

STATE OF NEVADA  
LEGISLATIVE COUNSEL BUREAU

LEGISLATIVE BUILDING

CAPITOL COMPLEX

CARSON CITY, NEVADA 89710

Fax No.: (702) 687-5962

LORNE J. MALKIEWICH, Director  
(702) 687-6100



LEGISLATIVE COMMISSION (702) 687-6800

JOSEPH E. DINI, JR., Assemblyman, Chairman

LORNE J. MALKIEWICH, Director, Secretary

INTERIM FINANCE COMMITTEE (702) 687-6821

WILLIAM J. RAOOIO, Senator, Chairman

Daniel G. Milne, Fiscal Analyst

Marc W. Stevens, Fiscal Analyst

Wm. GARY CREWS, Legislative Auditor (702) 687-6315  
ROBERT E. ERICKSON, Research Director (702) 687-6823  
BRENDA J. ERDOES, Acting Legislative Counsel (702) 687-6830

February 4, 1994

Dr. Phillip S. Justus  
Senior On-Site Licensing Representative  
Division of High-Level Radioactive Waste Management  
Office of Nuclear Material Safety and Safeguards  
Nuclear Regulatory Commission  
301 East Stewart  
Las Vegas, Nevada 89101

Dear Dr. Justus:

State Senator Thomas J. Hickey, Chairman of the Nevada Legislature's Committee on High-Level Radioactive Waste (HLRW), has reviewed an article (see attached) in the January 1994, Issue of the *Nevada Nuclear Waste News*. The article was written by Dr. Charlie Malone of the Nevada's Agency for Nuclear Projects and is titled "What Nuclear Waste May Do To The Mountain." Senator Hickey is concerned by the implications that inadequate or incomplete environmental studies have been conducted by United States Department of Energy (DOE) on the Yucca Mountain Site Characterization Project which, as a result, may adversely effect the licensing process by the Nuclear Regulatory Commission (NRC).

It would be most helpful to the HLRW Committee to have an analysis of the article from NRC's perspective and answers to the following more specific questions:

1. Is it the NRC's opinion that an adequate environmental impact analysis has been conducted to date by the DOE during the Site Characterization Program in order to comply with NRC and the U.S. Environmental Protection Agency standards?
2. If the DOE should determine that Yucca Mountain is suitable for a repository and submits a license application, does the NRC foresee any problems or delays in the licensing review process as a result of the environmental impact analysis work that has been conducted?

NHOB 11  
Wm-11  
102

9402140206 940204

PDR - WASTE

WM-11

PDR

3. Are there additional studies or information on the environment and potential impacts from a repository that, in the NRC's opinion, should be developed to meet licensing procedure requirements?

Your early response to this request for information will be greatly appreciated.

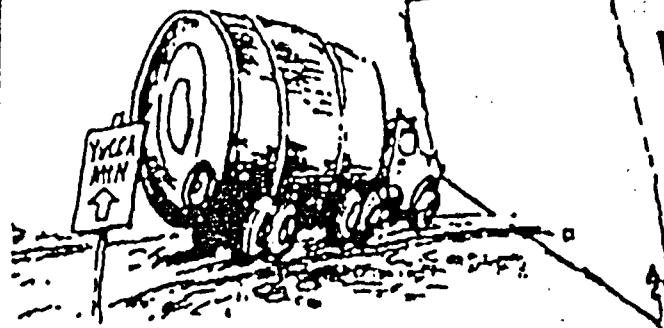
Please call me, toll free, in Carson City at 384-2225 if you have any questions on this matter.

Sincerely,

John L. Meder  
Senior Research Analyst

JLM:lp:hlw/307  
Enc.

# Nevada Nuclear Waste News



Inside

- Grappling with nuclear waste: Removing the solution, not the problem
- Department of Energy discharges top man on Yucca Mountain from the dump project
- Researchers label nuclear industry ad campaign initiative in Nevada 'a risk communication fiasco'
- Other items related to Yucca Mountain

Vol. 5, No. 1

"There Is no right way to do a wrong thing"

January 1994

## Crucial Yucca Mountain information endangered

## State scientists discover testing flaw

A testing-sequence problem first discovered by State of Nevada Nuclear Waste Project Office scientists could compromise the Department of Energy's study of Yucca Mountain's surface and destroy information that might lead to its disqualification as a nuclear dump.

The discovery came as part of the State of Nevada's annual multimillion-dollar technical and scientific oversight of the DOE's site characterization project.

Despite the State's discovery of the problem, verified and endorsed by the U.S. Geological Survey, the DOE's

main testing contractor, the DOE has yet to change its sequence of testing at Yucca Mountain.

