

UPDATE ON THE YUCCA MOUNTAIN SITE RECOMMENDATION
January 28, 2002

A recent report to Congress by a scientific review panel, raising major concerns about the adequacy of the scientific basis for DOE's recent recommendation to approve the Yucca Mountain site, supports California Yucca Mountain Technical Review Group's findings and recommendations regarding the site. Last Thursday, the Nuclear Waste Technical Review Board (NWTRB) released its "Report to Congress and the Secretary of Energy" evaluating the technical and scientific work related to the Department of Energy's (DOE) recent decision to recommend the Yucca Mountain site. The NWTRB was established by the Nuclear Waste Policy Act, as amended in 1987, as an independent scientific review panel to evaluate the Department of Energy's site characterization studies at Yucca Mountain. The major findings of this report include:

- ∞ The technical basis for the DOE's repository performance estimates is weak to moderate at this time. (These estimates predict the ability of the repository to isolate the nuclear wastes from the environment for 10,000 years.)
- ∞ Gaps in data and basic understanding cause important uncertainties in the concepts and assumptions on which the DOE's performance estimates are now based. Because of these uncertainties, the Board has limited confidence in current DOE performance estimates generated by DOE's performance assessment model. (This model is the DOE's principal method for evaluating the ability of the proposed Yucca Mountain repository, including its engineered and natural features, to isolate and contain harmful radioactive wastes.)

These findings tend to support the California agencies' recent conclusions, noted in our report to the Governor's Office on January 16, 2002, that:

- (1) The suitability of the Yucca Mountain site is still in question until the necessary route-specific transportation analyses and the scientific studies needed to evaluate potential groundwater impacts in California have been completed.
- (2) DOE has provided insufficient information to make a decision on the suitability of the Yucca Mountain site;
- (3) The Secretary of Energy should not make a recommendation regarding the suitability of the site until all necessary studies have been completed;

On the other hand, the Board also concluded that:

- ∞ At this point, no individual technical or scientific factor has been identified that would automatically eliminate Yucca Mountain from consideration as the site for a repository.
- ∞ Policy-makers will decide how much scientific uncertainty is acceptable when decisions are made on site recommendation or repository development.

Therefore, they conclude that there are no clear scientific reasons for eliminating the Yucca Mountain site from consideration for the proposed repository and that policy-makers, not scientists, will decide how much scientific uncertainty is acceptable.

CALIFORNIA'S COMMENTS ON DOE'S POSSIBLE APPROVAL OF THE YUCCA MOUNTAIN SITE

January 16, 2002

California has provided comments on various proceedings and documents for the proposed Yucca Mountain Project, since 1985. These include comments on the Department of Energy's (DOE) Draft Environmental Impact Statement (EIS) and comments to DOE in October 2001 on their possible approval of the Yucca Mountain Project. The California Energy Commission coordinates a Yucca Mountain Technical Review Group, made up of 13 California transportation, water quality, and environmental agencies.¹ This group met January 14 and 15, 2002, to update the October 2001 comments and prepare a summary list of findings and recommendations regarding DOE's possible approval of the Yucca Mountain Site. The Technical Review Group's findings are summarized below:

- ∞ DOE has provided insufficient information to make a decision on the suitability of the Yucca Mountain site. The Secretary of Energy should not make a recommendation regarding the suitability of the site until all necessary analyses have been completed. The suitability of the Yucca Mountain site is still in question until the necessary route-specific transportation analyses and the scientific studies needed to evaluate potential groundwater impacts in California have been completed.
- ∞ This finding is consistent with a recent report by the U.S. General Accounting Office stating that "it may be premature for DOE to make a site recommendation" because of the large number of remaining technical issues that must first be resolved. Recent findings and recommendations by the Nuclear Waste Technical Review Board (a review board established by the Nuclear Waste Policy Act as an independent scientific and technical review committee) and the Nuclear Regulatory Commission's Advisory Committee on Nuclear Waste document the large number of unresolved technical issues and problems with DOE's risk assessment models.
- ∞ DOE has ignored the majority of California's concerns and requests for additional analyses, as well as concerns and requests of the Western Governors' Association and Western Interstate Energy Board. For example, DOE stated in 1986 that, "Route-specific analyses and an evaluation of the impacts on host States and States along transportation corridors will be included in the environmental impact statement." Despite this promise and requests by California and other states for these analyses, DOE has not provided them.
- ∞ DOE has not adequately considered project alternatives. DOE only examined two alternatives: (1) the waste remains in dry storage at their present sites for 10,000 years with "institutional controls" for the full 10,000 years (extremely costly) or (2) institutional controls are in place for just 100 years, after which there would be no controls assumed to protect public health and safety (unacceptable, due to the potential disastrous potential consequences from radionuclide leakage into the environment). Neither of these are realistic alternatives.

