OFFICE OF THE SECRETARY
CORRESPONDENCE CONTROL TICKET

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AUTHOR:	Catherine Cortez Masto (NV AG)		
AFFILIATION:	NV		
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SUBJECT:	Concerns DOE's license application for the proposed Yucca Mountain HLW		
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STATE OF NEVADA

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August 20, 2009

Gregory B. Jaczko, Chairman
Dale E. Klein, Commissioner
Kristine L. Svinicki, Commissioner
U.S. Nuclear Regulatory Commission
Mail Stop 0-16G4
Washington, D.C. 20555-001

Dear Chairman Jaczko and Commissioners Klein and Svinicki:

On May 5, 2009, and again on July 21, 2009, the State of Nevada wrote to the NRC Staff asking that its safety evaluation of the Department of Energy's license application for the proposed Yucca Mountain high-level waste repository include consideration of whether DOE could comply with post-closure radiation standards without the titanium alloy drip shields the Department proposes to install after the wastes are emplaced. We suggested specifically that the NRC Staff ask the Department to do the necessary performance assessment of a repository without drip shields because there is considerable doubt whether the drip shields could or would ever be installed, and the assessment would in any event be important in evaluating whether the license application satisfies the requirement that there be multiple barriers. On July 23, 2009, the Staff responded tersely, without elaboration, that its review would "include consideration of the items you mention." Copies of the Staff's response were provided to interested parties and Congressional delegations.

Nevada has submitted, and three presiding atomic safety and licensing boards have admitted, contentions on this subject and related subjects in the contested licensing proceeding. It is not the purpose of this letter to argue the merits of these contentions. However, Staff's response raises important questions about the nature and purpose of the Staff's safety review that the Commission can and should address. Atomic safety and licensing boards cannot tell Staff how to do its safety review, and contentions complaining about the Staff's safety review are not generally admissible. Nevertheless, the Commission has general supervisory power over its Staff and may,

without prejudging any contention, instruct Staff on whether matters should be addressed in its review. For example, the Commission reviewed the Staff Review Plan for the Yucca Mountain license application before it was finalized (see, for example, COMSECY-02-001 and related SRM dated February 25, 2002 (LSN No. 000002043)).

Nevada has long expressed special concerns regarding what it believes to be fatal flaws in the Department's drip shield proposal. The attached correspondence documents Nevada's history of concern. Despite this, the Staff's July 23 response resembles a form letter which ducks the issue Nevada raised by promising "careful consideration" of it, without saying whether it would actually ever do what Nevada requested or even committing to a more specific response after its review strategy evolves more fully. We believe the State deserves a better response.

Moreover, the Staff's reply raises the more general concern that the Staff may complete its Safety Evaluation Report without addressing specifically any of the safety contentions admitted for litigation. This would show disrespect for the legitimate safety concerns of the State and the other parties, who devoted substantial resources to support their safety concerns with expert evaluations and opinions. The Staff's credibility as an independent regulator will be eroded significantly if it fails to demonstrate a decent respect for the opinions of others, especially sovereign states with statutorily recognized interests in a particular application and substantial technical expertise.

It will be no excuse to blame scarce NRC resources or reduced budgets. If the Staff follows prior practice, it will be at great expense to address each contention with expert testimony at the licensing hearing. However, the thrust of that testimony would be prejudged by a Safety Evaluation Report that fails to specifically address the contentions in question. In addition, it is not clear to us that the management and internal peer review processes that apply to the Safety Evaluation Report will always apply to the preparation of expert Staff testimony for the hearing.

Thank you for your attention to our concerns. The importance of your specific guidance to staff in its preparation of the Safety Evaluation Report cannot be overstated.

Sincerely,

CATHERINE CORTEZ MASTO
Nevada Attorney General

CCM:MAA:cg
Enc.
cc: Distribution List

JIM GIBBONS
Governor

STATE OF NEVADA

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July 20, 2009

Lawrence Kokajko
Director, Division of High-Level Waste Repository Safety
Office of Nuclear Material Safety and Safeguards
USNRC
Washington DC 20555

Dear Mr. Kokajko,

I recently wrote you (5-9-2009) regarding the Department of Energy's failure to present, and the NRC Staff's failure to ask for Total System Performance Assessment calculations of the public dose near Yucca Mountain for the case where there are no drip shields. DOE has repeatedly insisted that it has not calculated this case.

