

**REPORT AND RECOMMENDATIONS
OF THE
NEVADA COMMISSION ON
NUCLEAR PROJECTS**



**Presented to
The Governor and Legislature
of the State of Nevada**

December 2006

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ATTACHMENT I

YUCCA MOUNTAIN INTERNAL EMAIL CHRONOLOGY

ATTACHMENT II

YUCCA MOUNTAIN LEGISLATION PROPOSED OR
INTRODUCED IN CONGRESS IN 2006

S.2589 THE ADMINISTRATION BILL

2007 ENERGY AND WATER DEVELOPMENT
APPROPRIATIONS ACT LANGUAGE

NUCLEAR ENERGY INSTITUTE PROPOSED BILL

S.3962 - DOMENICI STAND-ALONE YUCCA MOUNTAIN BILL

ATTACHMENT III

VICTOR GILINSKY GNEP PRESENTATION

**MEMBERS OF THE NEVADA COMMISSION
ON NUCLEAR PROJECTS**

Senator Richard Bryan, Chairman

Ms. Michon Mackedon, Vice Chairman

Mr. Larry Brown

Ms. Joan Lambert

Mr. Steve Molasky

Ms. Myrna Williams

Mr. Paul Workman

PREFACE

There is a lesson in the history of the federal high-level radioactive waste program for those in Congress who still believe the pervasive and systemic problems plaguing the Yucca Mountain program can be fixed simply by enacting new, heavy-handed legislation. In July of 1987, when Congress was in the throes of trying to decide what to do about a federal nuclear waste program that was “in ruins,” Representative Morris Udall, one of the most respected and admired members of Congress at the time, noted that the original Nuclear Waste Policy Act “set up a process for finding the safest and most sensible sites for these repositories.” Mr. Udall went on to say,

“We [the crafters of the original Act] tried to keep politics out of the decision. We were going to have the decision made on the basis of technical criteria. We bent over backwards to make the process fair. We gave the state and affected tribes a voice in the process; we gave them money to hire experts; we even gave them a veto over the final decision. We provided for two repositories so no one state or region would have to bear the burden for the country.

The Department of Energy ... only had to follow faithfully the process we laid down. The fact is ... DOE blew it. At the first sign of public opposition they cast aside the entire second repository program to help a few office seekers. They have handled the effort so badly that the public and many of us in Congress have lost all faith in the integrity of the process.”

If Congress had followed Mo Udall’s advice almost 20 years ago and established a national commission to assist the nation in returning to the fundamental principles embodied in the original Nuclear Waste Policy Act, it is very likely the country would today have solved the nuclear waste problem. Instead, Congress, in its wisdom, decided to take the easy way out. It put its trust in DOE and in DOE’s faulty assessments of the Yucca Mountain site and moved to “fast track” the project by singling out Nevada through legislative fiat. The Yucca Mountain fiasco facing the nation today is the result of such short-sighted policymaking.

As a U.S. senator in the 1990s, it seemed that the Nevada congressional delegation was constantly fighting to head off one legislative ‘fix’ after another - every time DOE found new flaws and deficiencies with Yucca Mountain, allies in the nuclear industry and Congress attempted to fix the problems by simply legislating them away or exempting DOE and other federal agencies from having to deal with them. Instead of addressing the repository project in an objective, technically sound manner, DOE continually sought to base its decisions on politics and backfill them with faulty - and as we found out later, falsified and fabricated - science. And Congress, in its refusal to deal with the underlying flaws in U.S. nuclear waste policy over the years, has been complicit in DOE’s embrace of expedience over science.

Today there are a number of bills and legislative proposals before Congress that purport to, once again, 'fix' Yucca Mountain and get the nuclear waste program 'back on track.' With one exception, all of these legislative proposals suffer from the same basic flaw that Rep. Udall sought to avoid in 1987 - namely, a site that is inherently and unalterably unsuitable and unsafe for a nuclear waste repository cannot be made to work through congressional strong-arming. Legislating exemptions to health, safety and environmental laws and regulation and riding roughshod over the state and people of Nevada will not change that basic fact.

My predecessor and first chairman of the Commission on Nuclear Projects, former governor Grant Sawyer, in the first report of this Commission in 1986 set forth very simple and straight-forward criteria for the implementation of the federal nuclear waste program. Governor Sawyer wrote, "... a nuclear waste repository should not be built until it can be shown, beyond the shadow of a doubt, the facility can, in fact ... isolate radioactive materials from the biosphere for more than 10,000 years - and that ... such a repository will be benign in its effects upon the people, the environment and the economy of the state or region within which it would be located."

It is now obvious to almost everyone that Yucca Mountain cannot meet this simple test, a fact that will become even more apparent if Nevada is forced to oppose DOE's license application on technical and scientific grounds in a Nuclear Regulatory Commission licensing proceeding. Congress, instead, can step up to the plate and do what Rep. Udall urged it to do all those years ago - abandon the politics of forced facility siting and create an atmosphere where solutions based on sound science and new thinking can emerge. That cannot and will not happen as long as Yucca Mountain remains the focus of national nuclear waste policy.

Richard H. Bryan, Chairman
December 2006

CHAPTER ONE OVERVIEW OF YUCCA MOUNTAIN PROGRAM DEVELOPMENTS

*“Men occasionally stumble over truth, but most of them pick themselves up,
dust themselves off and carry on as if nothing happened.”*

Winston Churchill

In its January 2005 report, the Nevada Commission on Nuclear Projects concluded that, given its myriad problems and legal setbacks, the Yucca Mountain project appeared to be a program on the verge of collapse. The Commission observed:

“The program remains plagued with severe budget shortfalls; DOE was handed a major setback when the federal appeals court vacated EPA’s Yucca Mountain health protection standard - a standard that had been hand-crafted for the Nevada site; and, without a congressional bailout in the form of a legislatively mandated standard that the site is capable of meeting - something the Commission believes is unlikely - there is little chance Yucca Mountain can be licensed, since the site is incapable of meeting regulations that conform to the recommendations of the National Academy of Sciences.”

Like the Churchill quote, finding truth - or scientific fact - in the Yucca Mountain program is one thing; getting federal agencies to act on it is something else entirely. Today, the situation with respect to the federal high-level radioactive waste program remains essentially unchanged. Nevada’s legal victory in the U.S. Circuit Court of Appeals for the District of Columbia, whereby the court vacated the Environmental Protection Agency’s (EPA) radiation health protection regulations for Yucca Mountain - a ruling that effectively prohibits DOE from ignoring the Yucca Mountain site’s inherent inability to isolate deadly radioactive waste for the time required, stopped the program in its tracks. Instead of fostering a reassessment of the Yucca Mountain site and the program’s deficiencies, the court’s action sent DOE, its allies in Congress, and the nuclear industry scrambling to find ways to remove ‘obstacles’(i.e., the troublesome EPA standard and other health, safety and environmental requirements) and get the project ‘back on track.’

STATUS OF THE YUCCA MOUNTAIN PROGRAM: DOE’S CONTINUING PROBLEMS

In 2005, the Yucca Mountain program was rocked to its core by the revelation that scientists working for DOE had falsified data and computer models in an effort to mask fundamental deficiencies that were being uncovered in the critical area of site hydrology and to cover up major quality assurance deficiencies. As damaging as these revelations were to the integrity and credibility of the DOE program, they represented just another in a long string of ongoing problems that have brought the federal project to the brink of collapse. Those problems include the Yucca Mountain site’s major, unfixable geologic deficiencies; the program’s

pervasive scientific and technical irregularities; long-term and continuing quality assurance deficiencies; serious employee health and safety issues; mismanagement and continual restructuring and reorganization; out-of-control budgets; and deteriorating support in Congress.

Data Falsification: The Email Scandal

In March 2005, the Yucca Mountain program was rocked by revelations that USGS scientists working for DOE falsified crucial site suitability information and computer models with respect to the Yucca Mountain site. The disclosures came about as a result of email correspondence uncovered in the course of preparing DOE documents for inclusion on the Nuclear Regulatory Commission's (NRC) Licensing Support Network (LSN). The incriminating emails documented U.S. Geological Survey scientists working under contract to DOE on the Yucca Mountain program admitting to fabricating data and manipulating computer models to compensate for missing or inadequate data on hydrology and water infiltration issues. (See Attachment I for a chronology of the email scandal.)

Immediately following the public disclosure of the scandal, Governor Guinn, then-Attorney General Brian Sandoval, and the Nevada congressional delegation demanded an immediate investigation. Representative Jon Porter (NV), chairman of the House of Representatives Subcommittee on Federal Workforce and Agency Organization, convened hearings on the matter and sought to compel DOE to fully disclose the extent of data falsification and fabrication within the project.

Nevada representatives testifying before Rep. Porter's subcommittee noted that, while devastating to the integrity and credibility of the Yucca Mountain program, the admission by DOE that its scientists may have falsified crucial site suitability information was not especially surprising. Nevada's oversight personnel have recognized for years that DOE's scientists and researchers were under tremendous pressure to report findings supporting DOE's predetermined conclusions about the Yucca Mountain site, even though the data coming out of DOE's own site characterization studies was painting a vastly different picture of Yucca Mountain's waste isolation capabilities (or lack thereof) than DOE envisioned.

Nevada's Yucca Mountain oversight representatives have long suspected collusion and data manipulation on the part of DOE and its contractors charged with evaluating the site and developing information for licensing. The way DOE kept constantly changing the repository design and its performance models – everything from waste disposal package performance to predictions about climate change, hydrology, groundwater travel times, the potential for renewed volcanic activity, and the like – made it obvious that DOE was shopping for acceptable data and findings, throwing out things that did not fit the conclusions they were seeking, and exerting tremendous pressure on scientists and others to toe the party line.

As early as the late 1980s, DOE was desperate to counter data developed by State of Nevada scientists that showed fast water pathways or “fracture flow” through the mountain, a

condition that could have and should have disqualified the site. The emails detailing falsified documents and data appear to be directly related to this troublesome problem, even though work by the Los Alamos National Laboratory later confirmed the State's findings.

In the late 1980s and early 1990s, DOE sought to suppress information that indicated a repository at Yucca Mountain would emit so much radioactive Carbon 14 gas that it would not be able to meet EPA's Carbon 14 release limits. When the information finally came out, despite DOE's efforts to hide it, DOE prevailed on Congress to exempt Yucca Mountain from radiation release standards altogether, even though these same standards were seen as acceptable for DOE's Waste Isolation Pilot Plant facility, a repository for transuranic waste in New Mexico.

Recognizing that only a full scale investigation by a body outside DOE or USGS could fully and honestly assess the actual extent of data falsification and fabrication that occurred, Senator Harry Reid and Attorney General Sandoval called for the FBI to immediately step in and secure all of DOE's written and electronic files, lest incriminating evidence disappear now that this scandal had come to light and for Congress to immediately initiate an independent investigation.

During 2005 and into 2006, Rep. Porter held several hearings seeking to shed light on the matter. However, DOE was less than forthcoming in providing the subcommittee with information it requested. DOE even failed to fully comply with subpoenas issued by the committee.

In 2005 and 2006, the U.S. Attorney for southern Nevada, the Inspectors General for DOE and the USGS, and the U.S. Government Accountability Office (GAO) conducted limited investigations of the email scandal and related quality assurance and management problems associated with it. The DOE IG's investigation report characterized the scientists' actions as ones "which have been described by observers as irresponsible and reckless."

DOE's Continuing Quality Assurance Failures

An acceptable Quality Assurance (QA) program and the demonstration of its effective implementation are integral and indispensable elements of a license application. The Yucca Mountain project has been plagued by Quality Assurance deficiencies since its inception. Even before the 1987 Nuclear Waste Policy Amendments Act, DOE was aware of problems and the long-term implications of not correcting them and assuring that an acceptable Quality Assurance program was persistent and enduring. In its June 1987 Mission Plan Amendment (DOE/RW-0128), DOE wrote:

"As a result of quality-assurance audits performed by the DOE, "stop-work" orders were issued to contractors working on the Hanford and the Yucca Mountain projects. The DOE found that the technical and management controls for work performed before site characterization were not adequate for site characterization activities. A general

upgrading of procedures and controls is being implemented to satisfy NRC requirements for establishing a licensing basis and DOE requirements for a major system acquisition. Personnel associated with the stopped work were immediately assigned to develop the required procedures and controls and were given intensified training in quality assurance. The “stop-work” orders were gradually being lifted on certain activities at both sites as the DOE receives evidence that the quality assurance requirements are satisfied.” (Page 5).

