**January 2005**

# Yucca Mountain and Nuclear Waste

## Background

High-level radioactive waste is produced at commercial nuclear power plants and nuclear materials production defense facilities. Commercial nuclear reactors produce it in the process of generating electricity, while nuclear weapons facilities produce it through the manufacture of weapons-grade fissile material. The two principle forms of the waste are “spent fuel,” which is used, irradiated solid material from commercial and defense reactors, and liquid waste, which comes from the reprocessing of this fuel. Spent fuel from commercial reactors, the primary form of high-level nuclear waste in the United States, remains highly radioactive for hundreds of thousands of years.

Nuclear fuel is made of solid pellets of enriched uranium. The pellets are sealed in tubes, which are then bundled together to form nuclear fuel assemblies. These fuel assemblies are put inside a nuclear reactor, where a fission reaction takes place, generating tremendous amounts of heat. This heat can be harnessed for the production of electricity. The fuel in the reactor is only efficient in producing heat for a limited time, however. As a result, once a year, approximately one-third of the nuclear fuel inside a reactor is removed and replaced by new fuel assemblies. The irradiated fuel removed from the reactor is extremely radioactive and hot, so all nuclear power plants have “spent fuel pools,” where the waste is placed in order to cool and allow some of the radioactivity to decay.

The space in the pools is limited, however, and when the pools are full, the reactors must either shut down or move some of their older waste aboveground for storage. Dry casks, which are steel and concrete containers filled with inert gas, are the most common form of aboveground storage. When irradiated fuel is moved into dry cask storage, it is still highly radioactive.

## Current Situation

Past claims that nuclear energy would be “too cheap to meter” have proven false. Storage of nuclear waste is very expensive. Rather, than requiring the nuclear industry to be fully liable for the costs of long-term management of the waste it generates, the government has assumed this responsibility. Nuclear power plants add fees to their ratepayers’ bills for the Nuclear Waste Fund, established by the federal government in 1982 to research ways to dispose of nuclear

waste. The money in this fund, supplemented by defense appropriations for military waste slated for geologic disposal, is being used to pay for the Yucca Mountain Project.

**The Site**

Yucca Mountain, located approximately 80 miles northwest of Las Vegas, Nevada, is the only site being considered for a high-level nuclear waste repository in the United States. The proposed repository is slated to contain 70,000 metric tons (77,000 U.S. standard tons) of nuclear waste, including 63,000 metric tons of spent fuel from commercial nuclear power plants and 7,000 metric tons of high-level waste from the U.S. Department of Energy (DOE) weapons complex. High-level radioactive waste from commercial nuclear reactors is stored at 74 sites across the country - 65 with operating reactors and 9 with reactors that are being decommissioned (dismantled and cleaned-up). Commercial nuclear power plants have generated about 50,000 metric tons of "spent fuel" to date and this amount is expected to at least double by 2035. In addition, U.S. weapons and research activities have produced more than 2,700 metric tons of spent fuel and approximately 100 million gallons of liquid high-level waste.

Because the storage capacity of a Yucca Mountain repository is capped by legal (its capacity is capped by law at 70,000 metric tons) and physical considerations, the site cannot accommodate all of the waste that will be produced by currently licensed reactors (not including 20-year license extensions that many reactor operators are applying for). Moreover, since irradiated fuel must decay onsite in a cooling pool for at least five years before it can be transported, at least five years worth of nuclear waste (100 – 150 metric tons) will always remain at each operating reactor even if the proposed repository opens. Given this and the amount of waste already produced, Yucca Mountain would not consolidate all high-level nuclear waste in one place, nor will it eliminate the risk posed to communities across the country.

**Cost and Responsibility**

It is unlikely that the Nuclear Waste Fund is sufficient to cover the long-term costs of waste management and storage. The annual rate paid by companies into the fund, one-tenth of a cent per kilowatt-hour of electricity generated, has not changed since 1983. The money in the fund is not indexed for inflation. It is also unlikely that the Fund would be able to cover the cost of accidents or other problems that could arise at the site.