We have recently come across two 2007 DOE documents on the Licensing Support Network that give the results for this case that were apparently calculated using a TSPA version that was fairly close to the one on which DOE based its licensing application. (See LSN accession #s ALA.20070823.9652 and ALA.20070828.2318.) The results show the mean doses would exceed the 15 millirem per year standard set by the Environmental Protection Agency for the first 10,000 years and would thereby disqualify the Yucca Mountain project for licensing. We believe the latest version of the TSPA would show more dramatic noncompliance and would therefore even more emphatically disqualify the application.

If DOE disagrees with this assessment it has only to produce calculations to support its case. Its failure to do so both in its application and subsequently is telling. It is harder to understand why the NRC Staff has not required it, a circumstance that raises very troubling questions about the seriousness of the NRC Staff's safety review.

To avoid any misunderstanding as occurred in response to Nevada's previous letter, let me make clear that this letter is not intended as an allegation. It is directed to the NRC Staff technical component evaluating DOE's TSPA and preparing the related portions of the Staff's Safety Evaluation Report. What we seek is not the initiation of an investigation of wrongdoing, but the issuance of a Request for Additional Information to DOE asking for the appropriate calculations.

Respectfully,

Bruce Breslow
Executive Director

JIM GIBBONS
Governor

STATE OF NEVADA

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June 19, 2009

Lawrence Kokajko
Director, Division of High-Level Waste Repository Safety
Office of Nuclear Material Safety and Safeguards
USNRC
Washington, DC 20555

Dear Mr. Kokajko:

My letter to you articulating some of Nevada's safety concerns with respect to the corrosion studies DOE uses to support its Yucca Mountain license application, which you received May 5, 2009, was referred to the NRC Region IV Office of Investigations. However, it was never my intent that the letter be processed as an allegation. Instead, I simply wanted the NRC Staff to take proper account of Nevada's safety concerns in conducting its safety evaluation and writing its Safety Evaluation Report. The outcome I desired was some consideration and discussion of Nevada's safety concerns in Staff's Safety Evaluation Report, not an initiation of an investigation by the Office of Investigations. I've attached the original letter and your investigators reply for your convenience. Investigator Oglesby has scheduled an appointment on July 15th. Unless I hear that you wish to cancel the appointment, Former NRC Commissioner Victor Gilinsky will attend with me as he drafted the original letter for my signature as head of the Agency.

Sincerely,

Bruce Breslow
Executive Director
Nevada Agency For Nuclear Projects

cc. John H. Oglesby, Jr.
Senior Special Agent
Office of Investigations
Region IV, U.S. Nuclear Regulatory Commission

Bernadette D. Baca
Senior Allegation Coordinator

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 23, 2009

Mr. Bruce H. Breslow
Commission on Nuclear Projects
1761 College Parkway
Suite 118
Carson City, Nevada 89706

Dear Mr. Breslow,

This letter responds to two letters received from you, one on May 5, and one later on July 21, 2009, regarding the Nuclear Regulatory Commission (NRC) staff's review of the Department of Energy's (DOE's) License Application for authorization to build a repository at Yucca Mountain. As you know, the NRC staff's independent safety review is in progress. This review will include careful consideration of the items you mention and once our review is complete, we will document our results in a Safety Evaluation Report that will be made available to the public.

Sincerely,

Aby S. Mohseni, Deputy Director
Licensing and Inspection Directorate
Division of High-Level Waste Repository Safety
Office of Nuclear Material Safety
and Safeguards

cc: List Attached

JIM GIBBONS
Governor

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Lawrence Kokajko
Director, Division of High-Level Waste Repository Safety
Office of Nuclear Material Safety and Safeguards
USNRC
Washington DC 20555

Subject: NRC Staff Requests for Additional Information to DOE on Alloy 22 Corrosion Rates (Yucca Mountain License Application Volume 3, Chapter 2.2.1.3.1, Second Set, Numbers 6 and 11)

Dear Mr. Kokajko,

Nevada has been following the Staff's review of the Department of Energy's License Application by keeping close tabs on the RAI process—the NRC Staff's requests for additional information and DOE's responses. At this stage of the licensing process the public and prospective hearing participants, and Nevada as well, rely on the Staff to ask detailed and searching questions about DOE's assumptions, models, and calculations, and to follow up as necessary. We are providing comments on two of your RAI exchanges with DOE on corrosion rates—specifically, on the relevance of dripping vs. immersion tests and on the significance of salt separation effects—because they carry important implications for the license review that go beyond the immediate technical content of the information request and answer.