Specific areas of concern for California with respect to the Yucca Mountain site are

¹ They include the California Departments of Conservation, Emergency Services, Energy Commission, Fish and Game, Health Services, Highway Patrol, Parks and Recreation, Public Utilities Commission, Toxic Substances Control, Transportation, Water Resources Control Board, Water Resources, and the Lahontan Regional Water Quality Control Board.

potential transportation and groundwater impacts in California, including uncertainty regarding surface water percolation through the repository area to the underlying groundwater and keeping the waste isolated from the environment for thousands of years. Issues and recommendations are discussed below.

1. Potential Transportation Impacts

Issues

- ∞ Transportation impacts are the major component of the project that will affect the most people across the U.S., since DOE proposes transporting 70,000 metric tons of radioactive waste from 131 sites to the repository, mostly from eastern states.
- ∞ DOE has failed to provide an adequate analysis of the transportation risks and impacts associated with shipments to the repository. For example, DOE has not identified routes and transport modes, evaluated the impacts on route-specific populations and environmental consequences, evaluated the structural sufficiency of roads and railroads and costs for improving and maintaining these routes, evaluated the availability and costs of providing timely emergency response capability along shipment corridors over the estimated 40 years of the shipping program, and has not provided mitigation proposals to offset these impacts.
- ∞ The total number of shipments anticipated would be unprecedented, increasing from an average of about 15-25 shipments per year to a projected 400-600 shipments per year. Nevada estimates that the potential number of truck shipments to Yucca Mountain through California would be about 74,000 truck shipments of which about three-fourths could traverse southern California under DOE's "mostly truck" scenario over 38 years. Under a "mixed truck and rail scenario", California could have more than 26,000 truck shipments and 9,800 rail shipments over this period.
- ∞ Because of California's proximity to Nevada, along with the desire to avoid shipments over Hoover Dam and through Las Vegas, DOE may transport a large majority of these shipments through California into Nevada (potentially 5 truck shipments daily over 39 years). California agencies are concerned that DOE may decide to route through California a major portion of the shipments to Yucca Mountain. This concern was heightened with DOE's recent decision to route thousands of low-level and transuranic waste shipments through southern California on State Route 127, near Death Valley, to avoid shipments through Las Vegas. State and local officials are concerned that a precedent is being set for expanded use of this route for high-level waste and spent fuel shipments.
- ∞ DOE's expanded use of SR-127 for nuclear waste shipments is of concern because, according to Caltrans District 9 officials, SR-127 was not designed to accommodate a large amount of heavy truck traffic. SR-127 is a narrow, two-lane road with many sharp curves and changing grades, and has very remote and limited emergency response capability. Due to the remote location, emergency responders would come primarily from Barstow, California or Las Vegas, Beatty or Pahrump, Nevada. Depending upon the location of an accident along SR-127, emergency response times could take up to 3-4 hours. SR-127 is prone to flash flooding, since it parallels the Amargosa River. In addition, there are few shoulders for parking and few places for trucks to pull over along the route. SR-127 is the major tourist

access route to Death Valley National Park, which attracts over 1.25 million visitors per year.

- ∞ California's State Park System contains 265 park units encompassing 1.4 million acres of land of which some are located along potential spent fuel shipment routes in California. In addition, Death Valley National Park, visited by 1.25 million people annually, is located adjacent to potential routes in California.