Carl Johnson, administrator of technical programs for the State agency, pointed out in a letter to the Nuclear Regulatory Commission that DOE wants to begin tunneling at Yucca Mountain before it performs surface-based tests, which are essential to determine whether radioactive gases could be released in unacceptable amounts from a repository.

The tunneling, Johnson said, will disturb the ground and ruin crucial gas transport and geochemical information

that needs to be collected on Yucca Mountain's surface.

In another letter, Johnson called on the DOE Yucca Mountain project manager to straighten his testing priorities before significant data is irretrievably lost.

"It is unconscionable to blindly plow ahead underground in the name of 'showing progress at Yucca Mountain' at the expense of much-needed information aboveground that could demonstrate the mountain's deficiencies," Johnson said. "That's not good science — it's showmanship and obfuscation."

## What nuclear waste may do to the mountain

Charlie Malone has a Ph.D. in nuclear ecology from Rutgers University and is a Certified Environmental Professional. He has worked on siting and related issues concerning nuclear facilities and nuclear waste management and has about 40 professional publications to his credit.

Dr. Malone has been with the State of Nevada's Nuclear Waste Project Office since 1986. During the preceding 17 years he worked at the National Academy of Sciences, Oak Ridge National Laboratory, and Idaho National Engineering Laboratory. This Q&A session about environ-

mental issues regarding the proposed Yucca Mountain dump was recently conducted with Dr. Malone.

Question: It sounds like you must have had some experience with Department of Energy programs prior to the Yucca Mountain project.

Dr. Malone: That's right. I've worked on a number of DOE activities, beginning with a DOE postdoctoral fellowship. After that I worked at two of DOE's major nuclear facilities and with one of DOE's prime contractors on the high-level nuclear waste program.

Q: What brought you to Nevada?

Dr. Malone: After passage of the Nuclear Waste Policy Act in 1982, I started following the high-level nuclear waste program around the country and this is where it landed. It's a scientifically intriguing issue because there are so many uncertainties and unresolved technical questions.

Q: Tell us what the State of Nevada's role is with respect to the environment at Yucca Mountain.

Dr. Malone: Our office conducts oversight of the DOE program con-

(Continued on Page Two)

# *DOE removes Carl Gertz from Yucca Mountain manager role*

The manager of the Department of Energy's Yucca Mountain project for the past six years has been removed and reassigned.

Carl Gertz told the press in October 1993 that he will assess the DOE's organization at its Hanford, Wash., nuclear weapons plant.

The DOE said Robert M. Nelson Jr., who was the first director of DOE's waste management project office (now the Yucca Mountain project office) from 1978 to 1981, will serve as acting project manager along with being acting associate director of the office of geologic disposal.

Nelson previously served two interim assignments as manager of DOE's Rocky Flats nuclear weapons facility in Colorado.

The DOE made no comment on why Gertz was reassigned.

## **YUCCA HOTLINE**

For more information about Yucca Mountain

Nevada Nuclear Waste Project Office  
Capitol Complex  
Carson City, NV 89710  
(702) 687-3744

**TOLL FREE 1-800-336-0990**  
(In Nevada only)

## *Assessing the environment at Yucca Mountain*

(Continued from Front Page)  
cerning environmental impacts at Yucca Mountain, both from site characterization and from a potential repository.

**Q: Why is this important?**

**Dr. Malone:** Well, a repository poses a really long-term environmental threat, up to 10,000 years or longer. The National Environmental Policy Act addresses such matters by including the protection of future generations among its goals. DOE is investigating the underground environment at Yucca Mountain to try to assess whether or not geologic and hydrologic conditions are sufficiently adequate to protect the health of future generations. Similar kinds of studies need to be done on the above-ground environment to understand how the ecosystem might influence the underground setting at Yucca Mountain and affect the safety performance of a repository over a period of 10,000 years or longer.

**Q: How can conditions at the surface possibly affect a repository that's supposed to be a thousand**

feet or so underground?

**Dr. Malone:** In two ways. First, we already know that Yucca Mountain inhales and exhales air — that is, it breathes, as strange as that sounds. It does this through fractures in the bedrock that extend from the surface to well below the depth of a repository. Changes in atmospheric pressure are responsible for the breathing phenomenon, which is not unusual in highly fractured rocks like those at Yucca Mountain. This so-called "pneumatic process" occurs when high atmospheric pressure pushes air into the mountain and lower pressure lets the air escape.