1. *Assess the potential effects of dripping and evaporation of seepage water on general corrosion rates of alloy 22*

In the first of these RAIs you ask DOE to provide a technical basis for assessing the corrosion associated with "dripping and evaporation of seepage water" on the waste package surface. You ask specifically in the context of generalized corrosion, which suggests interest in what happens over long times. The more profound implications of this question are for localized corrosion at relatively early times.

In the Yucca Mountain repository configuration that DOE proposes, mineral-laden seepage water would drip onto hot waste packages that are unprotected by drip shields. The chemical and electrochemical consequences of repeated cycles of dripping and evaporation, formation of crusts, and concentrations of corrosive liquids underneath the

crusts, are extremely complex. DOE-funded experiments that simulated dripping (Lee and Solomon, 2006) showed that under these conditions the passive film that normally protects alloy 22 from corrosion can break down and localized corrosion can proceed at a fairly rapid rate.

That was also the result of Nevada-supported experiments that modeled dripping in an environment that simulated expected underground conditions. We would especially like to draw your attention to this work which was done at the Institute of Metal Research in Shenyang, China, one of the premier corrosion research institutes in the world, and was reported as IMR Report on Experiments A and B, 2008. Nevada understood from the start that the only way to produce convincing data on localized corrosion of alloy 22 on waste packages was to simulate actual dripping.

As you point out in your question, DOE took a different tack. It relied, and continues to rely, on corrosion tests in which the alloy 22 samples were immersed in a solution, a condition far different from the one of concern. Despite its enormous resources, DOE apparently funded only one experimental set on dripping, the one described in the 2006 Lee and Solomon paper. It reported localized corrosion results inconvenient to DOE's case and, so far as we can tell, DOE does not mention it in its License Application. We only found out about it from the NRC RAI.

Now that the NRC Staff brings up the Lee and Solomon work, DOE criticizes it as unreliable and claims DOE experiments that immerse the sample in a solution also cover the dripping case. This is yet another instance, and perhaps the most egregious one, of a familiar DOE pattern—to substitute argument and rationalization for the lack of data. If there is anything that characterizes industrial experience with localized corrosion, it is that there are many surprises for those who try to transfer conclusions from one environmental situation to another. It is well known that the same metal may be stable in some circumstances and while under different conditions it may corrode rapidly. That is why all the standard corrosion texts emphasize that, as one put it, "it is very important for the tests to duplicate the actual plant service conditions as closely as possible." This is especially important in the Yucca Mountain case because DOE's errors would be hidden and irretrievable upon repository closure. NRC should not accept DOE's immersion tests as representative of dripping-induced corrosion.

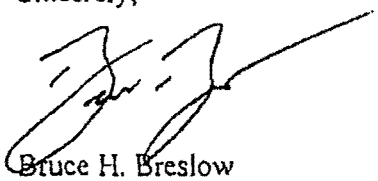
2. *Assess the effect of salt separation effects on localized corrosion rates used in the performance assessment*

DOE admits its License Application analysis of localized corrosion did not include the effect of salt separation in the seepage water that would drip onto the waste package, and that this effect would substantially increase initiation of localized corrosion. DOE estimates that during its estimated period of vulnerability—in the first 1,000 years after repository closure—localized corrosion would initiate at about one-third of the waste packages not protected by drip shields. DOE promises to fix its calculation to include the salt separation effect, but argues this correction won't have any significant effect on the TSPA result because in the nominal case "the first drip shield failures occur at about

230,000 years." Additionally, DOE provides elaborate calculations to show that inclusion of salt separation would not significantly affect the TSPA results for seismic events "due primarily to the low probability of drip shield failure."

