### OFFICE OF THE SECRETARY CORRESPONDENCE CONTROL TICKET

Date Printed: Jun 05, 2008 10:54

PAPER NUMBER:

LTR-08-0321

**LOGGING DATE:** 06/05/2008

**ACTION OFFICE:** 

**OCAA** 

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ADDRESSEE:

The Commissioners

SUBJECT:

State of Nevada's Petition to Reject DOE's Yucca Mountain License Application as

Unauthorized and Substantially Incomplete

**ACTION:** 

Appropriate

**DISTRIBUTION:** 

Chrm, Comrs, OGC, EDO, RF

LETTER DATE:

06/04/2008

**ACKNOWLEDGED** 

No

SPECIAL HANDLING:

Immediate release in ADAMS via SECY/DPC

**NOTES:** 

FILE LOCATION:

**ADAMS** 

DATE DUE:

**DATE SIGNED:** 

## UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

# BEFORE THE COMMISSIONERS

## STATE OF NEVADA'S PETITION TO REJECT DOE'S YUCCA MOUNTAIN LICENSE APPLICATION AS UNAUTHORIZED AND SUBSTANTIALLY INCOMPLETE

**JUNE 2008** 

#### TABLE OF CONTENTS

BASIS	OF TH	IE PETITION	3.
I.	Introduction and Authority		3
	A.	Authority to File the LA	3
	B.	Secrecy	3
II.	Disabl	ing Deficiencies in the LA	3 3 4 6 6 8 9
	A.	Introduction	4
	B.	Missing EPA and NRC Safety Standards	6
	C.	Missing Drip Shield Information	8
	D.	Missing Final Design Information	9
	E.	Aging Facility	. 18
	F.	Missing NRC Standards on Protection Against Terrorist Acts and Control and Accounting for Nuclear Materials	. 20

### STATE OF NEVADA'S PETITION TO REJECT DOE'S YUCCA MOUNTAIN LICENSE APPLICATION AS UNAUTHORIZED AND SUBSTANTIALLY INCOMPLETE

The Department of Energy ("DOE") submitted its application for a construction authorization for its proposed Yucca Mountain high-level radioactive waste disposal facility (the "LA") to the NRC on June 3, 2008. This LA is completely unauthorized. The Nuclear Waste Policy Act authorizes only one application for a high-level waste disposal facility, and that one application had to be filed with the NRC by October, 2002, nearly six years ago. Also, the facility DOE told Congress in 2002 it would build is substantially different from the one now described in the LA. Moreover, parts of the LA are considered secret, and DOE takes the position that the NRC has no control over who may see the secret parts. The Congress, which gave NRC licensing authority over DOE, never authorized DOE to file an LA on the condition that NRC would be powerless to decide who may review it. Finally, even though DOE unilaterally gave itself an additional six years to prepare an LA, it is immediately evident that the LA DOE filed on June 3, 2008 is substantially incomplete.

Accordingly, the State of Nevada asks the Commission to reject DOE's tendered license because it is unauthorized and also because, under NRC's rules, an incomplete LA cannot be accepted and must be returned to DOE.

Nevada is aware that, in ordinary circumstances, a decision whether to docket a license application (to accept a tendered application for a full merits

review) is delegated to the appropriate Office Director, here the Director of the Office of Nuclear Material Safety and Safeguards ("NMSS"). However, there are special circumstances here that compel the direct involvement by the Commission itself. This LA will be the first application for a high-level waste repository in the history of the world, and the licensing review will involve the application of licensing standards that are unlike any others. The whole world will be watching and judging whether the NRC is capable of a fair and full review. The docketing of the LA will affect not only Nevada and its citizens, but also neighboring states and their citizens, as well as nearly countless individuals and governmental entities along transportation routes or affected by contaminated groundwater, now or in the future. Many distant generations will look back at NRC's licensing decisions here with gratitude or regret. In short, the decision whether to docket the LA is too important to be delegated to a Commission employee, or even to an officer of the Commission, but is one that must be made by the Commissioners themselves, who are Officers of the United States, appointed by the President with the advice and consent of the Senate.

Moreover, given the Commission's expressed intent to reach a final licensing decision in three years, and the fact that the docketing of the LA begins the running of the Commission's three-year clock, the decision to docket the LA becomes an adjudicatory matter with a major impact in how the adjudicatory

proceeding and hearing will be conducted. The docketing decision should not be delegated to NMSS, which will be a party to the proceeding.

