewed in accordance with NRC's established licensing practices in two distinct phases – a technical review by NRC staff which would culminate in the issuance of a Safety Evaluation Report (SER) and an adjudicatory phase wherein intervening parties could challenge the application and have their contentions heard before a three judge panel in a formal trial type proceeding – before the Commission would reach a decision on whether or not to grant a Construction Authorization. This application would be amended and revisited by the Commission at each subsequent stage of the repository development process.

Following enactment of the YMDR, DOE moved slowly to develop, and submit to NRC, the required license application. The Department experienced a number of internal delays and missed a promised December 2004 License Application submittal date by nearly 4 years. During this time DOE continued to engage NRC in pre-application dialogue. Several interested parties, followed this process closely in anticipation of eventual participation. Once the application [10] was filed in 2008, the process began moving forward on a much brisker schedule.

By 2010 the first phase of the NRC review (staff technical review) was nearing completion and preparations for the second phase (adjudicatory proceedings) were well under way. But progress was disrupted when, in March of that year, DOE filed a motion to withdraw its license application [11]. While NRC's Atomic Safety and Licensing Board (ASLB) – one of four three

judge panels that had been established to manage the adjudicatory phase of the process – deliberated on whether or not the Department, in accordance with the NWPAA, had the authority to withdraw, NRC staff continued their technical review. The first of 5 volumes of the SER was issued in August of 2010 [12] and the critically important volume 3 – addressing the long-term (post-closure) safety of the repository – was scheduled for publication in November of that year [13]. But even though the ASLB ruled on June 29, 2010 that DOE did not have the authority to withdraw [13], progress slowed while the Commission deliberated the question of whether or not to uphold the ASLB ruling and funding for the process was dialed back. The Commission was evenly divided on this question and unable to reach a decision. Eventually, citing a lack of funding, the Commissioners directed NRC staff to close out its technical review of the Yucca Mountain license application, and the Atomic Safety and Licensing Board to suspend its adjudicatory hearing on the application, by September 30, 2011 [14]. Figure 1 below depicts the timeline over which the Yucca Mountain licensing process progressed up to the point of termination.

FIGURE 1
Yucca Mountain Licensing Process Timeline



In looking back on the Yucca Mountain licensing process, and contemplating the prospect of restarting it, it is important to note the unusually high number of parties that would have been represented in the proceeding. Twelve parties originally sought intervention and submitted contentions in support of their petitions, two other parties sought participation as interested government parties only and did not file contentions. Table 3 below contains a list of these parties, the number of contentions they filed, and how these contentions initially fared with the Boards [15] and Commission [16]. By the summer of 2009, when the adjudicatory proceedings began in earnest, it had been determined that ten parties had standing (Caliente Hot Springs Resort was not admitted and the two potential parties seeking to represent the Timbisha Shoshone agreed to combine and represent the tribe as one party). This meant that when, on September 14 and 15 of 2009, a fourth Construction Authorization Board (CAB-04) convened a prehearing conference in Las Vegas to begin organizing discovery and early briefings in the proceeding, 14 parties were seated before the Board – the ten intervening litigants, the two interested government parties, DOE, and NRC staff.

TABLE 1
Participants in the Yucca Mountain Licensing Process

Party	Contentions Submitted	Admitted by Boards	Appealed by NRC staff	Upheld by Commission	Late Filed Contentions
State of Nevada	229	222	22	220	4
State of California	24	22	2	22	
Clark County, NV	15	13	0	13	1
Inyo County, CA	12	11	0	11	
NEI	9	7	6	6	
Nye County, NV	7	6	1	6	
Churchill, Esmeralda, Lander & Mineral Counties, (Four Counties), NV	4	4	0	4	
White Pine County, NV	4	4	0	4	
Timbisha Shoshone (non-profit)*	9	8	0	8	
Timbisha Shoshone (Tribe)*					
Native Community Action Council	3	2	1	2	
Caliente Hot Springs Resort	1	0	0	0	
Lincoln County, NV	Lincoln and Eureka counties participated as interested government parties only and did not submit any contentions				
Eureka County, NV					
TOTAL	317	299	32	296	5