This uncertainty about the Fund is increased by recent lawsuits filed against DOE. The lawsuits, filed by utilities and other companies that own and operate nuclear power plants, are over DOE's failure to begin taking nuclear waste in 1998. As required by the 1982 Nuclear Waste Policy Act, DOE signed contracts in 1983 with 68 utilities and seven other commercial nuclear waste owners, agreeing to begin taking their waste by January 31, 1998. In August 2004, Exelon was the first company to settle its suit. The company settled for an initial $80 million, as reimbursement for storage costs already incurred, but the total could reach $300 million by 2010, the earliest date DOE could possibly begin accepting waste at Yucca Mountain. The settlement, which does not grant compensation for "damages," works out to almost exactly 1 mil per kilowatt (one-tenth of a cent) since 1998, which is what its ratepayers paid into the Nuclear Waste Fund.

## Yucca Mountain Project Timeline

On February 14, 2002, Energy Secretary Spencer Abraham officially recommended to the president that a nuclear waste repository be developed at Yucca Mountain. The next day President Bush approved this recommendation. On April 9, 2002, Nevada Governor Kenny Guinn issued a Notice of Objection, which serves as a veto to the site recommendation. Congress responded by overriding Nevada's objection with a majority vote in both Houses, as allowed by an expedited and tightly constrained procedure defined in the Nuclear Waste Policy Act of 1982. On May 8, 2002, the Republican-led House of Representatives voted 306-117 to approve the Yucca Mountain repository. On July 9, 2002, the Democratic-led Senate similarly approved the site by a vote of 60-39.

According to the DOE's plan, waste will be accepted at Yucca Mountain beginning in 2010 and will continue to arrive at Yucca Mountain for at least 24 years, with the final "emplacement" activities ending after 2035. The DOE, however, must first apply for a license from the Nuclear Regulatory Commission (NRC) in order to construct and operate the repository. Although the Nuclear Waste Policy Act stipulates that a license application must be filed within 90 days of the Congressional action, the DOE has not yet submitted its application. The DOE has repeatedly stated that the agency must submit its license application in December 2004 in order to meet the 2010 timeline. But DOE announced at the end of November 2004 that it would not be able to submit its license in December. DOE claims that the principle reasons for this delay are two recent court decisions, one by the DC Circuit Court of Appeals, and the other by a NRC Atomic Safety and Licensing Board Panel. But notably, the DOE and NRC have not yet agreed on the level of detail or type of information about the facility's design, among other outstanding issues, that DOE must provide in its application.

### Illegal EPA standards

Environmental and public interest organizations, including Public Citizen, together with the State of Nevada, filed a lawsuit in June 2001, challenging EPA's 10,000-year compliance period for radiation protection standards at Yucca Mountain. On July 9, 2004, the DC Circuit Court of Appeals ruled that the EPA's compliance period was illegal. The court voided the portions of the EPA standard and the NRC licensing rule that implemented the 10,000-year compliance period.

Congress mandated in the 1992 Energy Policy Act that EPA set public health and safety standards "based upon and consistent with" the findings and recommendations of a National Academy of Sciences (NAS) study directed to identify the scientific bases for such standards at Yucca Mountain. The NAS study, which was issued in 1995, recommended "that compliance with the standard be measured at the time of peak risk, whenever it occurs." According to DOE's projections, the peak risk to an individual from leaking radioactivity would occur at about 300,000 years after closure of the dump. At 300,000 years, the dose is estimated to be 37 to 150 times greater than permitted by the EPA's groundwater protection standard, with the range reflecting the uncertainty in the calculation. A 10,000-year standard simply would not protect the health of future generations. Yet, EPA "unabashedly rejected NAS's findings, and then went on to promulgate a dramatically different standard, one that the Academy had expressly rejected," according to the Court ruling.

The EPA did not appeal the court's decision and has stated its intention to reissue its compliance period rule. Yet, a few members of Congress are advocating changing the law to allow for a 10,000-year compliance period, arguing that it is not possible to model the repository's performance or to establish regulations for hundreds of thousands of years. However, the NAS, in considering "whether scientifically justifiable analyses of repository behavior over many thousands of years in the future can be made," concluded that "such analyses are possible."

The Nuclear Energy Institute, the powerful lobbying arm of the commercial nuclear industry, sued the EPA in an effort to further undercut the groundwater protection standard, which EPA set at 4 millirem per year (10 millirems is equivalent to one chest X-ray). The court rejected NEI's challenge to the groundwater protection standard.