Since 1988, the General Accounting Office, now the Government Accountability Office, has identified Quality Assurance problems in the Yucca Mountain project in at least 8 reports, some devoted solely to the issue of Quality Assurance. In 1988, GAO warned that the project should not proceed until it had an adequate QA program in place. In 1990, GAO found that the project did not comply with NRC QA requirements. In 1992, GAO again pointed out the need for an adequate QA program. Reports in 2003 and 2004 spoke again to the persistent QA problems. In testimony on April 25, 2006 to the House of Representatives Committee on Government Reform, Subcommittee on the Federal Workforce and Agency Organization, the GAO Director for Natural Resources and the Environment concluded, based on GAO’s most recent report, the following:

“DOE has a long history of trying to resolve quality assurance problems in its Yucca Mountain project. Now, after more than 20 years of work, DOE once again faces serious quality assurance and other challenges while seeking a new path forward to a fully defensible license application.”

The GAO Director was testifying in the hearing as part of an ongoing House Subcommittee investigation of possible data and Quality Assurance documentation falsification by a few United States Geological Survey scientists modeling ground water infiltration for the Yucca Mountain project. Groundwater infiltration is key to the repository safety assessment in that it affects first the corrosion and failure rate of the metal waste containers, and then the rate of release of radionuclides to the environment. The investigation stemmed from the revelation of e-mails exchanged among the scientists between 1998 and 2000, but only first discovered by DOE contractor reviewers in late 2004 and revealed to DOE in March 2005. Inspectors General of both the Department of Energy and the Department of Interior investigated the case extensively, looking at e-mail records from the identified time period and later. The reports of the field investigations were forwarded to the United States Attorney’s Office for the District of Nevada, which, on April 24, 2006, declined to pursue criminal prosecution in the matter.

In an unusual move, after closing his investigation, the DOE Inspector General wrote to the Secretary of Energy of his findings and concerns because, during the course of the investigation, “certain internal control deficiencies were identified which were pertinent to the core allegations we were pursuing.” The concerns were over three specific matters: (1) “The nearly six-year delay in surfacing and appropriately dealing with the controversial e-mails was inconsistent with sound quality assurance protocols” (this was the subject of a November 9, 2005

Inspector General Report, Quality Assurance Weaknesses in the Review of Yucca Mountain Electronic Mail for Relevancy to the Licensing Process, DOE/IG-0708); (2) “Compromise of scientific notebook requirements” (requirements that, in this case, were waived to resolve the fact that, contrary to requirements, no scientific notebook had been initiated or kept for the infiltration model work); and(3) “Critical control files relating to the “Simulation of Net Infiltration for Modern and Potential Future Climates” AMR [Analysis Model Report] were not maintained in accordance with data management system requirements.” The Inspector General concluded:

“The discovery of the e-mails that prompted the Office of Inspector General Criminal Investigation understandably raised concerns over the Yucca Mountain Project’s quality assurance process. The Department has announced that, in order to address these concerns, it has initiated steps to remediate or replace certain work of the Geological Survey and that the quality of the results of this effort will be reviewed by a body of scientists independent of the Yucca Mountain Project. We concluded that these steps are essential if the Yucca Mountain Project is to overcome historical and current quality assurance concerns.”

That the e-mail situation was not an isolated problem seems to have been accepted even by Energy Secretary Bodman, who said, on April 12, that the culture of the Yucca Mountain organization was “reflected in” the USGS e-mail affair. This would suggest the question of whether the scientific underpinnings of the entire Yucca Mountain project merit confidence. For example, the GAO Director’s testimony also described a February 2006 stop-work order on Yucca Mountain work at the Lawrence Livermore National Laboratory:

“We believe this incident is an example of how the project’s management tools have not been effective in bringing quality assurance problems to top management’s attention. After observing a DOE quality assurance audit at the Lawrence Livermore National Laboratory in August 2005, NRC expressed concern that humidity gauges used in scientific experiments at the project were not properly calibrated – an apparent violation of quality assurance requirements. According to an NRC official, NRC communicated these findings to BSC [Bechtel-SAIC] and DOE project officials on six occasions between August and December 2005, and issued a formal report and letter to DOE on January 9, 2006. However, despite these communications and the potentially serious quality assurance problems involved, the project’s acting director did not become aware of the issue until January 2006, after reading about it in a news article.”

The deficient calibration of the gauges and other experiment execution problems with Quality Assurance connections and sound science implications discovered in the audit relate to work that is key to the safety assessment for the repository because it relates directly to the engineered barrier corrosion rate data that are included in the Yucca Mountain Total System Performance Assessment.

GAO concluded its April 25 testimony before Congress with yet another (albeit diplomatically worded) indictment of DOE's continuing QA failures and their implications for the Yucca Mountain program:

“Even as DOE faces new quality assurance challenges, it cannot be certain that it has resolved past problems. It is clear that DOE has not been well served by management tools that have not effectively identified and tracked progress on significant and recurring problems. As a result, DOE has not had a strong basis to assess progress in addressing management weaknesses or to direct management attention to significant and recurrent problems as needed. Unless these quality assurance problems are addressed, further delays on the project are likely.”

DOE's Major Redesign of The Repository System

In October 2005, DOE announced sweeping and fundamental changes in the design for a Yucca Mountain repository. The central element for this effort is the development and use of a multiple purpose canister for, theoretically, storing, transporting and disposing of spent fuel and high-level waste without ever having to handle the radioactive material inside.¹ Under this “Transport, Aging and Disposal” (TAD) proposal, a Yucca Mountain repository would no longer require extensive facilities for repackaging and handling raw fuel elements and, therefore, could be operated as a “cleaner” facility. While on the surface the TAD concept seems to have functional and logistical merit, there are a number of issues raised by the new design that would appear to seriously complicate matters from both an operational and licensing perspective.

First, the TAD concept transfers many of the spent fuel handling and packaging activities, risks, and costs from the repository to individual utility companies that would be responsible for loading waste into the TADs and welding and preparing them for storage and shipment.

Second, the new design does not take into account the fact that a significant percentage of nuclear utilities are already storing spent fuel in welded dry storage containers that are not compatible with DOE's proposed TADs. In addition, it will be unavoidable that a certain amount of spent fuel will have to be transported to a repository in legal-weight truck ‘transport-only’ casks that will have to be opened at the facility and the fuel removed and repackaged for disposal. There will also be instances where fuel will arrive at the repository in a damaged condition inside a container and would have to be repackaged. Consequently, use of TADs will not eliminate the need for costly hot cells, pools or other fuel handling facilities as part of the repository design.

¹ This ‘new idea’ has been floated before - back in 1992 as the “Multiple Purpose Canister (MPC) initiative”- and it was rejected then as being too costly and too logistically difficult to implement. To be fair, the proposal made some sense 13 years ago, when most utilities were still storing spent fuel in water-filled pools where it could be moved, relatively easily, into sealed canisters and from there into MPCs for dry storage, transport and disposal. Today, however, a significant percentage of nuclear utility companies are already storing spent fuel in dry storage installations using a variety of sealed storage systems, none of which are compatible with the standardized TAD canister idea.

Third, the TAD concept is fundamentally at odds with thermal and other engineering requirements that have governed DOE's repository design for decades. DOE's performance assessment models for Yucca Mountain are built around the assumption that water will be kept away from the waste disposal containers by maintaining the temperature of the repository above boiling for hundreds of years. Such a thermal strategy requires careful mixing of the fuel according to its thermal (heat) characteristics - something that will be difficult, if not impossible, if waste is welded shut in large volume packages at utilities.

Assessing DOE's Yucca Mountain Program: "Chaos"

As this report is being written, virtually all elements of the Yucca Mountain program are in a state of flux and uncertainty. As DOE has sought to "simplify" the Yucca Mountain program, uncertainties have grown exponentially with respect to the repository surface facility design, the design of the waste disposal canister (as well as transportation casks due to the ramification of the TADs), the design of the repository sub-surface facilities (due to the uncertainties in thermal loading and operational characteristics, again resulting from the TAD concept), and even the transportation system (including routes and even mode of transport, given the implications of the new TAD concept and the proliferation of transportation and dual purpose (storage/transport) casks that may or may not be compatible with the TAD approach. In proposing amendments to the 2007 Energy and Water Development Appropriations Act that would shift focus away from Yucca Mountain and towards interim storage and reprocessing², Senate Energy and Natural Resources Committee chairman Pete Domenici (NM) declared the Yucca Mountain program to be in "chaos."

CONTINUING UNCERTAINTY REGARDING EPA'S RADIATION HEALTH PROTECTION STANDARD FOR YUCCA MOUNTAIN

On July 9, 2004, the U.S. Circuit Court of Appeals for the District of Columbia issued a landmark ruling on a complex set of legal cases brought by the State of Nevada, Clark County, the City of Las Vegas, and the Natural Resources Defense Council and joined by other public interest groups that challenged the federal government's efforts to locate a high-level radioactive waste repository at Yucca Mountain.³ While not all of the challenges raised by the parties were upheld, the Court delivered a major blow to the federal program when it granted the State's petition to vacate the EPA's radiation health protection standard for a Yucca Mountain repository and voided NRC's licensing regulations to the extent that those regulations rely on the rejected EPA standard.

² See the discussion of Congressional Developments later in this section of the report for a more complete description of Sen. Domenici's proposed Yucca Mountain language.

³ The full text of the Court's decision is appended to this report as Attachment I. It is also available on Nevada Agency for Nuclear Projects' web site at <http://www.state.nv.us/nucwaste/news2004/pdf/usca040709.pdf>.

The decision struck at the heart of DOE's strategy to mask fundamental deficiencies of the Yucca Mountain site by using manmade barriers (i.e., waste disposal containers assumed to remain intact for 10,000 years or more) as a substitute for geologic containment of spent fuel and high-level waste. The attractiveness of this strategy, for DOE, was that it allowed DOE's performance assessment modelers to ignore troublesome physical characteristics of the site itself. As long as it could be assumed (however unrealistically) that the waste containers would last for 10,000 years, and that the maximum period of time for which DOE was required to demonstrate waste isolation was 10,000 years, the fact that Yucca Mountain itself contributes almost nothing to waste isolation could be ignored.

When the court decreed that any health protection standard for Yucca Mountain must encompass not just the first 10,000 years, but rather the period of maximum releases from the repository (whenever that occurs), it effectively obligated DOE to do what the law requires and what the State of Nevada has been demanding for years - demonstrate that the geology at the Yucca Mountain site is, in fact, capable of isolating waste for the full length of time required. Under the court's ruling, engineered barriers, concocted to mask fundamental and disqualifying site deficiencies, could no longer be used as a substitute for geologic waste isolation.

In an attempt to respond to the court's ruling, EPA, on August 22, 2005, issued a revised draft regulation setting forth a revamped primary radiation health protection standard to be used to evaluate the safety of the proposed Yucca Mountain nuclear waste repository in Nevada. The new standard proposed by EPA is nearly identical to the previous one and appears to suffer from virtually the same legal and scientific defects (and more) as the standard rejected by the Court.

The old rule established a 15 millirem/year individual protection standard for the first 10,000 years, and no limit thereafter. The new rule establishes the same 15 millirem/year standard for the first 10,000 years and an extremely (and unprecedentedly) high 350 millirem/year standard thereafter. The old rule included no groundwater protection standard after 10,000 years, and that remains true for the new rule.

The disparity between the radiation dose limits before and after 10,000 years actually becomes far greater than the 23-fold difference between 15 and 350. That is because the statistical method EPA mandates for determining compliance with the "350" sharply diverges from that used for determining compliance with the "15," making the 350 millirem/year standard the functional equivalent of a much higher number, one so high that it affords essentially no public protection at all. The dose permitted at Yucca Mountain would be roughly ten times greater than what EPA, NRC and other regulatory bodies have previously allowed for all non-medical anthropogenic radiation sources combined.