Recommendations

- ∞ Changes in spent fuel shipping cask designs and terrorists' capabilities to attack and destroy targets make it essential that DOE revise their risk analyses for spent nuclear fuel shipments to Yucca Mountain in light of September 11. These analyses should include a revised, comprehensive assessment of the risk of terrorist attacks and sabotage against repository shipments.
- ∞ DOE should provide route-specific analyses of the risks to communities along shipment corridors from transporting spent nuclear fuel to the repository.
- ∞ DOE must identify road, rail, and emergency response improvements needed along shipment corridors in California to protect public health and safety and resources, consistent with Section 180(c) of the Nuclear Waste Policy Act.
- ∞ DOE should evaluate the potential public health and safety and resource impacts on affected state and national parks in California from repository shipments and should propose measures to mitigate these impacts.

2. Potential Groundwater Impacts.

Issues

- ∞ Inyo and San Bernardino Counties contain major portions of the aquifers through which radionuclides potentially leaking from the proposed Yucca Mountain repository are predicted to travel. Inyo County is within 17 miles from the Yucca site.
- ∞ The potential contamination of the deep regional aquifer, which appears to underlie both Yucca Mountain and the Tecopa-Shoshone-Death Valley Junction area, poses a significant long-term threat to the citizens and economy of Inyo County. Groundwater research conducted by Inyo County in California and Nye and Esmeralda Counties in Nevada and the USGS indicate a direct connection between water in the deep "Lower Carbonate Aquifer" beneath Yucca Mountain and surface discharges (springs) in Death Valley National Park.
- ∞ A site suitability decision is premature given that key scientific studies regarding waste package corrosion processes are still underway. Comments by the U.S. General Accounting Office, the Nuclear Regulatory Commission, and the Nuclear Waste Technical Review Board demonstrate the high levels of uncertainty regarding the geologic, hydrologic and proposed engineered systems to isolate the wastes from the environment.
- ∞ The degree of uncertainty regarding potential groundwater impacts in California is too high to support a recommendation that the Yucca Mountain site is suitable for a

permanent, high-level waste repository. Key uncertainties include the rate of corrosion of waste containers, the potential release of radionuclides into the environment, and the impacts on California from the potential movement of radionuclides from any leaks from the proposed repository.

Recommendations

- ∞ DOE should revise their risk analyses for spent fuel management, storage and disposal at the repository in light of the September 11 attacks and the resulting changes in assumptions regarding terrorists' capabilities to attack and destroy targets. These analyses should include a revised, comprehensive assessment of the potential environmental impacts, including groundwater impacts, from terrorist and sabotage attacks against the proposed repository, particularly attacks against surface and near-surface facilities.
- ∞ California water quality agencies have concluded that DOE needs to perform a more complete evaluation of the potential pathways for radionuclide migration into groundwater in eastern California, such as the Death Valley region and the Amargosa Valley. Better data and more realistic models are needed to evaluate groundwater flow and radionuclide migration toward California aquifers before a determination can be made on the suitability of the proposed Yucca Mountain site.
- ∞ The research needed includes: (1) better evaluation of the relationship between the perched water and the volcanic aquifer up-gradient from the Yucca Mountain; one monitoring well clearly is not sufficient to determine water level for the up-gradient model boundary; (2) a more accurate determination of the transition zone between the volcanic and the alluvial systems to improve estimates of groundwater travel time and the potential radionuclide concentration; (3) better understanding of groundwater flow parameters beneath the site; (4) coordination and integration of modeling efforts with the US Geological Survey's modeling effort; (5) studies to determine the extent to which groundwater flowing under Yucca Mountain discharges into Death Valley and Amargosa Valley; (6) studies to determine whether the carbonate and volcanic groundwater systems are independent; and (7) DOE needs to describe how it will monitor or detect migration of radionuclides from the repository.

3. DOE's Criteria for Approving the Site Contravene the Nuclear Waste Policy Act

- ∞ The Nuclear Waste Policy Act (NWPA) requires geologic isolation of the nuclear wastes. In the last two years, DOE has substituted engineered barriers for waste containment in place of geologic isolation, as required by NWPA, because of the significant flaws that have been discovered in the geology of the site. This is likely to be the subject of future litigation.