*Although these entities initially filed separate petitions, they were eventually consolidated into one

The abrupt termination of the Yucca Mountain licensing process left unanswered the question of how the litigation of these contentions would proceed. NRC had been making every effort to reach a licensing decision on the 3 year schedule mandated by the NWPA. Although the Act did provide for NRC to take a fourth year if Congress was notified, the agency was working hard to avoid this. By mid-2010, the staff technical review was essentially complete with the SER being published one chapter at a time. Also, four licensing boards had been established to manage the litigation of the large number of contentions. This comported with NRC's original plan to spit the allotted time in half, using the first 18 months for the staff technical review and the second 18 months for the adjudicatory process. NRC's licensing boards were working, to the extent funding allowed, to accomplish the completion of the second phase of the process in accordance with this plan. Before it was disrupted, the Yucca Mountain licensing process was a model of efficiency. But now, if the process were to resume, NRC would find itself almost 3 years behind schedule and facing a new set of challenges as the licensing boards would have to revisit these contentions against the backdrop of a world that has changed significantly since they were submitted.

THE POST-YUCCA ERA, WHAT CHANGED

Following the termination of the Yucca Mountain project, events unfolded on two fronts in a manner that suggests two completely opposite paths for the future of the US repository program. First, the President established a Blue Ribbon Commission to recommend alternatives to Yucca Mountain and, second, the Courts took up litigation brought by supporters of the project challenging the authority of DOE and NRC to shut down the licensing process under the Nuclear Waste Policy Act.

In January of 2012, the Blue Ribbon Commission (BRC) dismissed the Yucca Mountain program as the product of “a policy that has been troubled for decades and has now all but completely broken down” and concluded that “the need for a new strategy is urgent” [3]. The BRC’s central recommendation was for a new “consent-based” approach to siting future storage and disposal facilities. Although the BRC did not attempt to define precisely how such a process would be implemented, this recommendation did prompt an immediate response from the Nevada County in which Yucca is located. On March 6, 2012, the Nye County Board of Commissioners wrote a letter to the Secretary of Energy stating “Nye County, Nevada, hereby provides notice to you, the Secretary of Energy, that we consent to host the proposed repository at Yucca Mountain” [17]. However, only 6 days later the State of Nevada countered – with its Governor telling the Secretary that the State “would oppose any attempt” to resurrect Yucca Mountain [18]. Given this disagreement, there has been no attempt to align any restart of the Yucca Mountain licensing process with DOE’s plans to implement the BRC’s recommendations.

While all of this was going on, the US Court of Appeals was carefully deliberating the challenges to the shutdown of the licensing process. On August 13, 2013 the Court ruled in favor of the Yucca Mountain supporters in a Writ of Mandamus ordering “unless and until Congress authoritatively says otherwise or there are no appropriated funds remaining, the Nuclear Regulatory Commission must promptly continue with the legally mandated licensing process” [19]. NRC is now considering how to comply with this order. NRC staff, along with several of the intervening parties including NEI, has recommended to the Commission that NRC focus its remaining resources on completion of the SER. [20]

Of course, with the Executive and Judicial branches of the Federal Government now sharply divided on the question of whether or not to proceed with the Yucca Mountain licensing process, the issue of “remaining resources” now calls attention on the question of whether or not the Legislative branch would fund the process. NRC staff has indicated that the agency has sufficient reserve funds to complete the SER [20], however, for the adjudicatory phase of the process to resume in earnest Congress would have to provide additional appropriations. And here, again, we find ourselves pointed in two completely different and opposing directions. The House of Representatives strongly supports continued progress at Yucca Mountain and has passed several resolutions to restore funding by wide margins. However, the Senate, at the direction of Majority Leader Harry Reid of Nevada – a staunch Yucca opponent – has consistently refused to allow any funding to be appropriated.

