

SEABED ARTICLE
LOIS CONGDON (ATTORNEY)STATEMENT OF DR. LOIS M. CONGDON
(2314-9 Lawrenceville Hwy. Decatur, GA. 30033-3134)

I URGE YOU TO REMOVE YUCCA MOUNTAIN FROM CONSIDERATION AS A REPOSITORY FOR SPENT NUCLEAR FUEL AND OTHER NUCLEAR WASTE.

1 [Yucca Mountain is definitely not a safe repository because 33 fault lines exist within or close
to the site, and 600 earthquakes of 2.5 or greater on the Richter scale have occurred within 50 miles
of the site in the last 20 years including a 5.6 quake in 1992 that damaged your own D.O.E. field
2 office 6 miles from Yucca Mt.] Studies have shown numerous cracks in the mountain and proved the
seepage of water into the facility from outside and through the mountain. This would put in danger
3 the only source of water for the people in the area. [The average distance is 2,000 miles from nuclear
facilities over narrow, winding, hilly roads near the site that have snow or ice on them 8 months of
4 the year.] Would you be willing to move your family to a house near this road close to Yucca
Mountain? [Dairy cows graze fairly close to Yucca Mountain. Would you like your children to drink
milk that may well have been contaminated with radioactive substances? Many people in this country
have died from bone cancer caused by the milk they drank as children that contained strontium 90
from our atmospheric nuclear tests. Let's not make the same mistake of allowing radioactive isotopes
in our milk again.] I support the attached petition to remove Yucca Mountain from consideration as
a storage site for radioactive materials.

DO NOT UNDERTAKE THE MASS TRANSPORTATION OF NUCLEAR MATERIALS FOR THE MANY YEARS IT WILL TAKE TO DEVISE SAFER WAYS TO TRANSPORT THEM SHORTER DISTANCES AND AWAY FROM MAJOR POPULATION CENTERS.

5 [Casks have not been tested and proven safe for accidents at the high speeds of the interstate
highways they travel or if they are being moved by a train derailed by an earthquake, as happened last
week.] There is a problem of preventing criticality in a shipping cask, such as occurred in Japan last
6 month due to an error made at a nuclear power plant that injured many people, some critically.] [Your
own D.O.E. engineer estimates 4-6 accidents involving the release of radioactivity off the site,
endangering the lives and health of some of the 50 million people who live within half a mile of a
7 likely transportation route.] Local emergency teams are not trained or equipped to handle an accident
involving nuclear materials. The paper suits provided one fire department are a joke, since paper only
8 shields against alpha rays, not beta and gamma ones. An accident involving a diesel fire would spread
lethal radioactivity for miles. [In one hour a legal, undamaged cask puts out gamma rays equivalent
to 10 chest x-rays to those 6 feet away, and the surface of the cask puts out 10 times this much.
9 Would you like to be in the car next to a truck with such a shipment of casks stuck on the interstate
for four to six hours like the vehicles on I-85 on October 197?] Several years ago from a distance of
12 feet the radiation from a train carrying nuclear materials through Decatur was 5 times the level of
background radiation, and the train stayed in one place for 2 hours, putting forth radiation to start
10 the process of mutations leading to cancer or birth defects or the like. [Much more work needs to be
done to develop safer technology before nuclear materials are moved on our roads or train tracks.
For the immediate future WORK MUST BE DONE TO MAKE SAFER THE SPENT FUEL BEING
KEPT AT POWER PLANTS.]

11 PLEASE CONSIDER BETTER METHODS FOR DEALING WITH NUCLEAR WASTE.
One idea is putting it deep under the ocean bed in no fault areas. I attach part of an article about that. I understand the D.O.E. started studies on this years ago but stopped them when it looked as though Yucca Mountain would be a viable storage place. This Yucca Mountain is not acceptable, I suggest you look again at sub-seabed storage.

DO NOT LICENSE ANY NEW NUCLEAR POWER PLANTS OR RENEW THE LICENSES OF EXISTING ONES UNTIL A GOOD SOLUTION IS FOUND FOR DEALING WITH THE WASTE. Instead, accelerate studies of ways to provide electricity that are non-nuclear, non-polluting and renewable, such as solar, wind, tides, use of gasohol, etc.