**Lack of Publicly Available Documents**

DOE is required to make all of the documentary information related to its Yucca Mountain license application available online six months in advance of filing its application. This means that, in order to have met its application deadline of December 2004, DOE would have had to index and post all its supporting documents on the NRC's Licensing Support Network (LSN) by June 30, 2004. On June 30 – exactly six months to the day – DOE certified that its documentary material was "available." But despite DOE's self-certification, all of the information related to the Yucca Mountain licensing application was not available to the public. For example, DOE later admitted that more than four million emails related to research on the Yucca Mountain Project had not been posted by June 30.

The State of Nevada challenged DOE's self-certification. On August 31, 2004, an NRC Atomic Safety and Licensing Board Panel (ASLBP) ruled that DOE had failed to make publicly available on the Internet all documents related to the Yucca Mountain Project. According to the ASLBP, "[W]e conclude that because of the incompleteness of its document review and production, the many years that DOE has had to gather and produce its documents, and the fact the date of production was effectively within DOE's control, DOE's document production on June 30, 2004, did not satisfy its obligation to make, in good faith, all of its documentary material available pursuant to" NRC's regulations. Posting all relevant Yucca Mountain documents online is important because it allows the public to review the material and participate effectively in the Yucca Mountain licensing proceedings. DOE is now estimating that it will certify the LSN again in the spring of 2005.

**Funding**

The DOE has spent more than $9 billion (2003 dollars) on the repository program since its inception in 1982. The total cost of the Yucca Mountain Project is currently projected to reach $61 billion (2003 dollars), up 24% from the previous estimate.

In its budget proposal for Fiscal Year 2005, DOE requested $880 million for the Yucca Mountain Project - a $300 million increase from Fiscal Year 2004. Nearly two-thirds of this increase was for building new onsite surface facilities and roads, and developing the transportation system for shipments to Yucca Mountain. The increase also included funding for the Yucca Mountain license application. The project was ultimately funded at the FY2004 level, but it is expected that DOE will request $1 billion in next year's budget.

DOE also proposed that income from the Nuclear Waste Fund be classified as "offset collections" for five years, meaning that it would not be counted under the congressional budget caps and would provide a guaranteed income for the project. Reclassifying the Nuclear Waste Fund, however, which would effectively remove it from Congressional oversight, requires legislation in both houses. This legislation passed in the House Energy & Commerce Committee, but did not get a floor vote, and has not yet been brought up in the Senate.

## Problems with the Yucca Mountain Site

In addition to the regulatory issues surrounding the proposed repository at Yucca Mountain, there remain numerous unresolved scientific questions about the suitability of the site to safely contain the waste.

*Groundwater contamination*
The DOE talks about "disposing of" nuclear waste, but nuclear waste cannot be disposed of, it only can be stored. When stored, there is always the danger that radiation will escape.

The original concept of a geologic repository was for a site with "natural barriers" capable of containing nuclear waste throughout the hundreds of thousands of years it remains dangerously radioactive. But after the DOE found problems with the natural barrier system at Yucca Mountain, the agency decide to rely on an engineered barrier system instead.

A freshwater aquifer lies beneath Yucca Mountain. If radioactive waste from a repository leaks, it would jeopardize the health of nearby residents, who depend on that aquifer as their sole source of drinking water. The aquifer is also used for irrigation by the residents of the Amargosa Valley, an organic farming and dairy community only 20 miles away, as well as parts of California. The National Academy of Sciences has identified the groundwater pathway as a significant pathway of exposure in the vicinity of the Yucca Mountain site.