So the nation is now faced with a standoff on the question of whether or not to continue with the Yucca Mountain licensing process. This situation has three potential outcomes:

1. The standoff continues indefinitely, and the US remains without a repository program while used nuclear fuel continues to accumulate at reactor sites
2. Congress passes, and the President signs, legislation replacing the NWPA and YMDR with a new law, most likely based on the BRC recommendations. Such action would render the Court's order moot and the nation would then be faced with finding a consent-based alternative to Yucca Mountain
3. Congress and the President agree to fund the Yucca Mountain licensing process and it proceeds forward. ,

Legislation has been introduced in the Senate to advance the 2nd scenario, however it appears to be making little progress in a sharply divided Congress. Most observers would say that prospects for the 3rd scenario are even less likely since, given the current opposition the Senate Majority leader to the project, it hinges on somehow earning the consent of the state of Nevada. However, given the unappealing prospect of a lingering standoff, perhaps this scenario does merit some additional consideration.

THE REGULATORY OPPORTUNITY FOR EARNED CONSENT AT YUCCA MOUNTAIN

The authors of 10 CFR Part 63 took a forward looking, visionary approach to the challenge of assuring the safety of geologic disposal for thousands of years into the future. They understood that attaining absolute certainty over such long time periods would not be possible. This is why the regulation specifies a step-wise approach in which separate approvals are granted for various key steps in the repository development process –construction, the receipt and possession of nuclear material, and permanent closure. It is also why the regulation provides for DOE to establish programs that allow new information that will be gained over time to factor in to the assurance of safety.

The regulation contains specific provisions for two distinctly different types of programs in this regard. First, Subpart F of the rule describes requirements for Performance Confirmation programs – tests experiments and analysis conducted to evaluate the accuracy and adequacy of information used to determine a reasonable assurance of safety. And second, section 63.21(c).16 of the rule provides for DOE to include in its application research and development (R&D) programs to address safety questions to confirm the adequacy of design. Essentially, the difference between the two is that performance confirmation programs are intended to provide increased confidence in information that DOE has already provided whereas the latter is intended to obtain additional information to be provided in the future.

There is another difference between these two types of programs – the extent to which DOE addressed them in the Safety Analysis Report (SAR) that was submitted to NRC in the 2008 license application. Chapter 4 of the SAR contains a description of monitoring and testing activities in 20 scientific and technical areas that DOE planned to address as part of its performance confirmation program [21]. In September of 2011, NRC observed that DOE had

provided “a reasonable description of its performance confirmation program that is consistent with the guidance in the Yucca Mountain Review Plan” [22] in a technical evaluation report (TER) published to document NRC’s review at the point staff was directed by the Commission not to complete the SER. DOE’s program to address safety questions is another story, Chapter 3 of the SAR is entitled “Research and Development Program to Resolve Safety Questions” – but no such program is described therein. Instead, Chapter 3 is largely empty except for the conclusion “The US Department of Energy, pursuant to 10 CFR 63.21(c)(16) has not identified any safety questions” [21]

DOE apparently had such high confidence in the scientific and technical underpinnings of its SAR, and the Performance Confirmation Programs that would reinforce that information going forward, that it believed there were no remaining safety questions to be answered. But in many of the approximately 300 contentions submitted to the licensing boards, it becomes apparent that several intervening parties did not agree. It is not unreasonable to suggest that this disagreement makes up a significant part of the difference between where the Yucca Mountain licensing process left off and a consent-based paradigm in which a repository program could begin moving forward again. At the very least, one might suggest that an effort to work towards closing this gap would be a good place to start.

RESEARCH AND DEVELOPMENT PROGRAMS BASED ON LICENSING CONTENTIONS AS A PLATFORM FOR CONSENT BUILDING

The Waste Isolation Pilot Plant (WIPP), a repository for low-level but long-lived defense nuclear wastes in Carlsbad

New Mexico has often been described as a successful example of consent-based repository siting by the BRC and others. One of the key reasons given for this is the role that the State had in assuring the safety of the project. But at Yucca Mountain, at least in recent years the only role that Nevada has had was to oppose the repository. Conversely, Nye County, largely through its early warning drilling program, has had significant involvement in the scientific and technical investigations of the Yucca Mountain site that have formed the basis for the license application. The fact that Nye County had its own, independent, scientific and technical program focused on the safety of the project has certainly helped make it possible for the County to take a supportive position.