#### BASIS OF THE PETITION

#### I. Introduction and Authority

#### A. Authority to File the LA

As indicated above, the Nuclear Waste Policy Act authorized only one application for a high-level waste disposal facility, and that one application had to be filed with the NRC by October, 2002, ninety days after the site recommendation became effective on July 23, 2002, pursuant to Public Law No. 107-200. See section 114(b) of the Nuclear Waste Policy Act. This was almost six years ago. Also, the facility DOE told Congress in 2002 it would build is substantially different from the one DOE now describes in the LA. Therefore, the LA DOE filed on June 3, 2008 is completely unauthorized.

#### B. Secrecy

Part of the safety evaluation in the LA contains information DOE claims is classified national security information that the public cannot ever see. DOE also claims in a recent motion filed with the NRC that the NRC must simply accept DOE's representation that disclosure of this information would endanger national security, without any independent NRC review. Even more astonishing, DOE also claims that this information may be kept secret from Nevada's representatives even if they have the necessary security clearances and the NRC believes those

representatives must be allowed to see the complete LA in order to represent Nevada's interests in the NRC licensing hearing.

If accepted, DOE's assertion of authority to dictate to NRC what parts of the license application Nevada may be allowed to review would make a mockery of the NRC licensing process. The Congress never authorized DOE to file an application under these conditions.

Furthermore, Nevada representatives applied to the NRC for the necessary security clearances many months ago. It would be inexcusable for the NRC to accept DOE's license application, but preclude Nevada's representatives from reviewing it fully, just because of the NRC's own failure to act in a timely manner on Nevada's security clearance applications.

#### II. Disabling Deficiencies in the LA

#### A. Introduction

The Commission's regulations at 10 C.F.R. § 2.101(e) require that DOE's LA be reviewed to ensure that it is "complete and acceptable for docketing." "If it is determined that all *or any part* of the tendered document is incomplete and therefore not acceptable for processing, the applicant will be informed of this determination and the respects in which the document is deficient." 10 C.F.R. § 2.101(e)(3) [emphasis added]. This petition asks the Commission to apply this rule to the incomplete LA DOE tendered on June 3, 2008.

Rejection of the LA, and returning it to DOE without docketing it, will avoid an unnecessary and wasteful expenditure of resources by NRC Staff and other potential parties who would otherwise be required to initiate a full review of a very large LA that is, nevertheless, unauthorized, hopelessly incomplete in important respects, and one that cannot possibly be the subject of a complete or efficient review. Returning the LA will avoid the harm to potential parties that will occur if the Commission pursues its goal of reaching a final licensing decision within three years but begins the running of the three-year clock with an LA that must be amended and supplemented. Amendments and supplements create moving targets that will require new rounds of contentions, and legal filings associated with new contentions consume precious time (and resources) that could otherwise be spent on the actual evidentiary hearing.

Nevada recognizes that the Commission will not want to prejudge its final adjudicatory decision on the merits of the LA, should an LA eventually be authorized and docketed. In considering the completeness of the LA, the Commission will not be examining its merits, and therefore no prejudgment should result. But, if DOE is so confident in what it filed that it advises NRC, perhaps in responding to this Petition, that it believes its LA is authorized and that the LA it just submitted may be finally judged as is, without amendments or supplements, then Nevada suggests that an early round of motions for summary disposition could be scheduled to address the issues in this Petition.

Finally, Nevada is just beginning its review of the completeness of the LA.

What follows are merely those deficiencies that are readily apparent based only on a brief, preliminary review.

#### B. Missing EPA and NRC Safety Standards

No LA can be considered complete, and no meaningful NRC review of an LA can begin, without licensing standards with which to judge the completeness of the LA's information and analyses. Yet, as explained below, fundamental critical standards are still missing, even though the U.S. Environmental Protection Agency ("EPA") has had years to issue them, and an NRC review cannot rationally proceed without them.

The most important part of the LA is the Safety Analysis Report ("SAR") required by 10 C.F.R. § 63.21(a), and the most important part of the SAR is the integrated evaluation of disposal safety, the so-called "post closure performance assessment" required by 10 C.F.R. §§63.21(c), 63.114-115, and subpart L. However, the standards governing how this performance assessment must be conducted for the potentially critical period after 10,000 years, when the risk to public health and the environment may be the greatest, are completely missing. Moreover, the purpose of the assessment is to calculate the radioactive dose affected individuals will receive from leaking radioactive waste and to compare that dose to a maximum dose standard. This dose standard for the post-10,000 year period is also completely missing.