12 Some of your studies have projected that there will be one extra cancer death per 1,000 in the population from the plan to transport spent fuel to Yucca Mountain. Some, however, have questioned your statistics which seem to average in radioactivity for the whole population of the United States and sometimes use the radiation level considered safe for adults without acknowledging that it is much lower for children and fetuses. However, even if we accept your estimate of one new death per 1,000 people, for the 50 million who live within half a mile of a transportation route, would this mean that 50,000 people would get cancer as a result of this plan? That is not acceptable to me. Who are these people who would die prematurely as a result of this plan? Many would be the Native Americans who live near Yucca Mountain and claim it as their own sacred property. What would your decision be if one of those persons was your child or grandchild? I had a friend whose granddaughter was a baby when her family lived a few miles from Three Mile Island at the time of the accident there. When the child was four she was found to have an inoperable malignant brain tumor, the cause of which was felt to be the radiation she had received. They gave her the best medical help available 17 years ago, but they had to watch as she lost control of more and more of her body and her pain increased during the course of a year, and she died at the age of five. How will you answer your Lord when He says, "I was a person who died of cancer as a result of your decision to help the nuclear power plants get rid of their dangerous waste by transporting it to Yucca Mountain?"

Lois M. Congdon

**PETITION FOR DISQUALIFICATION OF YUCCA MOUNTAIN
FROM CONSIDERATION AS A NUCLEAR WASTE REPOSITORY
Amended 12/12/98**

In accordance with the Nuclear Waste Policy Act of 1982, as amended, and 10 C.F.R. 960.3, Yucca Mountain should be immediately disqualified for the reasons outlined throughout this petition.

The Nuclear Waste Act states, in Section 113 (c) (3):

If the Secretary at any time determines the Yucca Mountain site to be **unsuitable** for development as a repository, the Secretary shall

- (A) terminate all site characterization activities at such site;
- (B) notify the Congress, the Governor and legislature of Nevada of such termination and the reasons for such termination;
- (C) remove any high-level radioactive waste, spent nuclear fuel, or other radioactive materials at or in such site as promptly as practicable;
- (D) take reasonable and necessary steps to reclaim the site and to mitigate any significant adverse environmental impacts caused by site characterization activities at such site; (emphasis added)

The basis for suitability is defined in the Site Recommendation Guidelines as provided for in the Nuclear Waste Policy Act, and promulgated by the Department of Energy in 10 CFR 960.

The Guidelines state in Section 960.3-1-5:

A site shall be **disqualified at any time** during the siting process if the evidence supports a finding by DOE that a disqualifying condition exists or the qualifying condition of any system or technical guideline cannot be met. (emphasis added)

The language in the Guidelines for Site Suitability is clear. The site **shall** be disqualified if a single disqualifying factor exists or a single qualifying condition cannot be met. (emphasis added)

Section I - Yucca Mountain Repository Site will not isolate nuclear waste, violating a disqualifying condition for site suitability as a nuclear waste repository.

Guideline: 960.4-2-1 Post-Closure Disqualifying Condition for Hydrology:

A site shall be disqualified if the pre-waste-emplacment ground-water travel time from the disturbed zone to the accessible environment is expected to be less than 1000 years along any pathway of likely and significant radionuclide travel.

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Recent analyses of samples collected at the underground Exploratory Studies Facility (ESF) at the Yucca Mountain site indicate that water infiltrating from the ground surface above the study facility has traveled rapidly downward in fractures in the Mountain to, and through, the proposed repository horizon, toward the water table. Samples collected from the fracture walls in the ESF contain elevated amounts of chlorine-36 that are sufficiently high to indicate that the source must have been atmospheric weapons testing in the Pacific. Chlorine-36 was produced by the activation of the salt in seawater. It was deposited in fall-out and rain across the Northern Hemisphere. Since chlorine-36 does not occur at such large ratios in nature, it provides a marker for the travel time of surface water.