In a consent-based world, the direct involvement of state and local governments in efforts to assure the safety of a controversial project becomes highly important. Indeed, if the gap in how safety is perceived that currently exists between intervening units of government and DOE is ever to be closed, the direct involvement of state and local governments in the programs that bring it to closure will be essential. It is in this context that the licensing contentions yet to be litigated and the currently unused regulatory provision for R&D programs to address safety questions combine to form an intriguing potential opportunity. If the contentions could be used to form a platform for defining R&D programs to confirm long-term safety and improve the repository, a model for closing the safety perception gap would be in place. In such a model, DOE and the intervening parties could negotiate settlements to many of the contentions by forging mutual commitments to R&D programs designed to further address the fundamental safety questions at issue in each dispute. If both parties to the settlements had the authority to

judge the satisfactory completion of these R&D programs, the State of Nevada would have a much stronger role in assuring the safety of its citizens – a key building block of “consent”. NRC could proceed towards making its initial licensing determination – an authorization to construct the repository – while these R&D programs were underway. R&D program would then inform subsequent licensing decisions to receive and possess nuclear materials or to close the repository.

Many of these R&D programs would be long-term endeavors, continuing all the way up until DOE seeks the third and final license to close the repository. This only makes sense when one considers that the vast majority of the contentions relate to the post-closure safety of the repository. 164 of Nevada’s 229 contentions fall into this category [23]. Given that repository closure will likely be as far as a century in the future, this will provide significant opportunity for these programs to yield major technical advances that can be applied to further improve the safety of the repository. If, on the other hand, the research yields information which adversely reflects on the safety of the repository, provisions to assure the retrievability of any waste emplaced in Yucca Mountain will allow for course corrections or even a reversal of course to be made. Because of the importance of retrievability to this concept, any R&D programs needed to support mutual assurance that the waste can be retrieved should certainly be completed before it is emplaced.

One key feature that should be incorporated into all R&D programs, regardless of their duration, is that they should be conducted – to the maximum extent possible – in Nevada and local communities. Local universities, technology companies, and other institutions should be seen as incubators of the expertise that will be needed to assure the long term safety of the repository. The knowledge and understanding of repository safety that this will foster among the citizens of Nevada will form a most important building block of sustained confidence and, hence, lasting consent – a culture of local scientific and technical expertise that endures throughout the life of the project.

EXAMPLES

To further understand how this concept would work, it is useful to examine a few of the contentions that might be amenable to negotiated R&D programs, as well a unique set of three contentions that already set a precedent for such a forward looking approach – but with respect to Performance Confirmation instead of Safety Questions. These contentions are summarized and discussed below:

- **NEI Contentions: NEI-SAFETY-1 “Spent Nuclear Fuel Direct Disposal in Dual Purpose Canisters” and NEI-NEPA-1 “Inadequate NEPA Analysis for 90% TAD Canister Receipt Design”**

Both of these contentions address the implications of having to unload previously loaded dual purpose (storage and transportation) dry cask storage canisters (DPCs) to transfer fuel into repository disposal packages. They seek to compel DOE to directly dispose of the already loaded canisters in Yucca Mountain to reduce the radiation exposure to workers and low-level radioactive waste generation that would be associated with

repackaging the fuel. NEI has provided, in support of this contention, scientific and technical analysis showing that Yucca Mountain could meet post-closure safety requirements with direct disposed DPC's in its tunnels. [24]

DOE could amend its license application to provide for the direct disposal of DPCs upon resolution of a newly established safety question built on the NEI analysis and addressed through R&D at Yucca Mountain. R&D programs could involve the creation of pilot tunnels in the repository in which DOE could either simulate or emplace a limited number of DPC's along with monitoring technologies to test the results of the NEI analysis. Repository construction and initial loading could proceed until these programs were complete because DOE would have multiple disposal options that could be pursued until the R&D programs were complete – including storing DPC's on the repository aging pad, loading disposable canisters directly from pools at nuclear plant sites, or repackaging a limited number of canisters as provided for in the existing license application.