EPA tried originally to shield all effects after 10,000 years from any safety consideration, but Nevada sued and EPA's misguided attempt was overturned by the Court in NEI v. EPA, 373 F.3d 1251 (D.C. Cir. 2004). EPA then worked with DOE and NRC to come up a new standard, and proposed one almost three years ago, on August 22, 2005. Nevada and others objected vigorously to what EPA proposed, and nothing has been heard from EPA since then, although it is known that EPA, NRC, and DOE worked behind the scenes to finalize a new standard, presumably one that met DOE's needs, and that a draft final rule was provided to Bush Administration officials for their final approval on or before December 15, 2006. Perhaps the final rule is being delayed so that there can be a final check for conformity with DOE's LA, or perhaps the rule has been delayed deliberately as a part of some strategy designed to prevent the new EPA rule from being overturned before the LA may be docketed. However, whatever the cause for delay may be, the LA cannot be reviewed or docketed without applicable EPA licensing standards in place.

By law, although the EPA standards are necessary, they are not self-executing, and NRC must issue its own licensing standards to implement what EPA promulgates and apply them directly to DOE's LA. NRC issued proposed implementing standards in tandem with the EPA proposed rule on September 8, 2005 and Nevada objected vigorously. Like EPA, NRC's public silence since then

has been deafening. The LA cannot be reviewed or docketed without applicable NRC licensing standards in place.

#### C. <u>Missing Drip Shield Information</u>

The LA proposes that titanium alloy drip shields, designed to delay corrosion of the packages containing radioactive waste, be counted in the total system performance assessment ("TSPA") computer simulation that will determine compliance with the federal radiation dose standard. These shields are essential to DOE's safety case—in fact, DOE's own calculations suggest that without the drip shields in place the repository would exceed the EPA standard by about a factor of 10. This would happen at about 2000 years after emplacement when the 15 mrem per year EPA standard is already established and is not subject to change. DOE does not plan to install the drip shields-over 11,000 of them, each weighing more than 5 tons—in the repository drifts (tunnels) until about a 100 years after the waste packages containing radioactive material have been emplaced. The installation would cost many billions of dollars and would consume a significant fraction of current world annual production of titanium and palladium. Whether these metals would be available 100 years from now and whether governmental authorities will want to spend the enormous sums involved is highly uncertain. This alone makes this protective element so questionable that reliance on it now for the purposes of licensing so absurd as to require immediate rejection by the NRC,

particularly as without the drip shields the application describes a repository that manifestly violates federal radiation dose standards.

It is also important to understand that any actual effort to install drip shields 100 years or more in the future will face conditions of high temperatures, high humidity, high radiation fields, and limited visibility in rock-strewn tunnels. The drip shields would have to be installed using uniquely-designed and remotely operated equipment that relies on rail, electrical and other systems that would have had to have been maintained and operational after years of exposure to humidity, radiation, heat, and other drift conditions, and that would have to operate within tight tolerances and design specifications. Successful installation of the drip shields would likely be extremely difficult if not impossible.

The LA is so deficient that it does not take this problem seriously enough to include detailed installation plans for evaluation. Without such plans, DOE's safety case cannot begin to be evaluated and the LA is materially incomplete.

#### D. <u>Missing Final Design Information</u>

The LA has no final repository design, and relies instead on preliminary or conceptual design information. For example, although the design of the transportation, storage and disposal canister holding the radioactive waste (the so-called "TAD") is critical to repository safety, there is no actual TAD design in the LA because DOE has yet to develop one. A contract to develop a TAD design has only recently been announced. Apparently, DOE prefers to file the LA

prematurely. As explained below, the NRC's regulation in 10 C.F.R. Part 63 requires much more design information in an LA.