Therefore, transport of this bomb-pulse isotope to its current depths by infiltrating precipitation must have taken place within the last 50 years. This significant discovery contradicts earlier conceptual models depicting unsaturated zone flow at Yucca Mountain as being dominated by very slow downward movement through pores in the rock.

DOE's recent unsaturated zone flow models, based on chlorine-36 and other data, indicate that within acknowledged bounds of uncertainty, water infiltrating through the waste emplacement horizon will quickly reach the water table. And according to saturated zone flow models, travel to a point at which it is accessible to humans through water wells is less than 1000 years. This meets the conditions of 960.4-2-1 for disqualification; therefore Yucca Mountain must be disqualified.

With Chlorine-36 showing that radionuclide travel to be faster than anticipated, it is clear that the expected performance of the repository will result in significant radionuclide contamination of the groundwater and, ultimately, the surface waters down-gradient from the site.

Section II – Protection of Groundwater, Yucca Mountain would violate a disqualifying condition if applied to the life of the repository

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Guideline: 960.5-2-6 Preclosure Disqualifying Condition for Socioeconomic Impacts:

A site shall be disqualified if repository construction, operation, or closure would significantly degrade the quality, or would significantly reduce the quantity, of water from major sources of offsite supplies presently suitable for human consumption or crop irrigation and such impacts cannot be compensated for, or mitigated by, reasonable measures.

This guideline as written does not expressly apply to the post-closure phases of repository performance, however isolation of nuclear waste from the environment, including groundwater is implicit in the goal of the repository program. Therefore we assert that this Guideline is relevant to the assessment of Yucca Mountain.

The expectation of the Guidelines was that the geologic barrier of the site would limit radionuclide releases from the repository through time, such that environmental contamination away from the repository would not be significant. Now, as discussed, the picture is quite different. The expected performance of a Yucca Mountain repository will result in significant amounts of radionuclides degrading the quality of off-site supplies of groundwater that are presently suitable for and used for human consumption and crop irrigation. Current land use in the Yucca Mountain area includes large-scale milk production. With 92% of milk comprised of water, our children may eventually be drinking radionuclides for breakfast, lunch, and dinner.

DOE intends for the contamination to occur during the long postclosure period, and affect much of the ground water in the Amargosa Valley before it is finally discharged to the ground surface where contaminants will be reconcentrated. Compensation for this degradation, as allowed for in the Guideline, is impossible. If mitigation were feasible, it would have to be included in the repository assessment; it is not.

The ability to avoid significant groundwater degradation after closure of the repository should be no less a siting requirement than it is before and during closure. These Guidelines were designed to prevent the emplacement of high-level nuclear waste at a site that is known to contaminate water supplies. Omission of this disqualifying factor from the Post-Closure Guidelines was in actuality an affirmation of the national commitment in the Nuclear Waste Policy Act to assuring the long-term isolation of radioactivity from the environment.

Section III – Problematic Unresolved Issues

It is clear that additional study of the Yucca Mountain site will not result in significant reduction in the projected dose rates to individuals, nor will it likely reduce the broad range of uncertainty. The purpose of this section is not to suggest that further study should be conducted at Yucca Mountain. Instead, we bring to attention significant factors and relatively new data which disarm any suggestion that the site and any scenario at Yucca Mountain is "good enough" for nuclear waste disposal.

Seismic Activity

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Geologic factors, in addition to rapid groundwater flow in the unsaturated zone, increase the risk and uncertainty about loss of waste containment and isolation at the Yucca Mountain site. Seismic risk is said by project officials to be "acceptably low," but it is acknowledged that the potential exists during the hazardous lifetime of the waste, for the repository to be impacted by an earthquake nearby in the magnitude range of 7.0 to 7.5.

The potential for large nearby earthquakes exists during the operational life of the surface facility of the repository. An unexpected magnitude 5.6 earthquake occurred at Little Skull Mountain, adjacent to the study site in June 1992. This quake was associated with a much larger event in Southern California.