Second, we know that DOE is thinking about packing high-level nuclear waste into Yucca Mountain so densely that the water in the rock fractures will boil away before dripping into the repository, corroding the metal waste containers and releasing nuclear waste that could then migrate into the groundwater aquifer below the repository. Heat from the packed nuclear waste will force water vapor through the cracks in the rocks above the repository all the way to the surface. This added moisture alone

might cause the ecosystem at Yucca Mountain to change.

If that isn't enough, the heat from the repository will be so great that the temperature in the soil on the surface of the mountain will increase enough to change the ecosystem, perhaps eliminating the vegetation or reducing it to the extent that erosion removes the soil and conditions become so severe that no vegetation can survive there. Bare, highly fractured bedrock will both erode faster and channel more water than ever into the repository once the temperatures drop below the boiling point after a few hundred or a thousand years.

**Q: Who has responsibility for seeing that environmental requirements and regulations are complied with at Yucca Mountain?**

**Dr. Malone:** The answer to that question is two-fold. First, DOE is largely self-regulated regarding the environmental protection requirements of the Nuclear Waste Policy Act and the National Environmental Policy Act. And there's no one in authority over DOE to oversee the

(Continued on Page Four)

# About Yucca Mountain's environment

(Continued from Page Two) agency's environmental actions at Yucca Mountain with respect to those two federal acts. The State Nuclear Waste Project Office performs non-regulatory oversight of DOE's compliance with the environmental protection provisions of the Nuclear Waste Policy Act and the National Environmental Policy Act, but we have no enforcement power.

The second part of the answer to your question is that State environmental regulations for things like air quality and water quality permits are enforced by the State of Nevada Division of Environmental Protection, which we work with regarding the Yucca Mountain program.

Q: How well is DOE doing regarding environmental compliance and environmental protection?

Dr. Malone: The requirements of the Nuclear Waste Policy Act are fairly straightforward and easy to meet by protecting endangered species and by trying to reclaim areas where the vegetation has been disturbed. DOE is accomplishing those things reasonably well.

However, there's a major problem with respect to DOE's meeting the spirit and intent of the National Environmental Policy Act. The Act has the goal and purpose of broadly protecting the quality of the whole environment and not just the individual pieces like air, water, and endangered species, which are addressed by separate laws. Simply put, one of the purposes of the NEPA is to ensure that a systematic, integrated approach is used by federal agencies for protecting environmental systems, or ecosystems, as they're referred to.

Q: As I understand it, some people, perhaps including DOE, believe that the Yucca Mountain project is exempt from the National Environmental Policy Act. Is that correct?

Dr. Malone: It's a confusing issue that's subject to misinterpretation. The Nuclear Waste Policy Act exempt-

ed DOE from the procedural requirement of preparing an environmental impact statement for site characterization, but DOE is not exempt from the purpose and intent of the National Environmental Policy Act, which is to protect environmental quality in a holistic and interdisciplinary ecological sense.

What the Nuclear Waste Policy Act exemption does is to exempt DOE from having to go through the legal motions of preparing a formal environmental impact statement, which includes public hearings and public reviews and is a lengthy procedural process. However, DOE is not exempt from accomplishing the substantial things that environmental impact statements achieve: that is, developing and implementing a strategy for making decisions that includes protecting natural ecosystems.

In the early stages of the repository program in the mid-1980s, many people in DOE, especially those in the Las Vegas office, believed that the Nuclear Waste Policy Act totally excluded the site characterization phase of the project from National Environmental Policy Act compliance. They now acknowledge that the substantive provisions and intent of NEPA apply throughout all phases of the program.

Q: How are they doing now?

Dr. Malone: Unfortunately for the citizens of Nevada, not very well. As an agency, DOE has never done well with NEPA compliance, here or elsewhere. At Yucca Mountain, they have what is called an "ecosystem program" that consists of reclamation activities, protecting the threatened desert tortoise, and attempting to detect ecological impacts caused by site characterization. However, these piecemeal components of the ecosystem program aren't integrated in the substantial and systematic sense intended by NEPA. Instead of trying to understand the nature of the ecosystem at Yucca Mountain and to predict and avoid adverse impacts, DOE is interested only in detecting impacts after they've occurred.

Impact assessment is the scientific

discipline on which NEPA is constructed, and it means that before a project like site characterization begins, a study has to be conducted of the natural ecosystem as it exists prior to being disturbed. On this baseline information an environmental impact specialist imposes the planned project, or action, like site characterization activities, and assesses the future impacts that might occur to the ecosystem. This is what the impact assessment process set forth by NEPA is all about.