In extensive comments, the State of Nevada noted that EPA's new rule has numerous fatal defects, among them the following:

- Failure to Adopt NAS's Peak Dose Recommendation. As the Court emphasized, the National Academy of Sciences (NAS) could hardly have been more clear that EPA's public health standard should remain in effect through the period of peak dose, whenever that occurs, and that no scientific basis exists to curtail that standard at 10,000 years. Like the old rule, the new one abruptly abandons EPA's health-based dose standard after 10,000 years with no scientific justification. The substitution of a second-tier standard 70 times less stringent, without scientific support, is an obvious effort to circumvent the "peak dose" approach referenced by the NAS and the Court, so as to "pass" the repository.
- Failure to Adopt the NAS's Exposure Recommendations. The level of human exposure after 10,000 years permitted by the new rule far exceeds 2 to 20 millirem/year, which the NAS specifically recommended as the acceptable range of radiation exposure. Until now, EPA has expressly adhered to that range. But EPA's proposed rule would be 17 to 52 times less stringent, depending on how the dose rate is calculated.
- Violation of EPA's Own Public Health Protection Standards. In its prior Yucca Mountain rulemaking, EPA expressly rejected a two-tier regulatory approach that would have applied a 150 millirem standard past 10,000 years, finding that neither EPA nor any other regulatory body would consider such a limit acceptable. EPA also rejected proposed standards of 70 millirem/year and even 25 millirem/year as providing insufficient protection of public health. With the proposed new regulation, EPA has done an about-face with no rational justification. Its new standard is so weak and inconsistent with long established national concepts of radiation protection that the president of the prestigious National Council on Radiation Protection has publicly opposed it.
- Weakest Standard in the World. EPA's proposed radiation protection standard would be the weakest peak dose standard applied anywhere in the world. It exceeds the maximum acceptable radiation exposure from man-made sources in all industrialized countries, and the proposed cleanup standard for other DOE sites with radioactive waste, by roughly a factor of 10.
- Abandonment of NAS and International Consensus on Apportionment. The NAS identified a "general consensus" among national and international bodies on a framework for public health protection from radiation releases. EPA has until now joined in this consensus, limiting to 100 millirem/year the total amount allowed for continuous or frequent exposures from all non-medical, human-produced radiation sources. The fraction of that total typically allocated to high-level waste disposal is 10 to 30 millirem/year. In flagrant violation of this apportionment principle, the proposed rule would allow a single source to far exceed the amount that could safely come from all sources.
- Abandonment of Groundwater Protection. The new standard would abandon any groundwater protection requirement after 10,000 years, arbitrarily eliminating this protection in the very manner criticized by the Court.

- Misinterpretation of the Importance of Uncertainty. The centerpiece of EPA's defense of its proposed standard — that the high levels of uncertainty are inherent in projecting performance over long time periods — is untenable on multiple levels and provides no foundation for the proposed rule. Uncertainties in the Yucca Mountain setting do not increase materially after 10,000 years. Moreover, even if there were a substantial increase in uncertainty, EPA fails to explain rationally how this would justify a looser standard rather than a conservative, protective one that applies through peak dose. EPA's use of the term "uncertainty" is chronically vague and fails to acknowledge that all of Yucca Mountain's uncertainties support a more protective rather than a looser standard.
- Misuse of Natural Background. The proposed rule offers the spurious analogy that, since natural background radiation levels are higher in some selected areas of the country and people continue to live in those areas, this somehow justifies allowing future generations residing in the Yucca Mountain region to be subjected to high levels of radiation from the repository. This reasoning is glaringly inconsistent with EPA's historical approach to radiation health protection. In the past, EPA and other national and international radiation standard setting organizations have rejected such comparisons in defining acceptable levels of risk, and EPA offers no rational explanation for the change in its position.
- Abandonment of Intergenerational Equity. The new standard wrongly assumes it is ethically permissible and consistent with EPA's duty to protect public health to expose future generations to radiation levels far higher than we would tolerate today.

The State concluded that EPA has no alternative but to again withdraw the proposed rule and reissue a new draft standard that abandons the arbitrary and scientifically unjustified bifurcated radiation exposure limits; that continues strict groundwater protection requirements through the period of maximum exposure; that eliminates statistical gerrymandering through the use of median vs. mean calculations; that removes inappropriate and illegal intrusions into the NRC regulatory arena; and that returns to EPA's historical approach to radiation and environmental protection.

The State's comments concluded, "The only scientifically and legally supportable way to bring EPA's Yucca Mountain rule into compliance with the Court's directives and the NAS recommendations is to extend the 15 millirems per year maximum exposure threshold, together with the 4 millirems groundwater protection requirement, through the period of maximum projected releases for the Yucca Mountain facility. This simple and straightforward approach is the one Nevada recommended to EPA even before the current proposed standard was released. It

remains the ONLY possible course of action that can result in a legally, scientifically and morally defensible radiation health protection regime for the proposed Yucca Mountain facility.”⁴

As of the date of this report, EPA has not issued its final Yucca Mountain health protection standard, and no firm date for the release has been announced.

CONGRESSIONAL DEVELOPMENTS

Given the pervasive and systemic problems plaguing the Yucca Mountain program, it is widely acknowledged that the only way for the project to go forward is the enactment of some form of legislation that would clear “obstacles” for DOE and permit the project to be implemented in spite of all of its deficiencies. During the spring, summer and fall of 2006, several pieces of legislation were either introduced in Congress or proposed by project supporters. Interestingly, several of the proposed bills contain provisions that would seem to open the door, however slightly, for new approaches to spent fuel and high-level waste management.

DOE’s Proposed Legislation (S.2589)

Since the Court of Appeals decision addressing the inadequacy of EPA’s now-withdrawn Yucca Mountain health protection standard, it had been widely expected that DOE would seek congressional relief in the form of legislation directing EPA to set a standard the site could meet. In March 2006, Energy Secretary Samuel Bodman released draft legislation that would do just that and more. The proposed legislation, ultimately introduced as S.2589 by Senators Pete Domenici (NM) and James Inhofe (OK), would not only ‘fix’ DOE’s problem with the EPA health standard, but it would also eliminate a series of ‘obstacles’ to moving Yucca Mountain forward. A brief summary of S. 2589’s provision follows, with a sectional analysis of the bill contained in Attachment II.

Land Withdrawal and Reservation

Section 3 of the bill deals with the permanent withdrawal from public use of the land on which the geologic repository operations area is located. Section 3 would withdraw permanently from public use approximately 147,000 acres in Nye County, Nevada. The proposed land withdrawal is the same one considered as a potential land withdrawal in the Final Environmental Impact Statement (FEIS) accompanying the Secretary of Energy’s 2002 nuclear waste repository site recommendation to the President, which the Congress subsequently approved.

⁴ When Nevada officials made this proposal in a meeting with EPA in 2005, the EPA staff rejected it on the grounds that it “...would effectively disqualify Yucca Mountain, and we have been directed not to propose anything that might disqualify the site.” So much for objective standard setting based on health and safety concerns.

Subsections (a), (b), (c), and (d) would withdraw the land; vest the Secretary of Energy with jurisdiction over the withdrawal; transfer jurisdiction from the Secretary of the Air Force and Secretary of the Interior of lands within the withdrawal currently under their jurisdiction; reserve the land for the Secretary of Energy's use for activities associated with the disposal of high-level waste and spent nuclear fuel under the Nuclear Waste Policy Act of 1982; and revoke existing land orders and right-of-way reservations over the withdrawn lands.

Subsection (e) would confer general management authority over the withdrawal on the Secretary of Energy. It would require development of a management plan that would be submitted to the Congress and the State of Nevada within three years. It would give the Secretary of Energy the ability to approve uses of the land by the Air Force and Nevada Test Site and would permit continuation of existing grazing, hunting, trapping, and mining uses of the withdrawn land.

Subsection (f) concerns claims against the United States. It would grant immunity to the United States, its departments and agencies, for any damages to persons or property suffered in the course of any mining, mineral leasing, or geothermal leasing on the withdrawal. This is a standard protection for the taxpayers in withdrawal legislation.

Subsection (g) would authorize land acquisition within the withdrawal. The Secretary of the Interior would conduct any exchange of lands outside the withdrawal for lands within the withdrawal.

Application Procedures and Infrastructure Activities

Section 4 would amend the Nuclear Regulatory Commission (NRC) licensing process in several respects.

First, section 4 would specify that an initial application for construction authorization at Yucca Mountain need not include information on surface facilities other than those facilities necessary for initial operations.

Second, section 4 would repeal the 70,000 metric ton limit on the quantity of spent fuel that could be emplaced in the Yucca Mountain repository. Removing this limit would allow the nearly 120,000 metric tons of spent nuclear fuel and high-level nuclear waste whose environmental impact was analyzed in the FEIS in 2002 to be emplaced at Yucca Mountain. Enactment of this provision would postpone indefinitely the need to initiate a second repository program.

Third, section 4 would establish an expedited one-year schedule and a simplified, informal process (including discovery procedures) for use by the NRC (if the NRC authorizes construction of the repository) to consider an application for permission to "receive and possess" nuclear materials, as well as applications for other license actions. A six-month extension would be

allowed under the provision. Current law sets no limits on this process beyond the construction authorization.

Fourth, section 4 would authorize the Secretary to undertake infrastructure activities needed to further waste disposal activities at the Yucca Mountain site or transportation to such site of spent nuclear fuel or high level radioactive waste, including the construction of a rail line to connect the Yucca Mountain site with the national rail network. These activities could be undertaken before or after an NRC construction authorization decision on the Yucca Mountain repository.

Fifth, section 4 would require normal environmental reviews of infrastructure activities. The scope of environmental review of activities undertaken under this section would be limited in a similar way as certain other activities under the Act as to need, alternatives, and the no-action alternative, and other Federal agencies would be required to adopt an environmental impact statement prepared under this section. The bill specifies that the undertaking of an infrastructure activity under this section would not provide grounds for NRC rejection of a construction authorization application for the Yucca Mountain repository.

Sixth, section 4 would direct relevant Federal, State, local, and Tribal officials to grant expeditiously, to the extent consistent with law, rights-of-way and other authorizations for infrastructure activities. This section also makes clear such activities are in the public interest and consistent with the public convenience and necessity.

Finally, section 4 direct the NRC that it need not consider in its environmental review relating to the Yucca Mountain repository any action connected or otherwise related to the repository that is undertaken outside the geologic repository operations area and does not need an NRC license. This would allow the NRC to focus its time and attention on the matters related to the safety of repository.

Nuclear Waste Fund

Section 5 would facilitate adequate funding for the licensing and construction phase of the Yucca Mountain program by making a technical budgetary scoring change. The annual fees collected from utilities would be classified as discretionary offsetting collections and would be credited against the amount appropriated from the Nuclear Waste Fund each year. Up to now the fees collected have been scored as mandatory receipts (fees required by law), while repository program expenditures have been classified as discretionary expenditures. Under deficit reduction laws, mandatory receipts cannot be used to offset discretionary expenditures. This proposal would correct that structural budget problem.

This section also would add infrastructure activities to the list of activities for which expenditures may be made from the Fund.

Regulatory Requirements

Section 6 would exempt from the requirements of the Resource Conservation and Recovery Act (RCRA) any material owned by the Secretary if it is transported in a package, cask, or other container certified by the NRC for transportation or storage of that type of material. Similarly, any material located at the Yucca Mountain site would be exempt from RCRA if managed in accordance with a license issued by the NRC to receive and possess high-level waste and spent nuclear fuel. The NRC licensing process is complex and comprehensive, designed to protect public health and safety. This section would eliminate lengthy, largely duplicative reviews under a different regulatory scheme.

This section also would designate the Environmental Protection Agency as the appropriate agency to issue, administer, and enforce any air quality permits required in connection with the nuclear waste project. This would simplify the regulatory framework for the repository without compromising environmental protection or safety.

Transportation

Section 7 would provide that the Secretary of Energy is authorized to determine the extent to which any transportation done in carrying out the Secretary of Energy's functions under the Nuclear Waste Policy Act of 1982 would be regulated exclusively under the Atomic Energy Act of 1954, as is currently the case with respect to the transportation of weapons grade material. In addition, on request by the Secretary of Energy, the Secretary of Transportation would be authorized to determine, pursuant to section 5125 of title 49, United States Code, that any requirement of a State, political subdivision of a State, or Indian tribe regarding transportation done by or on behalf of the Secretary of Energy in carrying out the NWPA is preempted, irrespective of whether the transportation otherwise is or would be subject to regulation under the Hazardous Materials Transportation Authorization Act of 1994.

The transportation provision of S. 2598 were vociferously objected to by numerous states, regional state organizations, and public interest groups and organizations on the grounds that they would exempt DOE from any meaningful control and oversight in the shipment of nuclear waste.

Water Rights

Section 8 would declare the use of water from any source for carrying out Department of Energy functions under the Nuclear Waste Policy Act of 1982 to be beneficial to interstate commerce in quantities sufficient to accomplish the purposes of the Act and would declare that such use does not threaten to prove detrimental to the public interest. The section would prohibit a State from enacting or applying a law that discriminates against that use. The section also would authorize the Secretary to obtain water rights by purchase or otherwise to carry out the Department's functions under the NWPA.