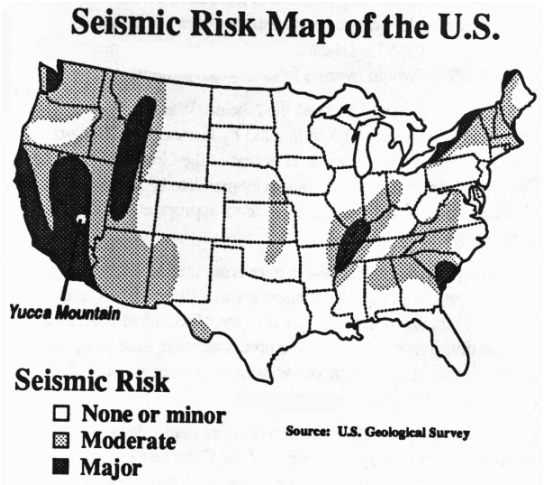
Yucca Mountain is composed of tuff, which is volcanic ash welded together over thousands of years. This rock can be nonporous or somewhat porous, depending on the extent of welding and how fast the layers cool. The tuff at Yucca Mountain is of both types, and has several distinct layers. The densely welded tuffs at Yucca Mountain are brittle with significant cracks and fissures. The cracks and fissures in the upper layer provide a potential pathway for water to get into the mountain. The fractures in the lower layer are a potential pathway for waste at some point to move down to the aquifer. The less densely welded tuff, which forms a layer between the two densely welded but fractured layers, has a lower frequency of fissures, but it is much more generally porous.

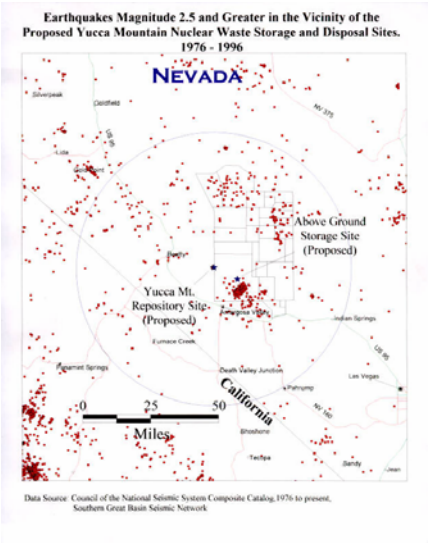
Yucca Mountain typically gets about 6-7 inches of rain per year, which is slight compared to other regions of the United States. The site, however, is not dry. DOE supposes that the average rainfall at Yucca Mountain is spread out evenly over the year, and thus that it only rains a small amount at a time, with most of the water evaporating before it can penetrate the mountain. In reality, rainfall at Yucca occurs frequently as torrential storms, which often result in erosion and flooding. Because of the intensity of the rain and the time it pools on the surface, the water can actually penetrate the mountain much more than previously predicted.

Once water has breached the rock surface, the fissures in the tuff allow water to move through the mountain at much faster rates than expected. In 1996, the radioactive isotope chlorine-36, which was produced by nuclear bomb tests in the 1950's, was found inside Yucca Mountain at repository depth. This indicates that water can travel through Yucca Mountain and move significant distances in less than 50 years.

*Earthquakes and Volcanic Activity*

Yucca Mountain is also not an area of geologic stability. Nevada ranks third in the nation for current seismic activity (see maps below). Yucca Mountain itself is crisscrossed by 33 fault lines and is nicknamed "Serpent Swimming West" by the Western Shoshone Indian nation due to its constant movement. Since 1976, there have been more than 600 seismic events of a magnitude greater than 2.5 within a 50-mile radius of Yucca Mountain. In fact, Yucca Mountain is bound on the east and west by fault lines (Ghost Dance and Solitario Canyon, respectively). In 1992, an earthquake with a magnitude of 5.6 caused damage to a DOE field office building in the area. Despite all of this evidence, the DOE has said it considers it unlikely that an earthquake will strike the region. The risk of an earthquake is concerning, however, because one could put the surface facility at risk, which is planned to hold up to 40,000 metric tons of spent fuel during waste emplacement. Further, some scientists believe that a significant rise in groundwater levels could occur as the result of an earthquake, possibly flooding the repository. This type of event could compromise the integrity of the nuclear waste containers and contaminate the groundwater beneath Yucca Mountain.




In addition to this seismic activity, several volcanic cones also exist near the Yucca Mountain site, one of which may have been active as recently as 80,000 years ago. If the volcanic cones were to become active, magma could enter the underground tunnels and cause the canisters to fail instantaneously, releasing radiation to the groundwater or in the case of a major eruption, to the air as contaminated ash. Geologists are still debating the likelihood and the severity of the radiation dose to the public as a result of volcanic activity. After 20 years, data collection and analyses are still under way on this critical issue.