What DOE has not presented, and we are surprised the NRC Staff has not asked for, are calculations of the RMEI dose for the case where there are no drip shields at all. This is, so to speak, the elephant in the room. It appears that even with DOE's localized corrosion rates (which Nevada regards as overly optimistic) the mean RMEI doses would exceed the 15 millirem per year standard set by the Environmental Protection Agency and thereby disqualify the Yucca Mountain project for licensing. DOE claims they never calculated the no-drip shields case. You have to wonder why they would not have done so, even if only out of sheer curiosity, when all it takes is the press of a button. The only valid reason for NRC not to require this calculation would be if the possibility that drip shields would not be installed were simply not credible, that is, if the probability was less than one in ten thousand. Is there anyone on the NRC Staff who would maintain that the chance of drip shield non-installation a hundred years from now is less than that? In view of deterioration of underground systems it may not even be physically possible to install the drip shields at all. And it certainly won't be possible to enforce any such requirement on DOE's successors once the waste packages have been placed underground. There is no getting away from the conclusion that it would be irresponsible to approve a license in the hope that an unsafe system will somehow be made safe a hundred years from now. The first step in making a sound decision is to get the facts by requiring DOE to produce dose calculations for the no-drip shield case.

Sincerely,



Bruce H. Breslow
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April 15, 2008

The Honorable Dale E. Klein
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: NRC SHOULD NOT ACCEPT DOE'S YUCCA MOUNTAIN APPLICATION IF IT RELIES ON THOUSANDS OF TITANIUM "DRIP SHIELDS" IT ALMOST CERTAINLY WILL NEVER INSTALL

Dear Chairman Klein:

During a long-awaited April 3, 2008 technical exchange in Las Vegas on the calculations underlying the Department of Energy's prospective Yucca Mountain license application, Nevada representatives – and NRC Staff, as well – learned for the first time the extent to which DOE's design for a repository relies on the presence of drip shields to comply with the Environmental Protection Agency's health and safety limits for radiation exposures.

DOE's own calculations show that, without thousands of these titanium-palladium alloy drip shields to ward off dripping water and thus retard the inevitable corrosion of the waste packages, the projected radiation dose to the public from leaking waste containers would soon exceed the EPA standard by about a factor of ten.

As we pointed out to the Commission a year ago, the trouble with allowing DOE to include drip shields in its licensing calculations is that that DOE does not plan to install, or even to fabricate, the drip shields *for at least a century after all of the waste has been loaded into the repository*, making their installation an exceedingly unlikely proposition. (Robert Loux to Dale Klein, April 19, 2007, and attachments.)

The new information revealed on April 3rd makes clear that DOE is asking us to gamble with public safety, and to do so against heavy odds. DOE's own calculations demonstrate that, without the drip shields, waste containers emplaced underground at Yucca Mountain would corrode rapidly. Experimental work funded by the state of Nevada on the corrosion of alloy 22 in a Yucca Mountain-like subsurface environment confirms such rapid waste canister degradation modes. The only protection then comes from the geologic environment. But since the geology at Yucca Mountain provides almost no isolation capability for the soluble radioactive elements, radiation exposures to nearby communities would far exceed EPA's allowable safety standard.

Drip shield installation is unlikely

Our 2007 letter and its attachments detail the reasons why it is extremely unlikely that whoever is responsible for a Yucca Mountain repository would actually install drip shields a hundred years from now or later. A fundamental problem is that it will probably not even be physically possible to do so, since such an effort would be unprecedented—installing thousands of drip shields by remote control in hot, rock-strewn tunnels in a high-radiation environment, using robotics that have yet to be invented. It would also be prohibitively costly. The multi-billion-dollar cost is likely to be an even greater restraining factor in the distant future.

The material that DOE needs for the drip shield is a titanium-palladium alloy. Both materials are in heavy demand industrially. The approximately 11,500 drip shields for Yucca Mountain (weighing about 5 tons each) would consume about a third to half of the world's current annual titanium production. The availability of such quantities of this material a hundred years or more in the future is not something that anyone can assure with any confidence. That is even more the case with palladium, which is classified as a rare metal.

A license condition would not be enforceable

The glib response we have heard to Nevada's concern about drip shields is that NRC could impose a license condition requiring their installation. Leaving aside that no license condition like this has ever been considered by NRC or even seriously proposed, the plain fact is that it would be unenforceable. If it will be prohibitively expensive or simply physically impossible to install the drip shields a century or more in future, as it almost certainly will be, or if whoever is institutionally responsible decides not to do it, what could any 22nd century regulatory entity possibly do to enforce such a requirement?

Conclusion

DOE's claim that Yucca Mountain can meet applicable post-closure health and safety standards is precariously balanced on one slender and implausible assumption—that 11,500 titanium-palladium alloy drip shields will be installed a hundred years or more from now. There is no safety net underlying this assumption. NRC should reject out of hand any application from DOE that relies on highly speculative installation of drip shields.