Waste Confidence

Section 9 would require the NRC, in considering whether to permit the construction or operation of a nuclear reactor or a related facility, to deem, without further consideration, that sufficient capacity will be available in a timely manner to dispose of the spent nuclear fuel and high-level radioactive waste resulting from the operation of the reactor and any related facilities.

Proposed Language in the FY 2007 Energy and Water Development Appropriation Act

In June 2006, Senators Domenici (NM) and Reid (NV) proposed language for the FY 2007 Energy and Water Development Act that significantly differs from the Administration's proposed approach to 'fixing' the country's spent nuclear fuel and high-level radioactive waste program. The Domenici/Reid language shifts priority away from fast-tracking the Yucca Mountain repository project and fosters establishment of state-specific or regional consolidation and preparation (CAP) facilities. Such facilities would provide for temporary dry storage of spent nuclear fuel, making the fuel more readily accessible for reprocessing as part of the Administration's Global Nuclear Energy Initiative (GNEP)⁵. A summary of the proposed 2007 Energy and Water Development Appropriations language is contained in Attachment II.

Prospects for enactment of the interim storage or CAP provisions contained in the Senate's version of the Energy and Water Appropriation Act are uncertain, since the House of Representatives version of the Act took a different approach, focusing more heavily on moving Yucca Mountain forward and limiting funding for GNEP initiatives. However, the Domenici/Reid amendments to the FY 2007 Energy and Water Development Appropriations Act have been passed out of the full Energy and Natural Resources Committee and reported to the floor of the U.S. Senate. It remains the only viable vehicle for Yucca Mountain-related legislation poised for passage in at least one house of Congress.

Proposed Nuclear Industry Legislation

In September 2006, the Nuclear Energy Institute (NEI) publically released a draft Yucca Mountain bill that would go even further than the Administration's bill in fast-tracking the movement of nuclear waste to the Yucca Mountain site. The NEI proposal, which has not been introduced in Congress as it is intended primarily to stake out the industry's position on any future legislation, incorporates all of the 'fix Yucca' provisions of the DOE bill, but it also included provisions for the establishment of a "temporary fuel storage facility" within Area 25 of the Nevada Test Site. In addition, NEI's proposed bill would provide for the voluntary siting of interim storage facilities in states where governors have given their consent, with provisions for "benefit agreements" for willing states and local governments. (See Attachment II for a summary of the proposed NEI bill provisions.)

⁵ GNEP is discussed in greater detail below.

Senator Domenici's Stand-Alone Yucca Mountain Bill (S. 3962)

On September 27, 2006, Sen. Pete Domenici, in his capacity as chairman of the Senate Energy and Natural Resource Committee, introduced S.3962, the Nuclear Fuel Management and Disposal Act. The bill also contains most of the Administration bill's 'fix Yucca' provisions, with the prominent exception of the exemptions to transportation regulations that were so widely criticized by states, interest groups and regional organizations. A brief summary of S. 3962 is as follows:

- The bill requires DOE to submit a license application for the storage facility at the same time it submits the license application for Yucca Mountain. DOE has said it expects to submit the Yucca Mountain license application in June 2008;
- Authorizes NRC to grant the license for the above-ground storage facility 18 months later. Under the Domenici bill, defense fuel could be consolidated at the above-ground site at the repository as early as 2010;
- Authorizes DOE to begin moving civilian spent fuel to the above-ground storage site as soon as the NRC issues the construction authorization for Yucca Mountain and after the DOE Secretary determines that there will not be a recycling option available for that fuel within a reasonable period of time. According to the DOE schedule, the construction authorization will be issued in September 2011;
- Authorizes DOE to permanently withdraw 147,000 acres currently controlled by the Bureau of Land Management, the Air Force, and the Nevada Test Site.
- Repeals the 70,000 metric ton statutory limit on emplacement of radioactive material at Yucca Mountain. The capacity of the mountain will be determined by scientific and technical analysis;
- Gives DOE authority to begin construction of infrastructure for the repository and surface storage facilities as soon as DOE completes an EIS that evaluates these activities;
- Authorizes DOE to begin moving defense fuel and waste to the Nevada Test Site as soon as DOE receives the permit for the surface storage facilities from the NRC;
- Withdraws the land for the rail route for Yucca Mountain;
- Modifies the waste acceptance contract that a utility must sign with the DOE that currently states DOE will begin to accept spent fuel in 1998;
- Changes the deadline for waste acceptance by DOE from a specified date to 25 years after the nuclear plant begins commercial operation;

- Provides that appropriations from the Nuclear Waste Fund will not count against the allocations for discretionary spending. In short, this bill takes the Nuclear Waste Fund off budget; and
- Requires the NRC, in considering whether to permit the construction or operation of additional nuclear reactors, to take the provisions of this legislation and the obligation of the DOE to develop a repository as grounds that sufficient capacity will be available in a timely manner to dispose of the spent nuclear fuel and high-level radioactive waste. This addresses the so-called “waste confidence” issue.

A more detailed summary of the Domenici bill, together with the actual bill language, is contained in Attachment II.

Prospects for Action on Yucca Mountain-Related Legislation

No Yucca Mountain legislation is expected to be addressed until the new Congress convenes in January 2007. Prospects for passage at that time will depend upon the make-up of the new Congress and the press of other high-priority matters on the congressional schedule.

NRC LICENSING: STATUS AND PROSPECTS

Overview of the NRC Licensing Process

In 1981, prior to the enactment of the NWPA, NRC promulgated its first regulations designed to govern the licensing of any high-level radioactive waste repository. Those regulations closely paralleled - and were the basis for - the criteria set forth for site suitability in the NWPA and subsequently incorporated into DOE’s original guidelines for siting and evaluating potential repository sites. In addition to requiring compliance with EPA’s health protection regulations, the NRC licensing regulations required DOE to demonstrate that the repository meet specific performance requirements for waste isolation based on site and design characteristics.

In 2001, NRC promulgated an entirely new set of regulations specifically and solely for licensing a repository at Yucca Mountain. NRC left the original regulations in place for use in licensing repositories elsewhere, thereby creating a licensing regime that had one set of standards for Yucca Mountain and another, more stringent set of requirements for repositories that might be located in other states. The new Yucca Mountain-specific regulations did away with specific performance requirements and, instead, only required DOE to demonstrate, using computer

modeling, that Yucca Mountain is capable of meeting EPA's health protection standard.⁶ Like the EPA health protection regulations, NRC's 2001 licensing regulations limited the period for which compliance must be demonstrated to just the first 10,000 years.

The D.C. Circuit Court of Appeals ruling in 2004 did not vacate all of NRC's new Yucca Mountain licensing regulations. It let stand NRC's decision to rely solely on a performance-based approach as opposed to evaluating the site against specific technical criteria. However, the court invalidated the aspect of the regulations that limited the period of compliance to 10,000 years (i.e., the extent to which the NRC regulations rely on the vacated EPA standard). NRC will revise its Yucca Mountain licensing regulations to incorporate the new EPA standard when the new standard is final.

DOE's Approach to Licensing

The NWPA requires that DOE submit a license application to the NRC within 90 days of final action by the President and Congress approving Yucca Mountain for development as a repository. In making its recommendation to the President in 2002 that the Yucca Mountain project go forward, DOE acknowledged that it could not meet the 90-day deadline and, instead, announced it planned to submit the license application in 2004. In late November 2004, DOE announced that it would not meet that self-imposed deadline.

In addition to major deficiencies in its license application, the failure to develop a defensible facility design, fundamental quality assurance problems, and the scandal involving data falsification and fabrication, DOE encountered major problems in obtaining NRC certification for its internet-based document access system for NRC's Licensing Support Network (LSN).⁷ In July 2004, DOE announced that it had met NRC's criteria for document availability by launching a web-based document access system. Almost immediately, however, it became apparent that the database was seriously deficient, incomplete and replete with major

⁶ To demonstrate compliance, NRC requires DOE to perform a 'performance assessment' that accounts for all of the various factors relating to waste isolation and facility performance in a single integrated computer model. Both NRC and DOE have been roundly criticized for over-reliance on the performance assessment approach because it permits DOE to mask major site deficiencies, even disqualifying conditions, by the way the computer model is structured and how the various factors are accounted for and weighted. For example, where rapid groundwater travel time was considered a disqualifying factor in the old NRC regulations, under the performance-based system, rapid water movement through the repository is treated as only one of many factors, and DOE is able to disguise its importance by loading compensatory factors into the computer model (such as long-lived manmade containers and other engineered barriers).

⁷ The LSN is an internet-based system designed to contain all of the materials and documents DOE and other parties in the licensing proceeding will rely on to support technical conclusions, contentions, etc. As part of its licensing regulations, NRC requires DOE to have all of its licensing-related documents on the LSN and certified as complete six months before a license application can be docketed. There are over 2 million documents DOE must have available on the LSN to support its license application. The requirement for access to supporting documents and materials also applies to the State of Nevada and interveners in the licensing proceeding. The State must make its licensing documents available not later than 90 days following certification of the DOE documents.

technical and security-related problems. Nevada challenged the certification, and NRC upheld the State's challenge and rejected the DOE certification.

In 2006, DOE announced a new schedule for finalizing and submitting a license application that would result in a final submission to NRC in June 2008. DOE now plans to have its licensing information system certified and on-line 6 month prior to that date.

Nevada's Role and Responsibilities in Licensing

By law, the State of Nevada is recognized as a full participant in the NRC licensing proceeding. As the Commission noted in its report to the Governor and Legislature two years ago, NRC licensing is an adjudicatory proceeding where DOE would be forced, for the first time, to defend its flawed and politically-driven science at Yucca Mountain in a forum where the State's first-rate team of licensing attorneys and technical experts are prepared to see to it that the real facts regarding Yucca Mountain's unsuitability as a geologic repository prevail.⁸ Nevada's legal team and technical experts would be able to question and cross-examine DOE staff and scientists with respect to evidence presented in support of DOE's license application. Nevada must also be prepared to present its own data and information to challenge DOE's conclusions and to support alternative conclusions and findings.

A continuing major concern for Nevada is assuring that the NRC licensing proceeding is fair, objective, and unbiased. As the Commission's 2004 report noted, there has been a history of inappropriate contacts by NRC staff and DOE in the pre-licensing phase of the project.⁹ NRC, very early on, adopted the view that it has a responsibility to assist DOE and assure that the Department is able to produce an acceptable license application for Yucca Mountain. Over the years, the two agencies have interacted repeatedly in subtle and not-so-subtle ways to assure smooth sailing for DOE's increasingly troubled repository program. Despite repeated letters and protestations from the Agency and its legal team, these NRC-DOE interactions continue, casting a shadow over NRC's ability - or inclination - to serve as an impartial arbiter of fact in determining whether to grant DOE a license for a Yucca Mountain facility.

Preparing for and intervening in a NRC licensing proceeding is a lengthy, extremely costly and resource intensive process. Like DOE, the State will be required to provide NRC with all of the documents, data and other materials it plans to use in licensing in a format compatible with NRC's licensing support network. That effort, which the Agency initiated over 2 years ago, involves thousands of documents and hundreds of person-hours as well as the services of a

⁸ In its 2002 Report, the Commission noted that, "Defending its actions under oath and under cross examination by premier national and international legal and technical experts is, for DOE, a far cry from pulling the wool over the eyes of willing and complicit members of Congress."

⁹ Report and Recommendations of the Nevada Commission on Nuclear Projects (December, 2002), p. 15 - 17.

speciality contractor for scanning, formatting and loading the information into a web-compatible database system.

The licensing process itself is an extremely complex one, both legally and technically. It is anticipated that there could be as many as three (3) NRC licensing boards in operation at the same time, requiring attorneys and staff to cover each one. The State of Nevada must be fully engaged in every step - from reviewing, commenting and, if necessary, challenging NRC licensing regulations, to participating in pre-licensing proceedings and forums, to producing detailed technical analyses supporting contentions the State will raise relative to DOE's assertions about site performance, to substantive and procedural legal challenges to NRC's implementation of the process, and to full-scale participation in the ultimate NRC proceeding themselves. The effort on the part of the Agency to effectively engage in the NRC licensing arena and adequately protect Nevada's interests is likely to be the most complex and costly activity the Agency has engaged in to date.