*Cask Corrosion*

DOE plans to use a nickel-chromium alloy container, covered with a drip shield made of titanium, as the principle engineered barrier at Yucca Mountain. Yet, Yucca Mountain is an oxidizing environment in which metals could corrode in the presence of moisture. Since the alloy has only been in existence for two decades, DOE's models of canister performance are based on relatively scant data and contain large uncertainties.

Recent research has, in fact, disagreed with DOE's modeling. Dr. Roger Staehle of the University of Minnesota and Dr. Don Shettel of the Geosciences Management Institute recently conducted laboratory experiments at Catholic University to assess the stability of the two key barrier metals, C-22 and Ti-7, under anticipated repository conditions. The results of these experiments strongly suggested that these repository conditions will produce an acidic vapor. This vapor, when condensing and evaporating, will form concentrated acid and solid precipitates. These solid precipitates will then in turn attract water vapor from the air and form additional very strong acids, which are extremely caustic. As a result, the engineered-barrier metals C-22 and Ti-7 corroded and actually dissolved. Previous laboratory results from other researchers investigating the same issue have shown that lead, mercury, fluorine, magnesium chloride, and other trace elements in Yucca Mountain (picked by water moving through the rock) could potentially form salts and corrode the C-22 and Ti-7 system, but not to this extent.

Cask corrosion is also affected by temperature. Decaying radioactive waste gives off significant heat, particularly for the first five hundred years. This heat can be controlled to an extent through the spacing of waste packages in the repository, but DOE's current repository design for Yucca Mountain packs the waste tightly, and is expected to operate at temperatures between 212 F (100 C) and 390F (200 C). This high-temperature design was chosen because it allows more waste containers to be stored in the repository. High temperatures, however, are concerning because they affect cask integrity and destabilize the waste. Specifically, temperature affects the humidity of the air, formation of salts, and the rate and possibility of cask corrosion.

## Transporting High-level Radioactive Waste

If the Yucca Mountain repository proposal is approved and licensed, waste will be transported to Nevada from the 74 reactor sites where it is currently stored. On April 5, 2004, DOE announced that it will use mostly rail to transport irradiated fuel to Yucca Mountain, and that it will construct a $ 1 billion 300-mile long rail line in Nevada along the so-called Caliente corridor. Waste would come from around the country to Caliente, where it would be moved across Nevada to Yucca Mountain. The corridor, however, which is northeast of the Yucca Mountain site, was recently hit by heavy flooding that damaged tracks and washed out embankments, raising concerns about the use of the area to transport high-level radioactive waste.

More than 51 million residents in 44 states live near the proposed shipping routes. While most of the proposed routes are by rail, some shipments will still have to be transported by truck from reactors because of the lack of rail near certain sites.

According to current DOE policy, rail carriers will determine the transport routes to Yucca

Mountain. Congress directed in the FY 2004 Energy and Water Development Appropriation Act that any rail line to Yucca Mountain should avoid waste shipments through the highly-populated Las Vegas area. However, due to high traffic along northern lines and bad weather in the winter in the Rocky Mountains and Great Plains, rail carriers may find routing the waste along southern rail lines more attractive. Thus more waste would travel across Texas, New Mexico, Arizona, and California, and over 80% of shipments would go through Las Vegas on its way to Caliente.

The DOE has acknowledged that the Nevada rail corridor is unlikely to be completed by 2010. On March 10, 2004, DOE issued a memo evaluating the possibility of transporting the waste in truck casks by rail to Nevada, where they would be trucked to Yucca Mountain, for the first six years of shipments - a proposal that had been rejected in the Final EIS for not being “practical”. According to DOE's own analysis, shipping nuclear waste using truck casks on rail cars to Nevada would create the highest risk to workers and public health and safety. This plan would also require five times the number of shipments than the mostly rail scenario, costing an additional $1 billion.

While the final shipping routes are not determined, DOE published maps showing potential shipment routes to Yucca Mountain in Appendix J of the Final Environmental Impact Statement, which is available online at http://www.ymp.gov/documents/feis_a/web_pdf/index_v2.htm.