The "preliminary design" concept DOE relies on is based on the old twostep licensing process for nuclear power plants in 10 C.F.R. Part 50 that was followed in the late 1950s and early 1960s. Part 50 required a construction permit application as a first step in a two-step licensing process. This application included a "Preliminary Safety Analysis Report" or "PSAR." 10 C.F.R. § 50.34(a). The PSAR included the "preliminary design" of the plant, which included "principal design criteria," "design bases and the relation of the design bases to the principal design criteria," and "information relative to materials of construction, general arrangement, and approximate dimensions, sufficient to provide reasonable assurance that the final design will conform to the design bases with adequate margin for safety." 10 C.F.R. § 50.34(a)(3). The PSAR also included a "preliminary [safety] analysis and evaluation," 10 C.F.R. § 50.34(a)(4), and identified structures, systems, and components of the facility, if any, which required research and development to "confirm" the adequacy of their design. 10 C.F.R. § 50.34(a)(8). A construction permit could be issued with design and safety questions left unresolved provided there was a research and development program to resolve them before operation was authorized. 10 C.F.R. § 50.35(a). This program was different than the less important "confirmatory" research and development program referred to in 10 C.F.R. §50.34(a)(8). The words "confirm"

or "confirmatory" do not appear in § 50.35 because, by reserving safety issues until later, the application of § 50.35 left no safety conclusions to "confirm."

The second step in the old nuclear plant licensing process was the operating license application, which was filed during actual construction. The operating license application contained a "Final Safety Analysis Report" or FSAR." The FSAR provided a description and a final safety analysis of "structures, systems, and components of the facility as a whole." 10 C.F.R. § 50.34(b). The level of design detail in a FSAR is usually referred to as a "final" design.

This approach to licensing of nuclear power plants, based on a preliminary design, led to the first important U.S. Supreme Court decision interpreting the Atomic Energy Act. In *Power Reactor Development Company v. Union*, 367 U.S. 396 (1961), the Court upheld the issuance of a construction permit for an experimental breeder reactor even though an important safety question, whether the reactor should include a design feature to protect against a core melt accident, was deferred to the operating license stage of review pursuant to 10 C.F.R. § 50.35. The Court's decision was based on assurance from the agency that the applicant's investment in the reactor would be given no consideration whatsoever when it came time, at the operating stage, to decide finally whether the reactor was safe to operate.

This two-step approach to licensing of nuclear power plants was extremely controversial, despite its having passed legal muster. Many believed that the

agency's assurance that the hundreds of millions of dollars of investment in the facility would be ignored when it came to decide whether operation would be allowed could not be accepted at face value. Moreover, the nuclear industry came to believe that the practice was undesirable because deferring submission of the final design and delaying the resolution of safety questions until the operating license stage led to regulatory uncertainty and expensive retrofitting. This practice of relying on a preliminary design and delaying the definitive safety finding until the operating license stage, and the problems with this approach to licensing of a major facility, were well-known to the NRC when it first began to develop licensing procedures for a high-level waste repository in 10 C.F.R. Part 60. As explained below, the old approach whereby construction was allowed based on preliminary design information was firmly rejected.

Initially, the NRC proposed repository licensing standards virtually the same as those for power reactors in 10 C.F.R. § 50.35 because, under the licensing framework then under consideration, a construction authorization would be required before sinking of the main repository shaft, and it was considered probable that important safety issues would need to be deferred because important site characterization information could not be supplied until the shaft was sunk and the repository site was studied at depth. "Licensing Procedures for Geologic Repositories for High-Level Radioactive Wastes, Proposed General Statement of Policy," 43 Fed. Reg. 53869, 53871 (Nov. 17, 1978). However, when it became

time to propose the actual rules, the NRC "now perceive[d] two grounds for questioning our previous thinking." A construction authorization would no longer be required before sinking of the main shaft because "the quality of the data that will be available before completion of site characterization as currently envisioned is unlikely to provide a satisfactory basis for arriving at the technical judgments...." Moreover, the Commission's policy would be that safety issues could be deferred only "so long as the increased financial investments and institutional commitments do not thereby reduce the stringency of the subsequent safety reviews," but the Commission now believed that "the commitment of resources involved is not so great nor the environmental impacts so large as to lead the Commission to exercise its licensing authority in advance of site characterization." 44. Fed. Reg. 70408, 70410 (Dec. 6, 1979).

This reflected a remarkable and important shift in the Commission's regulatory philosophy. Departing from prior practice, the Commission now believed that "increased financial investments and institutional commitments" did have the potential to skew, or to create the appearance of skewing its repository safety judgments. Therefore, the Commission devised a new licensing framework for the repository that would avoid putting the Commission is this uncomfortable (and untenable) position by requiring final design information and definitive safety findings before construction was authorized and such commitments could be made.