THE GLOBAL NUCLEAR ENERGY INITIATIVE (GNEP) AND IMPLICATIONS FOR YUCCA MOUNTAIN

The GNEP initiative includes three key elements that supporters say would comprise a proliferation-resistant closed nuclear fuel cycle: (1) the demonstration of separation processes in which usable and waste materials that are found in spent nuclear fuel are separated; (2) the demonstration of the conversion of transuranics; and (3) the demonstration of an advanced fuel fabrication process.

The stated goals of GNEP, as articulated in DOE's Federal Register Notice announcing the initiative, are to: (1) reduce the United States' dependence on foreign sources of fossil fuels and encourage economic growth, while meeting increasing demand for electricity without emitting air pollution and greenhouse gases; (2) recycle nuclear fuel using new proliferation-resistant technologies to recover more energy and reduce the volume of waste; (3) encourage prosperity growth and clean development around the world; and (4) utilize the latest technologies to reduce the risk of nuclear proliferation worldwide.

The proposed GNEP Technology Demonstration Program would involve the development of technologies to promote GNEP's goals. The GNEP Program would demonstrate technologies needed to implement a closed fuel cycle that enables recycling and consumption of spent nuclear fuel in a proliferation-resistant manner. While DOE has had some success at computer modeling of these technologies, it has not yet proven that these technologies will be feasible in demonstration-scale facilities.

The proposed GNEP Program includes three major projects that would be conducted in new or existing facilities. These projects would demonstrate: (1) Proliferation-resistant processes

that would separate the usable elements in commercial spent nuclear fuel from its waste elements; (2) the conversion of transuranics into shorter-lived radioisotopes; and (3) operation of an advanced fuel fabrication facility.

DOE's proposed EIS for the GNEP program will address siting, construction or modification, and operation of these demonstration-scale facilities. (Decontamination and decommissioning of these facilities will be addressed in one or more future NEPA analyses.) In addition, DOE anticipates preparing a separate NEPA analysis at a later date that would address the environmental impacts of potential future actions to encourage the commercial-scale adoption of these technologies for the management of spent nuclear fuel from commercial nuclear power reactors, as well as alternatives. At that time, DOE anticipates preparing a programmatic EIS that would address the potential environmental consequences of the widespread deployment of proliferation-resistant spent nuclear fuel separation technologies, technologies that consume transuranics while extracting their energy, and fuel fabrication technologies, including those technologies that are the subject of the Technology Demonstration Program.

The significance of the GNEP initiative for DOE's Yucca Mountain program lies in the fact that GNEP anticipates making productive use of spent nuclear fuel and high-level radioactive waste, rather than simply disposing of it.¹⁰ As such, the Administration's focus on GNEP has, for the first time since the passage of the original Nuclear Waste Policy Act, opened discussion on national nuclear waste management policy that goes beyond making Yucca Mountain work. As a result of GNEP, proponents of reprocessing and transmutation, like Sen. Domenici, have begun to put forth proposals for things like interim storage in states that currently house nuclear power reactors - something that would have been unimaginable just a few years ago. Ever so subtly, the debate about nuclear waste is changing from how to get Yucca Mountain done to what is the best way to deal with nuclear waste in the near term to preserve options for reusing the material later as GNEP matures.

The technologies proposed for development and use in GNEP are many years from being realized. Commercial scale reprocessing, using the type of untested proliferation-resistant processes envisioned under GNEP, will be a major challenge and will take decade and billions of dollars to develop. Nevertheless, in the context of Nevada's fight to successfully oppose Yucca Mountain, the fact that GNEP is stimulating discussion about alternatives to the present DOE program for waste management is a promising development.

DEVELOPMENTS IN THE LEGAL ARENA

¹⁰ At its April 26, 2006 meeting, the Commission heard a presentation on GNEP and its relation to Yucca Mountain by former NRC Commissioner and international nuclear power expert Victor Gilinsky, a copy of which is attached to this report (Attachment III).

Following the State of Nevada's significant legal victory overturning EPA's deficient Yucca Mountain health protection regulations in 2004, Nevada's legal team has filed a number of challenges to various aspects of the federal government's repository program and NRC's regulatory regime that is supposed to govern it. A summary of these cases is as follows:

State of Nevada v. U.S. Nuclear Regulatory Commission
(U.S. Court of Appeals for the District of Columbia Circuit,
Case No. 05-1350)

This action challenged NRC's rejection of a petition to change a 1990 rule known as the "Waste Confidence Rule." That rule allows the NRC to continue to license new nuclear plants and waste storage facilities at power plant sites based upon NRC's finding, contained in the rule, that a geologic repository for the disposal of high-level nuclear waste will be available by the year 2025. Nevada contended the rule unavoidably biases any future NRC Yucca Mountain licensing proceeding because NRC is on record as certifying repository availability by 2025. The only way that can come about is for NRC to grant DOE a license for the Nevada site because no other site could be found, characterized and licensed by that date.

In September 2006, the Court issued a ruling denying Nevada's petition, but affirming that there is no relationship between the 2025 date and NRC's obligation to impartially review a Yucca Mountain license application.

State of Nevada v. U.S. Department of Energy
(U.S. Court of Appeals for the District of Columbia Circuit,
No. 04-1309)

In 2004, Nevada challenged DOE's selection of the Caliente Rail Corridor for the disposal of spent nuclear fuel and high-level nuclear waste. Grounds for Nevada's challenge include DOE's failure to adhere to specific provisions of the National Environmental Policy Act (NEPA) and its unwillingness to defer, as required, to the authority of the Surface Transportation Board (STB). Oral argument was heard by a panel of the DC Circuit on October 18, 2005.

A decision in the case was issued on August 8, 2006. The court dismissed some of Nevada's claims and determined that others were not yet ripe for review. Specifically, the Court avoided the merits on some of Nevada's claims, finding them unripe and thus preserving them for future challenge. These include: DOE's interim transportation plan; the need for a supplemental environmental impact statement; whether DOE's transportation plan is arbitrary and capricious; and whether DOE failed to submit to the jurisdiction of the STB. The Court rejected Nevada's arguments concerning DOE's failure to consult the State Engineer; DOE's segmentation of the corridor and alignment selection; and issues relative to the environmental

impacts of corridor selection. As is the case in NEPA litigation, the court gave considerable deference to federal agency discretion in its conduct of environmental analyses.

State of Nevada v. U.S. Department of Energy
(U.S. District Court, Northern Nevada,
3:06-cv-153-ECR)

In 2006, Nevada filed a Freedom of Information Act challenge to DOE's refusal to provide the state with a copy of its draft license application. Despite making the draft license application available to NRC, the Nuclear Waste Technical Review Board and the Nuclear Energy Institute, DOE has refused repeated Nevada requests for the document. The United States has filed a motion for summary judgment and Nevada has been granted the right to seek limited discovery. Following discovery, the State will move for summary judgment.

United States v. State Engineer
(5th Judicial District Court, Nye County,
No. 15722)

This case was brought by the Justice Department on behalf of DOE following the State Engineer's denial of its applications for permanent water rights as a protective measure while the United States pursues its constitutional claims in federal court. The case is pending.

United States v. State of Nevada
(U.S. District Court, No. CV-S-00-0168-DWH-LRL)

In this case, the United States challenged the Nevada State Engineer's decision that DOE is not entitled to permanent water rights to construct and operate the repository based on the State Engineer's finding that the proposed use threatens to be detrimental to the public interest. At present, DOE is maintaining the status quo with respect to water usage at the Yucca Mountain site pursuant to a stipulation with the State of Nevada.

PRIVATE FUEL STORAGE LLC:
LESSONS FOR YUCCA MOUNTAIN

On September 8, 2006, the Secretary of the Interior voided the lease agreement the Goshute Tribe of western Utah had executed with a consortium of nuclear utility companies known as Private Fuel Storage LLC (PFS) to allow tribal land to be used for an interim storage facility for commercial spent nuclear fuel. The Interior Secretary's action effectively killed the PFS interim storage project, even though PFS had already received a license from the Nuclear Regulatory Commission to construct the facility on the reservation. While not directly related to

the Yucca Mountain issue in Nevada, there are lessons in the PFS experience for all sides of the radioactive waste debate.

In the mid-1990s, a consortium of nuclear utility companies, frustrated with the lack of progress in the federal nuclear waste management program, proposed to develop a private facility for the temporary storage of spent fuel on the Goshute Indian reservation in western Utah. The consortium formed PFS as a limited liability corporation and successfully negotiate a lease with the tribe giving PFS permission to use a portion of reservation land for the facility. Following a lengthy (6 year) and highly contentious licensing proceeding before the NRC, PFS in 2005 was granted a license to construct the interim storage facility - the first such license ever granted by the NRC.

The State of Utah strongly opposed PFS from the beginning. During the licensing process, the state raised numerous contentions dealing with a spectrum of issues, from facility design to the potential for aircraft crashes into the facility. In the end, the state was unsuccessful in preventing NRC from granting PFS a license. The state's congressional delegation was successful, however, in having a portion of land through which PFS had proposed to construct a rail access line designated as a wilderness area, requiring the U.S. Department of Interior (DOI) to approve any transportation infrastructure development within the wilderness boundaries.

Just a few months following NRC's decision to grant PFS a license, DOI announce that the construction and operation of a rail line was inconsistent with the purposes of the newly-designated wilderness area. At the same time, DOE, through the Bureau of Indian Affairs, announced that it was withholding approval of the lease agreement PFS had executed with the Goshute Tribe, effectively voiding the lease and bringing the project to a standstill.

One lesson for the Yucca Mountain project from the PFS experience is that relying on federal preemption to gain approvals is not a secure foundation for a project. Spending millions on an NRC license application process, as PFS did, is not a good investment if the state and its people are adamantly opposed to the project and are willing to go to the mat to defeat it. Obtaining the consent of the governor and people of the state is extremely important.

Another especially interesting aspect to this decision involves the reason the Interior Secretary found proceeding with PFS to be imprudent. The facility was to store "dry" casks containing radioactive spent fuel on an "interim" basis with the fuel ultimately to be shipped to the federal waste repository at Yucca Mountain. The Interior Secretary concluded, among other things, that he was not confident the Yucca Mountain repository would ever open.¹¹

¹¹ In what may be a reaction to the PFS defeat, the president of the Nuclear Energy Institute, retired Admiral Frank "Skip" Bowman, recently told members of the House Energy and Water Subcommittee that spent nuclear fuel is perfectly safe being stored at commercial nuclear power plants, and that the need for a Yucca Mountain repository is more for "public

CHAPTER TWO COVERING THE BASES: CRITICAL AREAS OF POLICY, OVERSIGHT AND LICENSING

*“Bureaucracy defends the status quo long
past the time when the quo has lost its status.”
Laurence J. Peter - US educator & writer (1919 - 1988)*

For over two decades, the State of Nevada, specifically the Nevada Agency for Nuclear Projects, has been engaged in a comprehensive program for monitoring, overseeing, and intervening in the federal Yucca Mountain project. Despite the weight of problems that have brought the repository program to a virtual halt, there remains significant inertia keeping the project afloat - or at least on life support. Consequently, during the past two years the State's efforts have been intensified in several key areas: (1) assembling data and information on key technical issues that will form the basis of Nevada's prospective challenge to any license application DOE may submit to the NRC for Yucca Mountain and undertaking new research that may be required to support the State's licensing contentions; (2) monitoring and helping defeat any legislation aimed at bailing out DOE's program or otherwise "fast-tracking" Yucca Mountain or the importation of spent fuel and high-level waste to Nevada; (3) preparing legally and procedurally for the eventuality that DOE is able to submit a license application for Yucca Mountain to the NRC; and (4) addressing DOE plans for transporting waste both nationally and within Nevada and for constructing rail access to Yucca Mountain.

CRUCIAL LICENSING AREAS

The Agency has identified certain technical areas and issues that will be critical to the State's intervention in any NRC licensing proceeding on Yucca Mountain. Major technical research has been ongoing in these areas for some time, and work to complete the studies and make the data and information available in the licensing process is expected to continue for at least the next two years. At this time, three areas of importance involve the potential for future volcanism at the Yucca Mountain site, corrosion potential for waste packages that DOE asserts will last for 10,000 years or more, and major engineering constraints involved with systems within the repository tunnels that would have to operate in extreme conditions in terms of the radiological, thermal and in-situ environment.

Volcanism

perception of confidence in where we are going.” Bowman went on to say that, as a contingency, interim storage sites should be set up, but not using the same method used to choose Yucca Mountain. "No more picking a state and forcing it down somebody's throat," said Bowman.