Operation of a nuclear waste repository at Yucca Mountain will require three irradiated fuel pools to facilitate waste transfer operations. The faulting and earthquake history of the area

is such that a nuclear power reactor with its irradiated fuel pools could not be licensed there. Therefore, on what basis does the Department intend to locate multiple irradiated fuel pools at the Yucca Mountain site? This unresolved issue is of critical importance.

Volcanism

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Yucca Mountain was formed by multiple volcanic events. There are lava cones that sit in a line with the Mountain, which are the results of recent volcanic activity. The two nearest cones are 9 and 15 kilometers from the boundary of the waste emplacement area. The risk of recurrence of volcanism, considered a low probability, high consequence event, in the near vicinity of Yucca Mountain is said to be "acceptably low."

A recent study, reported in Science Magazine in 1998, challenges former assessments with the use of the Global Positioning System satellites to gauge crustal expansion at Yucca Mountain. This study shows that the movement of the earth's crust at the site is about 20 times greater than previously estimated and that it is currently accelerating. The authors conclude that more study is needed, but assert that all previous estimates on crustal movements could be incorrect since acceleration was not previously factored. Further, they conclude that the evidence is consistent with the possibility of a magma pocket under Yucca Mountain.

Given this new information, it clear that we cannot assert that this site is necessarily subject to a "low risk" for future volcanism. If we consider for a moment that the repository program and the Nuclear Waste Policy Act were founded upon a commitment to intergenerational equity, perhaps we should ask ourselves: Would we be able to understand our ancestors if they had chosen a volcanically active site for their most concentrated radioactive waste? It is not clear that this site is subject to disruption by future volcanism, but it is also not clear that it is not. This new data on Yucca Mountain increases that uncertainty.

Human Intrusion

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Human intrusion remains an unresolved issue with respect to the long spans of time associated with a repository. Yucca Mountain lies in the midst of a number of natural resources and mineral deposits. In fact, there is now an operating gold mine within sight of Yucca Mountain. It is not realistic to make projections on repository performance without factoring in the potential natural resources and the impact on those who would seek them in the future.

III - Conclusion

From Section I, we conclude that the Secretary of Energy must immediately disqualify Yucca Mountain from consideration as a permanent repository. From Section II we conclude that Yucca Mountain would not protect the environment from nuclear waste, which is the goal of the program. From Section III, we conclude further study of Yucca Mountain will only increase the basis for disqualification, thus is needless, wasteful, and an irresponsible use of Nuclear Waste Fund monies.

Amended 12/12/98

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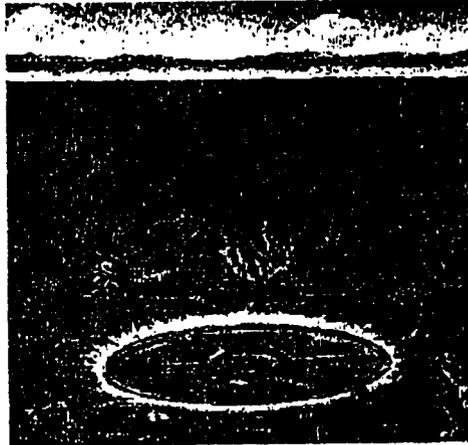
The Sub-Seabed Solution

Far from being embraced, a promising solution to the radioactive-waste problem faces stiff opposition from the federal government, the nuclear industry, and environmental interests

by Steven Nadis

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IN 1976 a giant coring device mounted to a ship plunged repeatedly into the bottom of the Pacific Ocean, three miles below the surface, bringing up 100-foot-long tubes of mud and clay with the consistency of peanut butter. The



primeval muck told a tale of geologic serenity. Sediment records from the cores indicate that the region -- roughly 600 miles north of Hawaii and spanning an area four times the size of Texas -- has been tranquil for 65 million years, unperturbed by volcanic activity or by shifting of the earth's tectonic plates. Charles Hollister, a geologist and senior scientist at the Woods Hole Oceanographic Institution, saw even more when he gazed at the thick dark ooze. He saw what might prove to be the perfect place to sequester our high-level nuclear waste -- the most potent and intensely radioactive by-products of military or civilian enterprise.