Accordingly, the proposed Part 60 departed from the previous Proposed General Statement of Policy, and included nothing like the provision in 10 C.F.R. § 50.35, allowing safety issues to be deferred until the operating (receipt and possession) phase of licensing. See proposed 10 C.F.R. § 60.31, 44 Fed. Reg. at 70418. Instead, an unqualified finding would need to be made before issuance of the construction authorization that (among other things) "the site and design comply with the criteria contained in Subparts E and F of this Part." No change made to this licensing approach when Part 63 was promulgated. 51 Fed. Reg. 27158 (July 30, 1986).

The specific differences between Part 63 and Part 50 are highly significant. Part 63 does not refer to a "preliminary design, "a "preliminary safety analysis report," or a "final safety analysis report." Instead, an application for a construction authorization must include a "Safety Analysis Report" (the "SAR") with a "pre-closure safety analysis" and a "post-closure performance assessment." 10 C.F.R. §§ 63.21(c)(5), 63.21(c)(9)-(15), 63.101, 63.111-115. The pre-closure safety analysis must include a systematic examination of "the design." 10 C.F.R. § 63.102(f). Neither the safety analyses nor the design information to be included in the construction authorization application are called "preliminary."

As under Parts 50 and 60, confirmatory research and development is allowed, 10 C.F.R. § 63.21(c)(16), but as explained above, there is nothing in Part 63 (or Part 60) like 10 C.F.R. § 50.35, which allows construction to proceed with

"non-confirmatory" safety issues left unresolved. The safety findings required by 10 C.F.R. § 63.31 before issuance of a construction authorization are stated in unqualified terms-it must be found that "the site and design" are in compliance with the regulations.

Also in stark contrast to Part 50, Part 63 has no special section describing the required contents of a separate operating (receipt and possession) license application (a step two in the licensing process). Instead, the LA merely must be "updated" before waste may be received at the site in order to consider information not available previously and to show "conformance of construction of structures, systems, and components with "the design." 10 C.F.R. § 63.24. There are no requirements to perform a "final" safety analysis report or to submit a "final" design before operation, because these would have been provided earlier in the application for a construction authorization. In contrast to the two-step Part 50 licensing process in Part 50, where eleven long paragraphs are needed to describe the requirements of the FSAR, 10 C.F.R. § 50.34(b), the entire contents of the repository operating license application are described in four short paragraphs. The clear implication from the regulatory language is, as the regulatory history indicates, that the construction authorization stage is where the key final design and other safety information must be submitted and reviewed and where the definitive safety findings must be made.

In sum, both the history and the text of Part 63 indicate clearly that the Commission intended a departure from the traditional two-step licensing process in Part 50. All of the important final design information and safety analysis were to be submitted and reviewed, and definitive safety findings were to be made, at the construction authorization stage. Preliminary design and safety information, like what was submitted under Part 50, would be insufficient. Moreover, the operating license stage was reduced in importance. It served only as check on new information and a determination whether the facility had been constructed in accordance with "the design" as described in the LA.

DOE's and NRC's early efforts to implement Part 60 part are completely consistent with the above. In its 1984 comments on a draft of DOE's repository "Mission Plan," required by section 301 of the Nuclear Waste Policy Act, NRC advised DOE that:

The [proposed DOE] sequence for developing repository design information and supporting data does not appear to be consistent with what will be required to make findings under 10 CFR Part 60....detailed design information, along with data on engineered system component performance, will be required to demonstrate compliance with 10 CFR Part 60 performance objectives and requirements at the time of submittal of the license application. Preliminary information on design will clearly not be sufficient to support licensing findings and a construction authorization by the Commission.

#### DN2001607603.

NRC elaborated upon this interpretation of Part 60 shortly thereafter, in a December 17, 1984 transcribed meeting with DOE:

The Commission provided for a construction authorization in 10 CFR Part 60 so that we could make a complete safety and environmental review before DOE expended a lot of resources on a particular site....it was clear as it was described, and as Part 60 was formulated, that the NRC was heading more toward a one-step licensing on this [repository] licensing than it does on nuclear power plants. The expectation is that you'd have essentially gone over designs of everything there, and that it would only be a very limited scope of issues expected to be present at the time we update the application to get the permit [to operate].

#### DN2002050708.

The Commission reiterated this point somewhat later in a 1988 notice of proposed rulemaking on what was then called the Licensing Support System, now called the Licensing Support Network:

In the view of the Commission, the information it needs in order to be able to consider the issuance of a construction authorization is generally the same as will be needed prior to the issuance of a license to receive and possess HLW. For this reason, the Commission regulations call for the application to be as complete as possible.