Sincerely,

Robert Loux
Executive Director

RRL/cs
cc Governor Gibbons
Attorney General Catherine Cortez-Masto
Nevada Congressional Delegation
Commissioner Gregory B. Jaczko, NRC
Commissioner Kristine L. Svinici, NRC
Commissioner Peter B. Lyons, NRC
Luis A. Reyes, NRC, Executive Director for Operations
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Lawrence Kokajko, NRC, Director of the Division of High-Level Waste Repository Safety
Jack Davis, NRC, Deputy Director for Technical Review
Nuclear Waste Technical Review Board
Ward Sproat, U.S. DOE

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March 13, 2008

The Honorable Dale E. Klein
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: RECENT ACNW LETTERS ON YUCCA MOUNTAIN WASTE PACKAGE AND DRIP SHIELD CORROSION AND POSTCLOSURE DEGRADATION OF EMPLACEMENT DRIFTS

Dear Chairman Klein:

You recently received two letters from the Advisory Committee on Nuclear Waste and Materials: one on Yucca Mountain waste package corrosion and the other on drift degradation. You should be aware that both letters suffer from an overly narrow technical perspective—perhaps because the Committee lacks expertise in these areas—with the result that the Committee's conclusions are largely irrelevant.

The chief problem affecting the discussion on both subjects is that the Committee throughout assumes that drip shields will be in place to cover the emplaced waste packages. As you know, the Energy Department's plans for installing drip shields are tenuous, at best and projected installation is far in the future. It is such a doubtful proposition that drip shields will actually ever be installed that the NRC cannot reasonably assume for the purpose of licensing that drip shields would be in place to protect waste packages. A Committee member did ask at one point during the corrosion briefing what would happen if there were no drip shield, but got no answer and the Committee did not raise the matter again.

The problem of narrow focus and superficiality affects both Committee letters, but in the following I will concentrate on the corrosion letter. The Committee bases its report on briefings it received but presents an even rosier picture than it received. For example, the NRC staff briefer stated:

> It is very difficult to predict the stability, persistence of passive film in such a long period of time.

You do not get the sense of this uncertainty in the Committee's letter, or that there is a lack of data on Alloy 22, which leads to reliance on experience with related alloys including those used in nuclear power plant steam generators. If we have learned anything from the history of steam generator corrosion, it is that there are many surprises when conditions change, and that one cannot rely on arguments based on lab tests without full-scale testing under service conditions. Yet the Committee happily swallows such arguments whenever they lead to conclusions that corrosion will be inhibited. For example,

> Current information from experiments indicates that crevice corrosion by dust deliquescence does not affect waste package performance significantly, because the surface tension of the deliquescent droplets can reduce the amount of brine that contacts a metal surface.

I can only say that is a very thin reed on which to balance a "no corrosion" argument. The Committee similarly also accepts that localized corrosion would produce only a "tight crack or a tiny pit. So it really doesn't open the surface," and that nitrate solutions inhibit localized corrosion.

The Committee reports the Staff's fundamental risk insights have not substantially changed since 2004. The Committee drops the qualification that this was based on the Staff's thinking that localized corrosion would only create small openings that would restrict the leakage of radioactive materials to the environment. When asked about the constancy of its "fundamental risk insights" the Staff briefer quickly qualified it by saying " that statement isn't being made in a global sense for everything"

Preliminary information from Nevada's experiments point to an entirely different conclusion--that dripping can occur from the drift ceiling during the initial thermal pulse and that the evaporation of such dripping on the waste packages can produce Davis-Besse type crusts under which localized corrosion would take place. Extensively pitted surfaces would, even if the individual pits were small, produce sufficient openings for water flow into the packages and radioactive flow out. Moreover, this would take place in the first thousand years or so, with the consequences, as compared with a later release, that the release would be more radioactive and the relevant protection standard would be 15 millirem per year. Whether or not the Committee agreed with this, it should have made the Commission aware of the full range of technical possibilities.

As you have already decided to terminate the Committee we have no further recommendations for improving its operation. However, the tendency to view DOE's submissions through rose colored glasses is not limited to the Committee; it runs throughout the NRC, and it is something you will have to address if there is to be a fair and thorough review and hearing on protecting the public health and safety.