- **Nevada Contention NEV-SAFETY-168 ‘Retrieval Practicality’**

This contention addresses Nevada's concern that the equipment DOE intends to use to retrieve disposal canisters from the repository has not been sufficiently “designed, prototyped, tested, or demonstrated” [23]. Establishing the functionality determination of this equipment as a safety question would require an extensive amount of prototype development and testing R&D of advanced robotics and other remote handling technologies. This work should be performed at Nevada universities and technology companies to the maximum extent possible to develop the local expertise to inform the State's future decision-making. These R&D programs would also provide significant industrial development opportunities in Nevada that would have benefits beyond the repository program itself. While the construction of the repository tunnels and much of the other infrastructure could be completed prior to the completion of these programs, final completion and loading of the repository would be contingent on the State of Nevada having confidence that the equipment needed for retrieval was adequately proven.

- **Nevada Contention NEV-SAFETY-10 “Consideration of Forcing Functions on Future Climate Projections” and NEV-SAFETY-11 “Human-Induced Climate Changes on Prediction of the Next Glacial Period”**

These contentions address Nevada's concerns that long-term climate change could result in environmental conditions at the repository site (such as increased rainfall) that are not adequately considered in DOE's post-closure safety analysis [23]. While DOE believes that its analysis is bounding in this regard, the Department could establish a safety question to further examine the long-term implications of climate change. Again, the R&D programs to address this safety question should be largely based at Nevada universities and other institutions. As there is significant global interest in climate change R&D, these programs would also benefit the State in ways that would go far beyond the repository program, perhaps even establishing the state as an international

center of climate change studies. Repository construction should proceed in parallel with these studies and, provided there was sufficient confidence in retrievability, so too should repository loading. This R&D should proceed all the way up until repository closure, as there will likely always be more that can be learned about future climate change.

- **NY County Contentions: NYE-SAFETY-1, NYE-SAFETY-2, and NYE-SAFETY-3 “Failure to include activities in the performance confirmation program sufficient to assess the adequacy of information used as the basis for...(various post closure parameters)”**

These three contentions provide an interesting model for how intervening parties can seek to use the forward looking provisions of NRC’s Yucca Mountain licensing regulations to obtain additional confidence in the safety of the repository. In this case, Nye County is not seeking to establish safety questions, but is seeking to have additional scientific and technical activities added to the performance confirmation program. Because this indicates that the gap between the information DOE has provided and that which Nye County expects is not so large as to warrant the establishment of a safety question, DOE might want to look settling these contentions early in any resumption of the process. Then, assuming DOE and Nye County reach agreements on performance confirmation programs in response to these questions, these agreements might serve as models for how R&D programs could be constructed to address some of the more controversial contentions. Alternately, Nevada and other intervening parties might review these agreements and determine that performance confirmation programs would be a more appropriate means to address their concerns than safety questions.

CONCLUSION

With respect to the disposal of used nuclear fuel and other high-level radioactive waste, the nation is at an impasse. A significant investment has been made in the scientific and technical work that has resulted in the Yucca Mountain license application, and the US Court of Appeals has ordered NRC to continue its review of the application. Yet the federal government’s primary focus over the last three years has been on developing a consent-based process to find an alternative to Yucca Mountain. As discussed herein, these do not have to be opposing paths. NRC’s Yucca Mountain regulations contain provisions for R&D programs to address the safety questions being raised by the opposition to Yucca Mountain. Such R&D programs have the potential to provide the State of Nevada and other intervening parties in the Yucca Mountain licensing process a significant role in assuring the project’s safety. The mutual participation of DOE and the intervening parties in such programs would provide a potential opportunity for the Yucca Mountain project to earn the consent that it has long lacked. If this path was successful, there is at least some possibility that the best alternative to Yucca Mountain might be the Yucca Mountain we have yet to know.

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