Q: Has DOE done this for the Yucca Mountain project?

Dr. Malone: No, and the concept of impact assessment is what's missing from the Yucca Mountain project and a subjective environmental impact assessment has never been carried out.

Q: But didn't DOE do an environmental assessment in 1986?

Dr. Malone: You're right, they did, but it was for the Nuclear Waste Policy Act and was more of a simple report than an environmental document required by the National Environmental Policy Act. DOE's assessment wasn't sufficient and credible by National Environmental Policy Act standards because it was based largely on incomplete regional environmental information and not on comprehensive baseline data specific to the Yucca Mountain site. Moreover, at the time the 1986 environmental assessment was prepared, plans for site characterization were not completed.

And, finally, the real weakness of the environmental assessment is that quantitative impact assessment was not performed. Instead, without any basis in substance, DOE concluded that no impacts would occur. This kind of speculation, or "guesstimation," is called "expert judgment." DOE routinely turns to such expert judgment when it lacks complete scientific information about the site.

Q: So where do we go from here? II  
(Continued on Back Page)

# More on the mountain's environment

(Continued from Page Four)

(a) the Yucca Mountain site is already disturbed by site characterization activities, and (b) there's still no baseline ecological information, and (c) DOE isn't pursuing the environmental impact assessment process, what should DOE do at this late date?

Dr. Malone: Well, it's too late for DOE to assess the impacts from the site characterization phase at Yucca Mountain because the damage is already done and baseline conditions for the ecosystem have been lost. Without pre-disturbance information on the ecosystem, and with the questionable manner in which DOE is attempting to detect impacts after they've occurred, the issue of DOE's meeting the substance and intent of the National Environmental Policy Act is out the window.

At this stage the best that can be done is for DOE to initiate the ecosystem level studies needed to do a credible assessment of future impacts from a repository. If the Yucca Mountain project continues that far. A full-blown environmental impact statement is required for the repository by both the Nuclear Waste Policy Act and the National Environmental Policy Act and it will take several years to obtain the comprehensive information on the ecosystem that's needed. DOE should get a head start on that now

before it's too late, rather than continuing to ignore ecosystem processes at Yucca Mountain. If they stay on their current path there's sure to be trouble later with National Environmental Act compliance.

Q: You talked earlier about what the Yucca Mountain environment might be like in the future. Can scientists really forecast what plants will live on a site after thousands of years?

Dr. Malone: It's just as likely to succeed as geologists, hydrologists, and climatologists are at predicting the underground environment at Yucca Mountain for up to 10,000 years.

Seriously, systems ecologists, ecosystem modelers, and paleoecologists probably can do this, although, like many other issues at Yucca Mountain, it's a complicated process that scientists are just now beginning to understand. While DOE has no researchers looking into it, several studies relevant to predicting the nature of future ecosystems are under way elsewhere. This kind of research takes a number of years to complete and interpret, so it should be initiated for the Yucca Mountain ecosystem now so that the consequences of interactions between the surface and below-ground environments can be understood in terms of what pneumatic processes and thermal stresses

mean to the long-term safety of a repository. If this isn't resolved by the environmental impact statement process, DOE will fail again to comply with the intent and substance of the National Environmental Policy Act and a lot of uncertainty will remain at Yucca Mountain to be resolved by "expert judgment."

Q: Have these kinds of issues been called to DOE's attention, and if so, how has DOE responded?

Dr. Malone: For several years both the Nuclear Waste Technical Review Board, appointed by the White House, and the State of Nevada Nuclear Waste Project Office have tried unsuccessfully to convince DOE to adopt an ecosystem approach to its environmental program. This would allow DOE to both comply with the National Environmental Policy Act and to be in a position to respond to future scenarios like the physical scientists at Yucca Mountain are trying to do. As recently as last month the Technical Review Board and our office brought the matter up again. The Board is going to outline the kinds of ecosystem studies it believes DOE should be doing now, and early next year the Board plans to discuss such studies with DOE. When they do, we'll be there to lend support and to hope for a rational response from DOE.

The Nevada Nuclear Waste News is published by the Nevada Nuclear Waste Project Office and funded through financial assistance provided by the United States Congress.

Nevada Agency for Nuclear Projects  
Nuclear Waste Project Office  
Capitol Complex  
Carson City, NV 89710  
(702) 687-3744  
(Address correction requested)

Bulk Rate  
U.S. Postage  
PAID  
Carson City, NV  
Permit No. 15

John Nester, Nuc. Waste Off.  
Legis. Counsel Bureau, Res. Div.  
Capitol Complex  
Carson City, NV 89710