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It's an intriguing vision, and one that in principle still holds great promise. Yet the concept of "sub-seabed disposal," first suggested by Hollister in 1973, has been undercut by a series of political blunders. A decision later this fall at a meeting in London sponsored by the International Maritime Organization, and a bill before Congress at this writing, may kill the idea -- possibly the best solution yet advanced to the nuclear-waste problem -- before society has had a chance to judge its true potential.

Hollister first hit upon the notion of sub-seabed burial twenty-three years ago, at a small social gathering in Washington, D.C. There he met William Bishop, a chemist at the Sandia National Laboratories, in New Mexico, who described the problems associated with a proposed nuclear-waste repository in Lyons, Kansas. "I immediately thought of the clays in the deep-sea floor, which I knew, from previous studies, clung tenaciously to the radioactive particles that had settled there as a result of atmospheric nuclear testing," Hollister recalls. He and Bishop stayed up all night discussing the idea, and a month later Hollister made a pitch to officials at Sandia, whose interest was piqued.

Next Hollister brought biologists, physicists, and oceanographers to Sandia to see if they could "destroy" the idea in what he calls the "biggest shootout since the OK Corral." He says, "If we could find out it was a stupid idea at the outset, it would save us a lot of time and money." But rather than shooting down the concept, many of the scientists told Hollister they'd like to work with him on it. A sub-seabed research program was initiated in 1974, with financial backing from Sandia; within a few years it had grown into an international effort involving ten countries and 200 scientists, under the auspices of the Paris-based Organization for Economic Cooperation and Development. This collaboration led to the core-sampling expedition that demonstrated the stability of the region underlying the North Pacific floor. Hollister points out that the Pacific site he and his colleagues explored twenty years ago is not unusual, geologically speaking. "About a quarter of this planet is covered with geology that is appropriate for this solution," he says.

Experiments conducted by this international team of scientists from 1974 to 1986 support Hollister's opinion that the sticky mud and clays that blanket the mid-ocean basins may provide the best burial grounds yet proposed

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for nuclear waste. These tests suggest that if waste canisters were deposited just ten meters below the ocean floor, any toxic substances that leaked out would be bound up by the clays for millions of years. Deeper interment, at 100 meters or more, could easily be managed, providing an even greater margin of safety. "The stuff sticks to the mud and sits there like heavy lead," Hollister maintains. "Nothing's going to bring it into the biosphere, unless we figure out how to reverse gravity."

If he's right, and the proposed technique could end the worldwide radioactive-waste problem that has been building up for the past fifty years, why has almost nobody in this country heard about it? The answer to this question -- along with the roots of many of the problems plaguing current U.S. nuclear-waste-disposal efforts -- can be traced to a 1986 decision by the Department of Energy which cut off research funds for sub-seabed and other disposal alternatives, so that the agency could focus exclusively on developing a land-based geologic repository for high-level wastes; a year later it settled on Yucca Mountain, Nevada. The timing was unfortunate: ongoing sub-seabed experiments were canceled in spite of encouraging results and after much experimental apparatus had already been built.

The federal government had a change of heart in 1987, when Congress passed amendments to the Nuclear Waste Policy Act which, among other things, established the Office of Subseabed Disposal Research within the DOE. The director of this office, Walter L. Warnick, was asked to create a consortium of university investigators and devise a long-range research plan. But a couple of months after Warnick had enthusiastically begun, the congressional committee that controlled appropriations strongly discouraged the Energy Department from spending any money on the program. With access to sub-seabed research funds blocked, Warnick shifted his attention to acid rain and global-warming issues. The Office of Subseabed Disposal existed in name only until this year, when it was abolished altogether.

Warnick was disappointed by the final decision, although he recognizes that it was effectively made about a decade ago, when the DOE and Congress chose the Yucca Mountain alternative and "put all their eggs in that basket." The judgment, he adds, was made on pragmatic, rather than technical, grounds. "It merely reflected the feeling that land-based-disposal technology was more advanced at the