Sincerely,

Robert R. Loux
Executive Director

cc: Commissioner Lyons
Commissioner Jaczko
ACNW
Nevada Congressional Delegation

JIM GIBBONS
Governor

STATE OF NEVADA

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April 19, 2007

The Honorable Dale Klein
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Denial of Safety Credit for DOE's Use of "Drip Shields" In the Proposed Yucca Mountain Repository

Dear Mr. Chairman:

I write to draw the Commission's attention to a critical safety and legal issue that has been disregarded by the NRC Staff in its pre-licensing interactions with DOE on the proposed nuclear waste repository at Yucca Mountain. The issue is whether any safety credit should be given to so-called "drip shields" in the post-closure repository performance assessment when, as explained below, it is doubtful that the drip shields would ever be installed.

DOE's calculations to demonstrate compliance with federal radiation standards have relied heavily on the protection of the waste packages from dripping water by means of an underground system of connected titanium "drip shields." These are a kind of a series of titanium tents covering the entire length of waste package emplacements in the repository tunnels, or "drifts." We have been informed that DOE's Yucca Mountain license application ("LA") will also rely heavily on drip shields to keep water off waste packages.

The idea of using drip shields as a part of the Engineered Barrier System ("EBS") for the repository arose in the mid-1990s after DOE discovered that, contrary to previous

expectations, Yucca Mountain's rock was highly fractured and allowed fast flow paths for infiltrating water. Such water would of course accelerate corrosion of the thousands of radioactive waste packages. At about the same time, DOE discovered from *in-situ* heater simulation tests that the spent fuel would cause water to collect above the drifts and drip down on the packages, which provided another incentive to find a means to divert water.

In DOE's various public presentations of the results of its Total Systems Performance Assessment ("TSPA") for the repository, the drip shields' protection is critical to lowering the resultant dose to humans in the biosphere. Counting the drip shields (leaving aside considerations of whether they will perform as proposed) might make sense if DOE actually planned to install the drip shields when it emplaced waste packages. But that is not at all what DOE plans to do—it doesn't plan to install them until repository *closure*, which could be up to 300 years from now. It is understandable that DOE would want to put off installation indefinitely because of the huge expense and complications involved. But the flip side is that NRC should accordingly not allow DOE to include the drip shields in its TSPA post-closure calculations in support of its LA.

The scope and scale of the project for manufacturing and installing the proposed drip shields would be enormous. The drip shields would be made of Titanium 7, would weigh about four tons each, and the repository would need at least 12,500 of them. DOE would have to buy an amount of very expensive Titanium metal equal to three-and-one-half years of the entire U.S. domestic production at a cost of at least $5 billion.

A fundamental problem with putting off drip shield installation for decades and perhaps centuries is that it is extremely unlikely that it will even be possible to install them at all. The effort would be unprecedented. Because of the high temperatures and extremely high radiation fields in the repository drifts, the drip shields would need to be installed remotely, using as-yet-nonexistent robotics. The drift environment will be heavily dust-laden, which will make remote visual monitoring of placement operations difficult if not impossible. It will be extremely difficult if not impossible to install the drip shields within the projected tight clearances in the drifts. Installation equipment will have to be brought by electric locomotives of a kind not yet in existence. The rails over which they would have to travel, and the rails supplying electric power, will almost certainly have corroded by the time they are needed. The installation equipment will need to be custom-designed to operate reliably in a dusty, hot, and radioactive environment, and will need a means for retrieval and repair of disabled equipment. DOE has recognized that there are so many uncertainties and potential difficulties with drip shield installation that "field tests to determine feasibility of operations *will be required.*" *See* DEN 001480432 (emphasis added). It is doubtful, however, that realistic field tests can even be performed. DOE has even conceded that "human beings probably cannot reliably make a drip shield." *See* DEN001227105 (emphasis added). Additionally, anticipated rock-fall would likely by itself make installation of the connected drip shield structures physically impossible.

These and other serious technical problems with DOE's drip shield proposal are explained and documented in a presentation to the Nuclear Waste Technical Review Board ("NWTRB") by Nevada's mining expert Mr. Frank Kendorski in November 2005; in an NWTRB letter to DOE dated December 19, 2005; in a June 2006 report from CNWRA (Center for Nuclear Waste Regulatory Analysis) entitled "Review of Tools and Techniques to Monitor Repository Excavations;" in an August 2006 report from CNWRA entitled, "Summary of Current Understanding of Drift Degradation and Its Effects on Performance at a Potential Yucca Mountain Repository;" and in a letter from NRC Staff to DOE dated January 18, 2007. Each of these items is enclosed.