Whether the waste is transported by truck or rail, it will be carried in transportation casks similar to the one pictured below. Current NRC regulations allow these casks to emit radiation equivalent to a chest x-ray (10 mrem/h) at 6.5 feet from the cask surface.


Transporting nuclear waste poses inherent dangers, particularly in the event of an accident (e.g., equipment failure or human error) or crash. In the past 40 years, there have been just 3,025 high-level waste shipments in the United States. Most of these took place from the 1970s to the mid-1980s. The transport of 70,000 metric tons of the country's high-level radioactive waste to one national site would be completely unlike past radioactive waste shipments in the United States. The magnitude and duration of this proposal is the outside current the realm of experience. More waste would be shipped regularly each year than as been shipped in the U.S. in the last three decades. It would also be hauled over much larger distances. It is unclear whether hospitals, police and rescue personnel along transportation routes would have the capacity to respond effectively to a nuclear waste emergency.

Accidents involving nuclear waste shipments to Yucca Mountain will happen if there are shipments. The DOE's own estimates suggest that at least 50 accidents and as many as 310 accidents could occur during shipment of radioactive waste. As part of the 1986 Environmental Assessment for the Yucca Mountain repository site, the DOE conducted a study that found that a severe accident in a rural area involving a high-speed impact, lengthy fire and fuel oxidation would contaminate a 42-square-mile area, require 462 days to clean up and cost $620 million. The health, economic and environmental impacts of such an accident could devastate a community.

Ultimately, the robustness of the shipping casks will determine whether radioactivity is released when there is an accident. Yet, the NRC does not require full-scale testing as part of its certification process, and there are no plans for the full-scale testing of the casks that could be used for waste shipments to Yucca Mountain. This problem is not a new one. In 1987, the NRC sponsored a study, commonly referred to as the "Modal Study," by the Lawrence Livermore National Laboratories, which used computer modeling to predict cask responses to accident conditions. The study was inadequate in that it did not include full-scale physical testing of the casks, and the conditions that were used in the computer analysis did not represent real-life scenarios. Recently, the NRC has contracted with Sandia National Labs to conduct another study (the "Package Performance Study"). Among other problems, the draft of this study, which was released in February 2003, proposes testing scale models of the casks to proposed regulatory standards, rather than testing full-scale casks of every design to failure. Public Citizen's full comments on the draft study are available at http://www.citizen.org/documents/ppscomments.pdf.

Transporting high-level nuclear waste to Yucca Mountain could cause other problems for communities en route. The potential for terrorist attacks on waste shipments has not been satisfactorily addressed in DOE's Yucca Mountain proposals. Also, property values have been shown to decline along nuclear waste transportation routes even without an accident or act of sabotage.

## Flawed Process

The Yucca Mountain Project has been a composite of dramatically flawed processes, all of which have undermined the credibility of the DOE and its characterization activities at the site.

In 1987, the intentions of the Nuclear Waste Policy Act (NWPA) of 1982, which mandated that DOE study a number of potential sites for a repository, and that geology be held as the principal determinant for selecting a location, were abandoned. Under pressure from the nuclear industry anxious to speed up the process, and from members of Congress concerned about having a repository established in their states, Congress did away with the selection process and designated Yucca Mountain as the only site to be further considered. Yucca Mountain was to be "researched" and "evaluated" to see if it was suitable; yet, it was the only site to be considered. At the same time, the development of a second repository – which would have been located in the East – was halted.

Since that time, DOE has further changed the site selection criteria to fit Yucca Mountain. In 2000, after several years of proposals and rulemaking, the DOE issued new site suitability guidelines for the proposed repository. These new guidelines, which don't include many

requirements of the Nuclear Waste Policy Act, are very vague, focusing on “balancing favorable and unfavorable conditions”. Under these guidelines, factors that qualify or disqualify Yucca Mountain from development as a repository are no longer specified.

Furthermore, from the beginning of the site suitability studies, DOE contractors were given financial arrangements that complicated, and often brought a conflict of interest to the process. Financial bonuses, for instance, set clear motivation for contractors to find the Yucca Mountain site a suitable one.