The NRC believes that volcanism is an issue that must be addressed in any license application for Yucca Mountain, even though DOE has been stating for years that the probability of any volcanic activity affecting Yucca Mountain is below the regulatory cutoff of 10^{-8} /year. NRC is still insisting that this is a viable issue for licensing and this Agency is continuing to perform research in this area.

The Agency's primary volcanism contractor, Dr. Gene Smith of UNLV, has been performing research on the probability of volcanic activity around the Yucca Mountain site since the mid-1980s. He has developed an alternative model that shows a magmatic disruption probability for Yucca Mountain 10 times higher than the DOE number. This research has indicated that DOE has underestimated the size of the volcanic field that surrounds Yucca Mountain and the number of volcanoes in this field. The research also strongly indicated that the volcanic activity is cyclic in nature and that the area is currently in a period of quiescence but activity will probably increase within the time frame of peak dose. DOE scientists rejected this idea for years but in the latest rendition of the expert elicitation on probabilistic volcanic hazards assessment, the experts discussed the cyclic nature of the volcanism in the area as if they had agreed all along.

Dr. Smith's current work involves collecting more samples from areas near Yucca Mountain, such as in Death Valley, age dating the samples, and running geochemical analyses to determine if the chemical characteristics of the volcanic deposits are similar to those at Yucca Mountain and are of similar age. If the results are as expected, this will give more credence to the belief that the probability of volcanic activity in and around Yucca Mountain is greater than DOE believes and could have a significant impact on the licensability of Yucca Mountain as a repository.

The Agency has been fortunate that, because of funding restraints, Clark County has recently been able to fund Dr. Smith's work and is willing to do so for the near future.

Corrosion Studies

The Agency began researching the corrosion resistance of the alloy C-22, the proposed material for the waste package, in 1999. Since that time, Agency researchers have discovered that C-22 is not the "miracle metal" that DOE had been touting. Originally, DOE stated that the waste package would last long past any regulatory time frame, in fact, stating times as long as 700,000 years! Because DOE believed that the waste package will last so long, they are not worried that the mountain itself provides little, if any, performance for the repository.

Once the Agency researchers began evaluating this alloy, they quickly realized that this metal had never been used in any similar type of environment that would be found in a repository at Yucca Mountain. The Agency researchers took a different approach than DOE in evaluating

this alloy. They looked for environments that would adversely affect the metal so that they would know the weaknesses of this metal in specific environments. DOE evaluated the metal in what they hoped would be the environment the metal packages would see in the repository. The research indicates that there will be very aggressive environments that will cause rapid corrosion of the waste package and, therefore, rapid release of radionuclides from the repository. The research also indicates that DOE's belief that little, if any, water will enter the repository during the thermal pulse is erroneous. In fact, a research experiment from the NRC's contractor, Southwest Research Institute, shows that water can flow through fractures even though the rock is above the boiling point. Not surprisingly, DOE ignores this evidence and states that any water that enters the repository will either be in volumes too small to have an effect or that the drip shields will divert the water, so no water will contact the waste package.

The drip shields are another issue of concern. The current plans call for the drip shields to be emplaced just before the repository is sealed. This could be anywhere from 50 to 300 years after the waste is emplaced. The Agency argues that at the projected current cost of more than 8 billion dollars, there will be little incentive, or possibly even ability, for future administrations to fund this cost for drip shield emplacement. The Agency believes that DOE should not be able to take any credit for the drip shields in the performance assessment of the repository in licensing since it is not known if the drip shields will even be emplaced. If this is the case, then DOE should have to show that the waste package performance does not depend on drip shields diverting any water that will enter the repository. This would have a major impact on the corrosion assessment of the waste package.

Engineering

An aspect of the repository construction and operation that DOE and the NRC have both failed to evaluate is the capability of current technology to deal with emplacement of the drip shields over the waste packages in the emplacement drifts of the repository. At the behest of the Agency, an evaluation performed by Mr. Frank Kendorski, a mining engineer with many years of experience from Agapito Associates, Inc., has shown that some of the design specifications of the repository drifts show very limited clearances for the machinery that will emplace the drip shields and that these machines will be operating in extreme conditions that could easily impact the capability of the emplacement gantries to perform. While some of the issues raised by Mr. Kendorski may change because of the new proposed TAD concept for the repository, Mr. Kendorski's work in actual mining operations indicates that, although what DOE plans looks good on paper, the reality of actually performing the operations will be very different. The high temperatures and volumes of dust in the drifts will have direct, negative impacts on any remote-controlled machinery used.

TESTIMONY ON LEGISLATION BEFORE CONGRESS

As discussed above, 2006 has seen several new pieces of Yucca Mountain legislation either proposed or introduced in Congress. For the most part, legislation is designed to clear away impediments - or perceived impediments - to moving the Yucca Mountain project forward. In at least one instance, however, the legislation would, for the first time since the passage of the original Nuclear Waste Policy Act of 1982, begin to shift focus away from siting a repository and towards alternatives for better managing and utilizing spent fuel and high-level waste.

Agency staff, in conjunction and close cooperation with the Nevada congressional delegation, provided testimony to various congressional committees on the status of the Yucca Mountain program and proposed bills dealing with the Yucca Mountain program.

Testimony Before the Senate Energy and Natural Resources Committee On the Status of the Yucca Mountain Program

The Executive Director of the Agency was invited to appear before the Senate Energy and Natural Resources Committee when it held oversight hearings on DOE's Yucca Mountain program in May 2006. The testimony focused on the major uncertainties and deficiencies that have defined the project almost from the beginning. Key elements of the testimony are as follows:

- The current status of the Yucca Mountain high-level nuclear waste repository project can be described in a single word: unknown – not even uncertain, but unknown.
- The progression of potential repository opening dates go from the statutory 1998 date to a more recent estimate of 2010, and now to maybe 2015 to 2020.
- Multiple episodes of “redirection” of the program, both from within the Department of Energy and from the Congress, define the past twenty years of the Yucca Mountain project history.
- The current status of the Yucca Mountain project, within the Office of Civilian Radioactive Waste Management, is a product of fundamental persistent and unresolved problems, with both the site and the project execution, being overlain by layers of redirection that wrongly assume the problems have been, or will be resolved.
- The failure to submit the license application in 2004 came as no surprise, since a regulatory prerequisite for license application submittal - DOE's LSN certification that all documentary material in its possession on the proposed Yucca Mountain high-level waste repository was publicly available, in the prescribed manner, at least six months prior to submission of a license application - had not been met.

- The Yucca Mountain project has been plagued by Quality Assurance deficiencies since its inception. Even before the 1987 Nuclear Waste Policy Amendments Act, DOE was aware of problems, the long-term implications of not correcting them, and assuring that an acceptable Quality Assurance program was persistent and enduring. Yet DOE ignored repeated NRC and GAO recommendations for corrective action, and, today, QA is so compromised as to render almost any data intended for use in a license application deficient.
- The proposed redesign of the Yucca Mountain repository, using the TAD concept, is rife with pitfalls and appears to be poorly thought out. It not only revives the failed concept of the Multiple Purpose Canister of the early 1990s, but calls for the equivalent of a Monitored Retrievable Storage facility at Yucca Mountain, despite the fact that placement of such a facility in Nevada is prohibited by the Nuclear Waste Policy Act as Amended, as long as a repository site is under consideration in the State.
- The draft radiation health protection standard proposed by EPA is deficient in many of the same ways as the original standard that was vacated by the courts. Nevada proposed a straightforward approach to meeting the Court's ruling: simply extend the 10,000 year compliance period for the standard as written to the time of expected maximum dose, whenever that occurs in DOE's Total System Performance Assessment.
- Three times in the past 15 years Nevada Governors have advised Secretaries of Energy and finally the Congress that the site should be disqualified under DOE's original Site Recommendation Guidelines, because of its geologic and hydrologic deficiencies. Despite DOE's own analyses finally vindicating Nevada's basis for these claims, DOE's response was to eliminate relevant disqualification factors through issuance of new guidelines just prior to its Yucca Mountain repository Site Recommendation to the President. The Yucca Mountain site, so optimistically portrayed to Congress in 1987, is scientifically not the same site before Congress today. Yucca Mountain cannot meet any reasonable test for long-term safety.

S. 2589 - The Administration's "Fix-Yucca" Bill

In August 2006, the Agency was again invited to testify before the Senate Energy and Natural Resources Committee - this time on the Secretary of Energy's proposed legislation to "fix" the Yucca Mountain project by clearing away "obstacles" DOE perceived as impeding progress and bringing the program to a standstill. As discussed above, the bill (S.2599) introduced by Senators Domenici and Inhofe, would withdraw land for the repository, remove the cap on the amount of waste that could be stored at Yucca Mountain, effectively legislate a health protection standard DOE could meet, exempt the project from RCRA and US Department of

Transportation regulations, grant DOE unfettered access to monies in the Nuclear Waste Fund, and clear other perceived obstacles.

In testimony before the committee, the Agency strongly objected to the legislation, noting:

- The bill attempts, like a cowcatcher on a locomotive, to anticipate and sweep aside every potential administrative and policy requirement that could upset the relentless drive to begin receiving radioactive waste and spent nuclear fuel at Yucca Mountain in 2017. The bill is so dismissive of American democratic values that it is not worthy of the Committee's or the Congress' consideration.
- Exempting waste transportation, storage, and disposal from the requirements of the Resource Conservation and Recovery Act (RCRA) and relying, instead, on regulations adopted under the Atomic Energy Act is an unprecedented compromise of well-understood, long-held and accepted protection of the public from the risks of hazardous materials in the environment.
- The Secretary of Energy should not be permitted to exempt waste transportation to the repository from external regulation and should not be given the ability to take the initiative in preempting State, local, and Indian tribe transportation requirements, irrespective of whether the transportation otherwise is or would be subject to regulation under the Hazardous Materials Transportation Authorization Act of 1994.
- The bill's substantive and procedural measures truncating the NRC license application and review process curtail the existing rights of parties to review a complete application and take part in an adjudicatory hearing of the entire proposed project.
- The bill would usurp states authority for regulating air quality and emissions for any activity or facility associated with the Yucca Mountain project, which according to provisions of the bill, could include construction and operation of a 319 mile-long new rail line to Yucca Mountain. Effective air quality management relies on familiarity with local conditions, and the public benefit of this valuable experience, especially related to construction in essentially pristine areas, would be lost under the bill.
- The bill usurps the State's traditional authority to administer its waters by commanding the State to grant extraordinary rights to the Department of Energy.
- The proposed withdrawal of 147,000 acres (approximately 230 square miles) of land for the Yucca Mountain project, which could include land for the 319 mile-long rail access to the site, is premature. Without a construction authorization by NRC, which the

Department does not expect until at least 2011, there is no need or basis for the withdrawal.

- The bill's provisions allowing for significant infrastructure improvements and construction prior to NRC construction authorization are also premature and imprudent
- Granting DOE full access to the Nuclear Waste Fund is not only imprudent, but it would not have been the solution to the problems that the program has inflicted on itself historically and are beyond the scope of the anticipated and potential problems that the bill seeks to sweep aside.
- Throughout its history, the inability of the DOE Yucca Mountain program to implement a satisfactory quality assurance program has been chronicled by the General Accounting Office (now Government Accountability Office) and the NRC, yet to date the problems persist, leaving DOE with a wholly inadequate and unreliable QA program.

The testimony concluded that none of the provisions of S. 2589 are needed by the Department of Energy to carry out the primary task at hand - to prepare a complete, high quality license application and submit it to the Nuclear Regulatory Commission for review and hearing. It noted that the bill gathers the powers of numerous federal and state agencies, local authorities, and Indian tribes into the hands of the Department of Energy, probably the most distrusted federal agency in the human health and environmental arena, and it boldly does this for the sole purpose of attempting to force a faltering Yucca Mountain nuclear waste repository into becoming a reality.

PRE-LICENSING AND LICENSING ACTIVITIES

A major focus of Agency activity during 2005 and 2006 has been assuring that the State is adequately prepared to participate effectively and successfully in any NRC Yucca Mountain licensing proceeding that may occur. As noted above, DOE has established June 2008 as its newest deadline for submitting a license application to the NRC. While there are serious impediments to achieving that milestone - not the least of which is being able to complete the required licensing information database that is a key prerequisite for license submittal, the Agency believes DOE will do everything in its power to submit the license application in 2008 before the current Administration leaves office. As a result, the Agency has been working diligently to prepare the State's licensing plan and assure that all necessary work is accomplished in a time frame adequate to support a rigorous, substantive, and effective intervention strategy.