53 Fed. Reg. 44411, 44414 (Nov. 3, 1988).

DOE soon adopted this same understanding of what Part 60 meant. DOE's YMP/97-03, Rev. 0, "Technical Guidance Document for License Application Preparation," December 1998 (DN2002071681), an early (perhaps the earliest) effort to put in place plans to develop the design for the LA/CA, provided specifically that "[p]re-closure accident analyses should be at the level of detail of the accident analysis in a typical nuclear power plant Final Safety Analysis Report" and similarly, for repository items that are important to safety or waste isolation and are without regulatory precedent, design information would likely need to be

"similar to the level of detail provided for items of similar importance in a commercial nuclear power Final Safety Analysis Report." *Id* at Intro-7.

The absence of final design information in DOE's LA is a major deficiency and the LA cannot be accepted until DOE completes substantially more of the design. Without final design information, no firm safety conclusions about the repository design are possible. Billions of dollars will be spent on a project based on only preliminary design information and preliminary safety evaluations that, after more work, may turn out to be fatally flawed, with the result that these billions will be wasted. Even worse, after billions have been spent, NRC may feel pressured to allow waste to be transported to Yucca Mountain and disposed there despite the discovery of serious flaws in the course of finalizing the design and safety evaluations. The Commission recognized that "increased financial investments and institutional commitments" did have the potential to skew, or to create the appearance of skewing its repository safety judgments, and it established a licensing process for Yucca Mountain that would avoid this problem by requiring final design information and final safety conclusions up front, before construction is authorized. Unless the Commission rejects DOE's LA, it will encounter the exact problem its regulations were designed to avoid.

#### E. Aging Facility

The LA includes a plan whereby tens of thousands of tons of spent reactor fuel will be transported to Yucca Mountain from nuclear plant sites around the

country and then stored above ground at Yucca Mountain on "aging pads," years before the spent fuel will put into to the drifts (tunnels) for disposal. The law (section 114(g) of the Nuclear Waste Policy Act) expressly forbids DOE from locating a retrievable spent fuel storage facility at Yucca Mountain. Therefore, the capacity of any above ground spent fuel storage facility must be strictly limited to what is necessary to assure that, once disposal operations begin, spent fuel will always be on-site waiting for disposal and there will be no unnecessary hiatus in conducting disposal operations.

The capacity of the aging facility DOE proposes in its LA is far in excess of what conceivably could be needed for efficient disposal operations, especially since DOE will have flexibility in how the waste is emplaced and how the tunnels will be ventilated, so that thermal effects from relatively new fuel can be managed. In fact, DOE has admitted on several occasions that its aging facility would decouple waste acceptance from disposal. Moreover, even if some fuel must be "aged" or cooled before disposal, this aging can occur most easily and cheaply on reactor sites where the fuel is currently stored. In short, DOE is planning an illegal end run around the law in order to make nuclear licensees happy by accepting lots of spent fuel at Yucca Mountain as soon as possible, regardless of when it will actually be disposed.

This obvious attempt to circumvent the law cannot be tolerated. At the least,

DOE must be told that, absent some significant scaling back of its acceptance and

storage plans or further explanation, the LA is rejected.

### F. Missing NRC Standards on Protection Against Terrorist Acts and Control and Accounting for Nuclear Materials

EPA and NRC safety standards for long-term disposal safety are not the only standards that are missing. NRC has not finalized its licensing standards for protecting Yucca Mountain from terrorist acts and for keeping track of and accounting for sensitive nuclear materials that may be shipped to Yucca Mountain. These standards are critical because vast quantities of highly dangerous radioactive materials will be stored above ground at Yucca Mountain, where they will be exposed to potential acts by terrorists. Also, if some of these same materials (high-enriched uranium and plutonium) are stolen from the Yucca Mountain site, they could be used to manufacture nuclear bombs for use against United States targets.

NRC has some physical security (protection) and material control and accounting standards that might be applied, but they pre-date September 11. On December 20, 2007, after acknowledging specifically that "[t]he current security and MC&A [material control and accounting] requirements for a GROA [geologic repository operations area] are *not adequate* to protect the common defense and security or the public health and safety [emphasis added]," the NRC proposed new, upgraded standards that would apply to Yucca Mountain. Nevada supported the

need for an upgrade, although it commented that what NRC proposed was still deficient in important respects, most notably NRC's proposed elimination of any consideration of attacks such as occurred on September 11. No final rule has been promulgated.

Dated this 4th day of June, 2008.

Respectfully submitted,

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