Given the uncertainties over whether the drip shields would ever be installed, it would make a mockery of the TSPA calculation to include them. NRC should not allow DOE to rely on uncertain future actions. Nor can NRC cope with this situation by imposing a license condition. The time from issuance of a repository operating license to the repository's permanent closure could be three-hundred years. *See* Part 63 Preamble, 66 Fed. Reg. 55738, 55743 (2001). Thus, DOE's proposal *presumes the enforceability of a license condition requiring the installation of successfully working drip shields up to three hundred years after waste emplacement*, longer than the existence of the United States. No license condition like this has ever been considered by NRC or even seriously proposed.

Moreover, there are at least two fundamental problems with enforceability. First, the notion assumes the continued existence for hundreds of years of what the National Academy of Sciences refers to as "active institutional control." Reliance on continuing enforceability would therefore be contrary to the Academy's recommended conclusion that, beyond some initial period of time, the ability to rely on active institutional systems diminishes in a way that is intrinsically unknowable. *See* "Technical Basis for Yucca Mountain Standards," NAS (2001), at p. 106.

More importantly, the license condition would be intrinsically unenforceable. If it will be impossible to install the drip shields, as is almost certain, what could any regulator do?

In sum, DOE's proposal that its TSPA will include critical safety credit for drip shields to be installed up to three hundred years after waste emplacement conflicts with the technical possibilities, with a realistic assessment of the value of institutional commitments, and therefore with a common sense reading of the law. In the past, NRC has refused to give similar proposals any serious consideration. *See Houston Lighting and Power Co. (Allens Creek Nuclear Generating Station, Unit 1)*, ALAB-629, 13 N.R.C. 75 (1981).

Because of all the above, Nevada respectfully requests NRC to advise DOE that, absent a drastic change in DOE's drip shield installation plans, DOE should not claim, and NRC cannot legally allow, any safety credit for drip shields in DOE's TSPA for the upcoming Yucca Mountain License Application.

Sincerely,

Robert Loux
Executive Director

cc: DOE
TRB
ACNW
Nevada Congressional Delegation

KENNY C. GUINN
Governor

STATE OF NEVADA

ROBERT R. LOUX
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May 18, 2004

Nils J. Diaz
Chairman
U.S. Nuclear Regulatory Commission
Washington D.C. 20555-0001

Nevada would like to raise with you an essential point concerning the criteria the Nuclear Regulatory Commission (NRC) will apply to the Department of Energy's (DOE) Total System Performance Analysis for Yucca Mountain to decide whether it meets the basic post-closure radiation standard in the regulations. Specifically, Nevada believes that the NRC, in evaluating DOE's TSPA calculations, should give no weight to the drip shield feature of DOE's design.

DOE describes the drip shield as a kind of large titanium mailbox set over each waste package to divert the downward flow of water past the package in order to inhibit package corrosion. The drip shields would collectively cost many billions of dollars. DOE's documents to date uniformly state that the Department plans to install the drip shields during the closure phase. According to DOE's plans, this could be 100 years from now, or possibly even 300 years from now. This postponement is presumably driven by the high cost of the titanium drip shields.

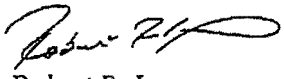
It is Nevada's position, one it will take in any NRC hearing on DOE's license application, that the planned duration between waste placement and repository closure is so long that whether or not the successors to DOE will ever install the drip shields before closure is a matter of sheer speculation. The NRC cannot reasonably place any reliance on this happening in any licensing proceeding on the adequacy of public protection.

We would add that given this length of time, the difficulty of underground staging and transporting and installing the shields in the deteriorating tunnels containing the highly radioactive waste packages will consequently be substantially increased and the likelihood of their installation substantially decreased.

The time scale involved renders the analogy with other NRC facility licensing and attachment of license condition so strained as to be meaningless. When we talk in terms of centuries, any license conditions the current NRC imposes on the current DOE will be totally unenforceable and it would be a sham to pretend otherwise.

Public protection requires a firmer basis. In making its evaluation of DOE's application NRC should rely only on those features that, with reasonable assurance, it can count on being in place.

Sincerely,



Robert R. Loux
Executive Director

cc: Joseph Egan
Marta Adams

McKelvin, Sheila

From: Carole A. Gourley [CGourley@ag.nv.gov]
Sent: Thursday, August 20, 2009 12:53 PM
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