As noted above, the licensing process is an extremely complex one, both legally and technically. The effort on the part of the Agency to effectively engage in the NRC licensing

arena and adequately protect Nevada's interests is likely to be the most complex and costly activity in which the Agency has engaged to date.

To carry out its responsibilities in this regard, the Agency has assembled a first-rate team of legal and technical experts with experience and expertise in the highly specialized NRC legal, regulatory and adjudicatory arenas and in critical scientific and technical disciplines directly related to key areas of site/waste isolation system performance and overall Yucca Mountain licensability.

During the past two years, the State's legal team has been heavily engaged with the NRC's Pre-Licensing Application Presiding Officer (PAPO) Board in defining the policies and procedures that would govern any actual licensing proceeding. In addition, Agency staff, assisted and guided by the legal team, has been incrementally assembling documents and materials for loading on the NRC's licensing support network information database, a task that is both costly and extremely labor intensive.¹²

One of the most important - and frustrating - areas of the State's pre-licensing activities has been gaining access to current information and technical materials on the Yucca Mountain repository facility and system design being proposed for licensing and on DOE's key performance models and related information essential for licensing. DOE has, to date, refused to provide information on the current repository design and models used to assess repository system performance (i.e., waste isolation capabilities) and has rebuffed State efforts to obtain a copy of the draft license application, even though that document has been shared with others.

The Agency has also been engaged in a sustained and concerted research effort to address key technical and scientific issues that are expected to be important to the State's licensing intervention. To that end, the Agency has engaged nationally and internationally recognized scientists and experts in fields of hydrology, geochemistry, volcanism/seismicity, and health physics. These scientists are working closely with the State licensing team, compiling data from over two decades of Agency-sponsored research on the Yucca Mountain site, carrying out new research and preparing scientific reports and papers to be published in peer-reviewed journals - work that will support the State's contentions in any licensing proceeding. They will also be available as expert witnesses during any future licensing proceeding.

¹² The State of Nevada, as a participant in the licensing process, is also required to have all of the documents and materials it will rely on in licensing loaded into the NRC web-base information system. In addition, NRC also requires the State and other participants to include in the database Agency materials that DOE or other licensing parties might be reasonably expected to need to respond to contentions made by the State. This places an extraordinary burden on the State in that it means that thousands of documents must be converted to electronic files and loaded onto the web-based system, at considerable cost and effort.

INTERVENTIONS WITH RESPECT TO THE PROPOSED EPA HEALTH PROTECTION STANDARD

As noted above in the discussion on the EPA's Yucca Mountain health protection standard above, the Agency has expressed serious concerns regarding EPA's apparent refusal to adhere to the directives of the federal court and the National Academy of Sciences in issuing a new draft standard for review. The Agency devoted considerable time and effort to carefully reviewing EPA proposed revision of the standard and provided EPA with extensive comments, including several supplemental comments submitted after the close of the formal comment period by made timely but the release of new information not available during the comment period.

The 337 pages of comments on the revised health protection standard that were compiled by the Agency and submitted to EPA in November 2005 can be accessed on the web at http://www.state.nv.us/nucwaste/news2005/pdf/nv051118epa_comments.pdf . In January 2006, the Agency submitted supplemental technical comments dealing with how localized corrosion of waste packages is dealt with in the procedure EPA set forth for assessing waste isolation performance in the revised standard (<http://www.state.nv.us/nucwaste/news2006/pdf/nv060111epa.pdf>) .

PETITION ON SAFEGUARDS AND SECURITY BEFORE THE NRC

In 1999, more than two years before the events of September 11, 2001, the Nevada Attorney General, using information compiled by the Agency, filed a formal petition with the NRC asking that the NRC undertake a comprehensive review of its regulations governing the requirements for safeguarding shipments of spent nuclear fuel and high-level waste from terrorism and sabotage. In that petition, the Agency pointed out that the NRC "safeguards" regulation had not been reviewed or revised since 1980, and that both the nature of the terrorist threat and the type and capabilities of weapons potentially available to terrorists had changed significantly in the intervening years. The Agency asked NRC to undertake a thorough review of the changed circumstances and update its regulations accordingly.

Nevada's petition was endorsed by the Western Governors' Association, the State of Virginia and a number of public interest groups that wrote to NRC in support of Nevada's petition.

Other than acknowledging receipt of the petition and opening a docket - a purely routine administrative step, NRC took no action on the State's petition, despite repeated requests by the Agency and the Attorney General for NRC to undertake the reviews and updates.

In August 2006, the Attorney General received a letter from NRC stating that “NRC has completed its security assessments and is now in the process of resolving [the State’s] petition,” promising that it would be addressed in a Federal Register Notice. To date, no such notice has been forthcoming.

INCREASED ACTIVITY IN THE TRANSPORTATION ARENA

DOE’s Selection of a National Transportation Mode

In April 2004, DOE issued a Record of Decision (ROD) for the Yucca Mountain Final Environmental Impact Statement (FEIS)¹³ that formally selected rail as the preferred mode of transport for spent fuel and high-level waste to the proposed repository. The ROD specified that DOE would use rail transportation as the primary mode of shipment for moving waste from reactors and generator sites to Yucca Mountain, but it was silent regarding the fact that up to forty percent of reactor sites lack the capability to ship spent fuel by rail.

To further complicate matters, in a “supplemental analysis” to the FEIS issued just weeks before the ROD, DOE announced that it was resurrecting a transportation mode alternative that had been rejected in the FEIS as infeasible and excessively risky.¹⁴ This transportation alternative involved shipping spent fuel by rail using legal-weight truck casks and then off-loading the casks onto trucks somewhere in Nevada for transshipment to Yucca Mountain. The ROD incorporated this supplemental mode of transport, despite analyses in the FEIS that showed this alternative would have the “highest estimates of occupational health and public health and safety impacts” as well as being “impractical” and more costly than all the other alternatives by “more than \$1 billion.” The option was eliminated from further consideration by DOE years before the FEIS was completed, and it was not even considered in the FEIS’s balancing of the alternatives required by National Environmental Policy Act.¹⁵

In September 2004, then-Attorney General Brian Sandoval filed suit in the DC Circuit Court of Appeals challenging that DOE’s ROD failed to provide adequate justification for selecting rail transportation as the preferred national transportation mode, resurrected and incorporated a previously rejected modal alternative (i.e., shipping lighter, less robust legal-

¹³ “Record of Decision on Mode of Transportation and Nevada Rail Corridor for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada,” Federal Register, April 8, 2004 (Vol. 69, Number 68, p. 18557 - 18565).

¹⁴ “Supplemental Analysis” (DOE/EIS-0250/SA-1), prepared by the Office of Civilian Radioactive Waste Management, U.S. Department of Energy, March 2004.

¹⁵ Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (DOE/EIS-0250F), February 2002, Appendix J, p. 75.

weight truck casks on rail cars), failed to perform legally required environmental impact analyses in identifying a preferred rail corridor in Nevada for nuclear waste shipments to the proposed Yucca Mountain facility, and usurped the role and responsibilities of the Surface Transportation Board in the siting and construction of rail infrastructure. The suit contended the ROD violated the National Environmental Policy Act, the Interstate Commerce Act, and regulations set by the Council on Environmental Quality, the Surface Transportation Board, and DOE itself.

In September 2006, the court dismissed some of Nevada's claims and determined that others were not yet ripe for review. Specifically, the Court avoided the merits on some of Nevada's claims, finding them unripe and thus preserving them for future challenge. These include: DOE's interim transportation plan; the need for a supplemental environmental impact statement; whether DOE's transportation plan is arbitrary and capricious; and whether DOE failed to submit to the jurisdiction of the Surface Transportation Board. The Court rejected Nevada's arguments concerning DOE's failure to consult the State Engineer; DOE's segmentation of the corridor and alignment selection; and issues relative to the environmental impacts of corridor selection. As is the case in NEPA litigation, the court gave considerable deference to federal agency discretion in its conduct of environmental analyses. However, the court left the door open for Nevada to re-litigate issues at such time as DOE has made decisions and the matters become ripe for challenge.

Selection of the Caliente Alternative as the Preferred Rail Corridor to Yucca Mountain

The same ROD that selected rail as the preferred mode of transportation also formally designated the Caliente rail corridor as the preferred alternative for constructing a rail spur to Yucca Mountain. Even before the issuance of the formal ROD, DOE had requested that the Bureau of Land Management immediately segregate land within a one-mile-wide corridor (approximately 308,600 acres) running the length of the Caliente route from mining and other uses for a period of two years.

In its review of DOE's potential rail routes to Yucca Mountain, the Agency has long considered the Caliente route to be the most difficult and challenging alternative from an engineering and construction perspective. An Agency report published in 1998 estimated that the cost of constructing a rail line along the Caliente route would likely exceed \$1.9 billion. (cite PIC, An Independent Cost Assessment, Cost Item 3.3) In 2005, DOE announced that it was revising its cost estimates for the Caliente rail alternative from approximately \$800 million to \$2 billion.

The Caliente alternative dramatically illustrates the potential adverse impacts in Nevada and nationally of Yucca Mountain rail shipment routing. There are no Federal regulations governing selection of rail routes for spent fuel shipments. In practice, railroad companies select

the routes. While shippers may designate use of specific routes through contracts, DOE has not formally stated its policy regarding rail route designation. DOE's FEIS indicates that about 6 percent of all shipments to Yucca Mountain via the Caliente rail corridor would travel through downtown Las Vegas, within one-half mile of the Las Vegas Strip. State of Nevada studies have shown that railroad companies might route as much as 87 percent of the total shipments through downtown Las Vegas.

Nevada's analyses contradict DOE's assertion that the Caliente option would minimize shipments through the heavily populated Las Vegas metropolitan area, and demonstrate that New Mexico, Arizona, and California could be heavily impacted by rail shipments via the Caliente corridor.

The Emergence of the Mina-Schurz Route as a Possible Alternative to the Caliente Corridor

In October 2006, DOE issued a Federal Register Notice announcing its intent to amend the scope of the Caliente rail alignment draft EIS to include analysis of another rail corridor - the so-called Mina alternative. The new route would utilize an existing rail line from the Union Pacific mainline east of Fernley to Hawthorne. New construction would be required to extend the rail line from just south of Hawthorne to Yucca Mountain. The decision to broaden the rail alignment EIS was apparently spurred by the escalating costs of the Caliente route and a change of heart on the part of the Walker River Paiute Tribe to permit DOE to study the possible use of a rail line through the reservation - something the tribe had historically opposed.

The Mina rail alternative poses significant new issues and impacts to Nevada as well as for other western states potentially affected by the changes in national rail routing for spent fuel and high-level waste shipments. A significant number of shipments destined for Yucca

Yucca Mountain rail line option
 The Energy Department wants to study building a railroad line from Hawthorne to the proposed Yucca Mountain nuclear waste repository. Experts say a rail line in the once thriving mining corridor could be less expensive and faster to construct than a line from Caliente that has reached a \$2 billion price tag.



SOURCE: U.S. Energy Department

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Mountain would travel through the center of the Reno-Sparks metro area. Other shipments would impact Nevada communities along the I-80 corridor, where the Union Pacific mainline parallels the interstate and traverses the communities of West Wendover, Wells, Elko, Carlin, Battle Mountain, Winnemucca, and Lovelock. In addition, a Mina rail spur would dramatically increase repository shipments through California, from both the Pacific Northwest and from Texas and Arizona. The Salt Lake City metro area would also likely be more heavily impacted under this scenario.

In the notice announcing the expanded scope for the EIS, DOE solicited comments on the Mina rail option and other rail alignments. DOE also scheduled a series of meetings in communities along the proposed route. Nevada's initial review of the notices identified a number of serious procedural and substantive deficiencies, and Nevada officials immediately called on DOE to withdraw and re-issue the notices for public meetings and comment.

Nevada's letter called on DOE to extend the comment period from the existing 45 days to at least 90 days and to have detailed maps ready to show the public. Nevada asked that DOE hold meetings in other communities that will be impacted by these plans, including Reno, Elko, Battle Mountain, Winnemucca, Lovelock and Yerington, Nevada, as well as in Salt Lake City, Utah, and Sacramento, California.

"The notices of October 13, 2006, are yet another example of DOE burdening Nevadans with short time limits and inadequate information for meaningful participation," Robert Loux, Executive Director of the Agency wrote in his letter to Edward Sproat, director of DOE's Office of Civilian Radioactive Waste Management.