In November 2001, a DOE Inspector General investigation uncovered that the law firm Winston & Strawn was simultaneously employed as counsel to the DOE, working on the Yucca Mountain Project, and registered as a member of and lobbyist for the Nuclear Energy Institute, the pro-repository nuclear industry trade group, between 1992 and 2001. Despite the clear conflict of interest, and the resignation of Winston & Strawn from the Yucca Mountain Project in the wake of this scandal, the firm’s work was not withdrawn. Winston & Strawn had been hired by the DOE in 1999 for the lucrative $16.5 million job of helping DOE apply for a license for the Yucca Mountain Project.

## Conclusion

As long as reactors continue to operate, there will be significant amounts of waste left on-site. As long as we continue to produce more waste, we will continue to need more places to store it, particularly if we want to store it safely. The consequence of this is that the opening of Yucca Mountain will not solve our waste problem, and it will not make the 160 million citizens within 75 miles of reactors significantly safer.

Public Citizen advocates phasing out nuclear power and isolating high-level radioactive waste as close as possible to the reactor where it was generated, while we seek a real long-term solution for the existing waste and turn to renewable energy sources for the future.

## Roles of the Federal Government and Agencies

In addition to Congress, a number of federal agencies are involved in the development and implementation of national nuclear waste policy. The chart below outlines the roles of Congress and the various agencies.

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| **Congress** | Passed the Nuclear Waste Policy Act in 1982 and amendments in 1987, mandating DOE to evaluate the suitability of Yucca Mountain as a potential geologic repository for nuclear waste. Appropriates funds for agencies and for Yucca Mountain activities (Yucca Mountain funds come from the Nuclear Waste Fund – paid by fees collected from ratepayers – and the Defense budget). Approved Yucca Mountain in July 2002. |
| **Department of Energy (DOE)** | Responsible for characterizing Yucca Mountain site and determining its suitability as a geologic nuclear waste repository. Amended repository siting guidelines in December 2001. Issued a final Environmental Impact Statement for the proposed repository and officially recommended to the president that the project move forward in February 2002. Responsible for the construction, management and operation of the potential geologic repository at Yucca Mountain. Will take title to nuclear waste and transport it to Yucca Mountain if the repository is licensed. |
| **Environmental Protection Agency (EPA)** | Issued site-specific radiation protection standards for the proposed repository on June 6, 2001, which served as the basis for DOE's amended siting guidelines, NRC's site-specific licensing rule, and the Energy Secretary's site recommendation. The 10,000-year compliance period in the radiation standards was voided by the DC Appellate Court. EPA must now rewrite its compliance period regulations. |
| **Department of Transportation (DOT)** | Regulates nuclear waste transportation, including routing guidelines. |
| **Nuclear Waste Technical Review Board (NWTRB)** | Created by Congress and appointed by the president. Reviews scientific and technical basis for DOE activities pertaining to the management and disposal of commercial high-level waste. |

## Useful background links:

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| Public Citizen's Energy Program | http://www.energyactivist.org |
| Nuclear Information and Resource Service | http://www.nirs.org |
| Environmental Working Group | http://www.ewg.org/reports/nuclearwaste/exec_summ.php |
| State of Nevada Nuclear Waste Project Office | http://www.state.nv.us/nucwaste/index.htm |
| Yucca Mountain Project Office (DOE) | http://www.ymp.gov |
| Nuclear Regulatory Commission | http://www.nrc.gov |
| Nuclear Waste Technical Review Board | http://www.nwtrb.gov |
| General Accounting Office Report | May 2002, Uncertainties About the Yucca Mountain Repository Project: http://www.gao.gov/new.items/d02765t.pdf<br>December 2001, Technical, Schedule, and Cost Uncertainties of the Yucca Mountain Repository Project: http://www.gao.gov/new.items/d02191.pdf |
| DOE Inspector General Report | September 2004, Property Disposals at the Yucca Mountain Project: http://www.ig.doe.gov/pdf/ig-0664.pdf<br>November 2001, Review of Alleged Conflicts of Interest Involving a Legal Services Contract for the Yucca Mountain Project: http://www.ig.doe.gov/pdf/invrpt.pdf |
| NRC/Sandia Labs Package Performance Study Page | http://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr6768/nureg-6768.pdf |

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