The State of Nevada continues to believe that there is no acceptable rail route for transporting nuclear waste to Yucca Mountain. All of the routes identified by DOE over the years, including the Caliente and Mina alternatives, result in shipments impacting major Nevada population centers and traverse environmentally, economically and culturally sensitive areas of the State. An all of them have face major geographic, engineering, and institutional obstacles.

In the 1980s, when DOE evaluated candidate repository sites in six states, Yucca Mountain ranked the worst in terms of transportation access (both rail and highway). That situation has not changed, and the difficulties of developing a rail spur to the site, including the impacts any such spur would cause, continue to be strong reasons why Yucca Mountain is an unsuitable and unsafe repository location.

The NAS Transportation Study

In February 2006, the National Academies' (NAS) Committee on Transportation of Radioactive Waste released a report entitled "Going The Distance? The Safe Transport of Spent

Nuclear Fuel and High-Level Radioactive Waste in the United States.” The final version of the study was published by the National Academies Press in June 2006. The study’s most important findings and recommendations agreed with the recommendations made by the State of Nevada over the past two decades. The general conclusions of the study were:

1. While there are no fundamental barriers to safe transportation, social and institutional challenges to repository transportation require expeditious resolution, and the challenges of sustained implementation should not be underestimated; and
2. Malevolent acts (terrorism, sabotage, and theft) are a major technical and societal concern. Regarding malevolent acts, the NAS urged that an independent examination of security should be carried out before the commencement of repository shipments and that objective information about security risks and countermeasures should be shared with elected officials and the public to the fullest extent possible.

The study endorsed a number of specific measures for managing transportation risks:

1. Risks can be reduced by shipping the oldest fuel first, maximizing use of rail transportation, using dedicated trains, and minimizing truck shipments;
2. DOE should identify and make public preferred highway and rail routes for repository shipments as soon as possible;
3. Most significant transportation accident risks would likely involve long-duration, fully-engulfing fires; additional steps must be taken to reduce the likelihood of such accidents;
4. Potential adverse social and economic impacts of repository shipments are important; for many members of the public, social and economic impacts (often referred to as perceived risk impacts) are as important as health and safety impacts; special government efforts will be needed to manage social and economic impacts.

The NAS concluded that serious consideration should be given to taking the transportation program out of the DOE repository program, and perhaps out of DOE altogether. While Nevada staff and consultants agree with most of the NAS concerns about the DOE institutional structure, there is some concern that taking the transportation program out of DOE might result in less governmental oversight and less program accountability.

In one area, Nevada strongly disagreed with the NAS study recommendations. The NAS concluded that DOE should proceed to construct “the Nevada rail spur” along the Caliente corridor. Nevada strongly disagreed. As noted above, the State has long contended that there is

no acceptable rail route for spent fuel and high-level waste to Yucca Mountain, and the Caliente alternative is a prime example of why this is so. The NAS study ignored Nevada concerns regarding engineering feasibility, adverse safety conditions, and unacceptable environmental impacts. The study ignored evidence presented directly to the study committee by affected Nevadans that the proposed railroad would irreparably harm ranchers, miners, and other land users. The report ignored evidence presented directly to the study committee that selection of Caliente would likely route significant numbers of rail shipments through downtown Las Vegas, less than one-mile from the Las Vegas Strip, resulting in unique adverse social and economic impacts, and requiring extraordinary planning and training for emergency response.

The committee found that “the radiological risks associated with the transportation of spent fuel and high-level waste are well understood and are generally low, with the possible exception of risks from releases in extreme accidents involving very-long-duration, fully engulfing fires. While the likelihood of such extreme accidents appears to be very small, their occurrence cannot be ruled out based on historical accident data for other types of hazardous material shipments. However, the likelihood of occurrence and consequences can be further reduced through relatively simple operational controls and restrictions and route-specific analyses to identify and mitigate hazards that could lead to such accidents.”

The committee examined in detail previous accident consequence analyses, and previous full-scale cask testing programs, including the Sandia National Laboratory’s testing program in the United States in the 1970s, and the “Operation Smash Hit” testing program. The committee directly addressed the issue of full-scale cask testing:

“FINDING: The committee strongly endorses the use of full-scale testing to determine how packages will perform under both regulatory and credible extra-regulatory conditions. Package testing in the United States and many other countries is carried out using good engineering practices that combine state-of-the-art structural analyses and physical tests to demonstrate containment effectiveness. Full-scale testing is a very effective tool for both guiding and validating analytical engineering models of package performance and for demonstrating the compliance of package designs with performance requirements. However, deliberate full-scale testing of packages to destruction through the application of forces that substantially exceed credible accident conditions would be marginally informative and is not justified given the considerable costs for package acquisitions that such testing would require.

RECOMMENDATION: Full-scale package testing should continue to be used as part of integrated analytical, computer simulation, scale model, and testing programs to validate the performance of package performance. Deliberate full-scale testing of packages to destruction should not be carried out as part of this integrated analysis or for compliance demonstrations.”

CHAPTER THREE RECOMMENDATIONS OF THE COMMISSION

While there have been over the past four years, encouraging signs that the Yucca Mountain program may finally be collapsing under the weight of years of mismanagement, fraudulent science, cost overruns, and heavy-handed politics, DOE and its supporters in Congress and the nuclear industry continued to attempt to keep the project on life support. There is every indication that DOE plans to attempt to file a license application with the NRC in 2008, and legislation to sweep away “obstacles” to the program continues to surface in Congress. The Commission believes it is of critical importance to the State of Nevada that the State opposition to the ill-conceived and potentially disastrous project be strongly maintained and fully supported.

The following recommendation are designed to assist the governor and legislature in addressing the federal high-level nuclear waste program and maintaining the State’s strong, unified and successful opposition to the Yucca Mountain project:

(1) The Legislature’s continued support for the State’s legal and licensing efforts is crucial.

The Agency for Nuclear Projects and the Nevada Attorney General must have adequate resources to fulfill their obligations as participants in the licensing process and to pursue timely legal challenges to the Yucca Mountain program. In NRC licensing, the Yucca Mountain project is entering a new phase - a phase that poses significant new challenges for the State of Nevada, including but not limited to:

- (a) meeting NRC’s requirements for the Licensing Support Network - an electronic, internet-base system where thousands of documents and materials the State will rely on for licensing must be entered as a condition for participating in the licensing process;
- (b) engaging in complex and extended pre-licensing interactions involving NRC staff policy positions as well as decisions and actions by the pre-licensing board established by NRC that will determine how the formal licensing process is ultimately implemented;
- (c) preparing for, staffing, and effectively engaging in a process that will involve as many a three simultaneous licensing panels dealing with highly complex and controversial technical issues over a period of many years;
- (d) conducting and synthesizing research in all of the crucial areas where licensing contentions will be brought and assuring that the State’s findings will have a high degree of credibility and be widely recognized in the scientific community as well as by the NRC licensing boards;
- (e) assuring that the State has adequate legal and technical resources to effectively participate in the process, including the highest quality expert witnesses for each key area the State will challenge.

Another major challenge Nevada faces with regard to the new licensing phase of the Yucca Mountain program is gaining access to information. DOE anticipates that it will use some 6.8 million technical and scientific documents during licensing, withholding them until very late in the process when the State will have very little time to review and analyze them and prepare contentions. An example of this is DOE's refusal to provide the State with the draft license application it has already shared with NRC, the Nuclear Waste Technical Review Board, nuclear industry representatives and others. DOE has denied repeated requests from Nevada for access to this key document, and indication are DOE will continue to resist attempts to release any information it (DOE) deems might be helpful to Nevada. Gaining and maintaining access to such critical information in a timely manner stand to be an expensive proposition, involving technical justification and significant legal interventions.

The Commission finds that technical challenges the State will bring in a licensing proceeding are very compelling and that, in an objective licensing proceeding, Yucca Mountain cannot be licensed as a geologic repository. Continued work on technical/licensing issues is essential and must be done to assure the State is successful in challenging any future DOE licensing application.

The Commission recognizes that the cost to effectively participate in the NRC licensing proceeding will be substantial, but it is convinced that a well-funded, proactive participant like the State of Nevada has an excellent chance of prevailing. In addition, just the knowledge that Nevada is prepared to mount a serious, well-funded challenge to DOE's licensing application is having a major positive impact (from Nevada's perspective) on the NRC licensing process.

(2) *The Nevada congressional delegation must continue to do all it can to hinder the project and vigorously oppose any attempt to bail out DOE legislatively*

As the Commission has observed in prior reports, Nevada's congressional delegation has been extraordinarily effective in limiting funds for the Yucca Mountain program and derailing legislation that would fast-track or bail out the program. The Commission continues to consider it critically important that the delegation continue to do everything it can to (a) see that Nevada's oversight and licensing efforts are adequately funded, (b) deny DOE the funds it needs to move forward with the program, and (c) successfully oppose any future legislation that might seek to legislate away fatal site deficiencies, exempt DOE from health, safety and environmental laws and requirements, remove "obstacles" to moving ahead with the project, authorize interim storage in Nevada, or otherwise facilitate DOE's activities related to the site.

By the same token, Sen. Reid and the other members of the State's congressional delegation have been successful in fostering new directions in Congressional thinking about federal nuclear waste policy. Legislative language offered by Senators Domenici and Reid to the FY 2007 Energy and Water Development Appropriations Act would encourage the development

of alternatives such as state and regional interim storage and proliferation-resistant reprocessing for managing and utilizing spent fuel and high-level waste. Such efforts should be encouraged.

The Commission also urges the congressional delegation to assure that language in annual appropriations measures clearly provides funding for State and local oversight programs, including the ability to use federal nuclear waste funds for licensing and pre-licensing activities. Such funding is essential to the State's ability to adequately participate in the licensing process and assure that Nevada's interests are protected.

The delegation must also be vigilant to assure that any attempts to allow above-ground interim storage at Yucca Mountain do not succeed. New legislation introduced in Congress late in the 2006 session would have allowed DOE to begin shipping waste to the Yucca Mountain site at the same time it applies for a license - without the need for prior NRC or congressional approvals and in violation of the 1982 law prohibiting monitored retrievable storage in Nevada.

It is also crucial that the State's congressional delegation keeping a clear focus on the Yucca Mountain programs excessive costs and DOE major and pervasive management and quality assurance deficiencies. At the same time, the Commission urges the delegation to do all it can to hold NRC's feet to the fire in conducting a truly objective and fair licensing review.

(3) *The Commission recommends that the Governor and Legislature continue to actively oppose the Yucca Mountain project.*

This recommendation is one that is reiterated from the Commission's 2002 and 2004 reports. In those reports, we noted that, following Congress' override of Governor Guinn's veto in 2002, the playing field shifted to the legal and technical arenas where, for the first time ever, DOE would be forced to defend a program that is in clear violation of the Nuclear Waste Policy Act, the National Environmental Policy Act, and the Department's own regulations governing how the suitability of the Yucca Mountain site should have been evaluated. Unlike the political process, DOE will be forced to defend its conclusions and decisions in the legal, technical, and licensing arenas.

The Commission believes Nevada is well-positioned to successfully contest any application DOE might make to the NRC for a license to construct and operate a repository at Yucca Mountain. The State has assembled a first rate team of licensing attorneys and technical experts to represent Nevada in these proceedings and see to it that the real facts regarding Yucca Mountain's fitness (or lack thereof) as a geologic repository prevail.

The Commission concludes that, far from being inevitable, the State of Nevada appears to be within striking distance of successfully halting the Yucca Mountain project. It is crucial,

therefore, that Nevada's elected leaders continue to actively oppose DOE's Yucca Mountain program at every turn and to do so in a consistent and unified manner.

ATTACHMENT I
YUCCA MOUNTAIN INTERNAL EMAIL CHRONOLOGY

(Available upon request)

ATTACHMENT II

**YUCCA MOUNTAIN LEGISLATION
PROPOSED OR INTRODUCED IN CONGRESS IN 2006**

(Available upon request)

S.2589
THE ADMINISTRATION BILL

(Available upon request)

**2007 ENERGY AND WATER DEVELOPMENT
APPROPRIATIONS ACT LANGUAGE**

(Available upon request)

NUCLEAR ENERGY INSTITUTE PROPOSED BILL

(Available upon request)

S.3962 - DOMENICI STAND-ALONE YUCCA MOUNTAIN BILL

(Available upon request)

ATTACHMENT III
VICTOR GILINSKY GNEP PRESENTATION

(Available upon request)