

November 2002

### YUCCA MOUNTAIN

In July 2002 George Bush gave his formal backing for a giant nuclear waste dump in the Nevada Desert. At an estimated cost of \$58 billion, Yucca Mountain is intended to house 70,000 metric tonnes of highly radioactive waste currently stored at USA's 103 nuclear waste sites. The nuclear industry worldwide wants to point to Yucca Mountain to demonstrate that the problem of what to do with our deadly nuclear waste has been solved, but this is far from the case. Not only is Yucca Mountain dangerously situated on a volcanic fault line, but the mountain itself will provide virtually no protection for the waste. Instead fifty million people will be put at risk from accidents and terrorist attack as the waste is transported across America on a regular basis, just so nuclear operators can set about creating more space for more waste at US nuclear sites. Politics has driven this project from the start, with science and reason trying to fill in the gaps.

#### **What is Yucca Mountain?**

Yucca Mountain is a 1,200-ft high volcanic ridge running about six miles in length from north to south. It is located in the desolate plains of Nevada, about 90 miles north west of Las Vegas, at the edge of the Nevada test site that was used as one of the above ground test sites for the American nuclear weapons programme. It is also the site that was recommended earlier this year by Spencer Abraham, the US Secretary of Energy, to become the primary repository for nuclear waste in the USA. This was after the American government spent 85% of its civilian nuclear budget conducting feasibility tests on the site, making it somewhat critical that the site be chosen to avoid accusations of wasting taxpayers money.

The mountain is made out of densely compacted volcanic ash, which forms a rock, known as tuff. The solidity of this rock is one of the reasons the American authorities claim this is a suitable site, though even the Department of Energy's own report has shown that the seismic activity that still occurs in the area has already fractured the mountain. A fractured mountain hardly seems a good start for a repository that is supposed to contain waste for up to 240,000 years.

90% of the repository will be filled by waste already being stored on-site at existing nuclear reactors, with the remaining 10% coming from US defence programmes. It is the argument of the nuclear industry that it is better to consolidate the nation's waste in to one repository than to have it spread around the 43 states where it is currently stored. If they could guarantee safety of the waste in a fractured mountain, there may be some sense in this point. Unfortunately, by the time the repository is supposed to be open, there will be an estimated 107,500 metric tonnes of waste looking to be stored in a 70,000 metric tonne cavity. There will still be thousands of tonnes of waste spread around the country with no where to go. So the problem remains.

#### **Who's behind it?**

Since the project was originally commissioned back in 1987, the story of Yucca Mountain has been one of dirty politics and pseudo-science. The political history of

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this project makes disturbing reading as the goal posts continually changed to accommodate the damning scientific evidence that Yucca Mountain is simply not suitable. But money talks. With the appointment of Spencer Abraham in 2001 as head of the US Department of Energy, who has been one of the biggest recipients of nuclear campaign cash, combined with the \$25,069,321 that the nuclear industry spent on congressional lobbying that year, the money machine has kept Yucca Mountain on track.

The science is positively laughable. According to Congress' Nuclear Waste Technical Review Board (NWTRB), "Many of the DOE's assumptions regarding Yucca Mountain are extreme and unrealistic" (Jan 30<sup>th</sup> 2002). Examples of such assumptions are not hard to find, but below are just a few:

- While the DOE claims Yucca Mountain provides dry storage - which prevents radiation contaminating the surrounding water supply - and a secure environment, the reality is very different. No matter how far they dig into the mountain, engineers continue to run in to ground water. Even the DOE's own characterisation data shows rates of water infiltration to be 100 times higher than expected.
- The DOE's answer to this is to install a titanium "drip shield" around the flasks, costing billions of dollars. The effectiveness of these shields has never been tested, and as recently as February this year the Department of Energy conceded that they had found "levels of fluoride in water and rock at the proposed Yucca Mountain repository that could cause early corrosion of containers and titanium shields." (Las Vegas Sun, Feb 4<sup>th</sup> 2002).
- But at least there is the dense rock to contain the waste? Unfortunately not. According to the NWTRB, Yucca Mountain "looks like an engineered repository, not a geological repository". It added that containment would be "relying on an engineered barrier and not the mountain" (January 1999).

### **What's wrong with it?**

#### **It accomplishes no reasonable objective**

Yucca Mountain does not eliminate on-site storage at the 131 sites where it is presently stored. It merely takes a large chunk of the waste and puts it in one place in order to make space for producing more waste on the sites that are presently full up. The objective it *would* accomplish would be to allow current contracts to be extended, as they would suddenly have more room to store extra nuclear waste. In other words, Yucca Mountain would allow nuclear operators to make more money, and nothing else.

#### **It provides minimal protection**

The protection that the mountain itself provides is negligible. The main protection is provided by the containers that hold the waste. It is consequently pointless putting this waste inside Yucca Mountain, costing billions of dollars and putting millions of lives at risk during the transportation process.

### **It is at risk of seismic events**

Yucca Mountain is directly above an active magma pocket that is the third most seismically active area in the United States. In the last 25 years alone, the area has experienced over 600 earthquakes of magnitude 2.5 or greater on the Richter scale. The most recent in July this year had a magnitude of 4.4. You do not need to be nuclear scientist to recognise that burying nuclear waste that will remain deadly for the next 240,000 years should not take place in an area like this.

### **It puts fifty million people along the proposed transport routes in danger**

To get to Yucca Mountain, the waste is scheduled to travel through 44 states from 77 different power stations across the country, putting 50 million people in danger as it goes. Within the first year of Yucca Mountain opening, there would be more nuclear shipments through America than the past 40 years combined. Estimates suggest that as many as 400 accidents and 2,400 incidents could occur during shipment of radioactive waste. Compounding this fact, nuclear waste in transit is much more vulnerable to terrorist attack than it is in a fixed position. Nuclear reactor sites are among the most heavily protected sites in America, where as a targeted attack on nuclear shipments travelling through major population centres such as Atlanta, Chicago, St. Louis or Portland would result in incalculable casualties.

### **What are the implications for nuclear waste storage in the UK?**

The UK Government launched a consultation process on nuclear waste management in September 2001. This process will last until 2007. The consultation is being run against a background of several failed attempts since the late 1970s to site an underground nuclear waste repository in the UK. Consequently, the Government is aiming to facilitate the public's involvement in the framing of future policy, so that future policy on radioactive waste "has widespread public support" (Ross Finnie, Scottish Environment Minister, January 2002). In other words, the government is asking the public not "how would you like us manage our nuclear waste problem?" but is instead asking "how can we make what we plan to do more acceptable to you?"

The Consultation process takes a 'back-to-the-drawing-board' approach in that, unlike previous consultations, it does not assume that nuclear waste should be put in an underground repository.

There is a fundamental division between an environmental approach on the one hand and the nuclear industry's approach on the other. This fundamental division is over whether it is possible to "dispose" of nuclear waste. The nuclear industry claims that "deep disposal" methods, such as those proposed for Yucca Mountain, succeed in disposing of nuclear waste.

The philosophy of "deep disposal" is based on the concept of multiple barriers: -

- The waste containers themselves.
- The grout surrounding the containers.
- The surrounding rocks.
- The dispersal of dangerous radiation away from underground water sources

The primary parameter that any potential repository must meet is to demonstrate that the risk of death or hereditary genetic defect encountered by any member of the public during the thousands or even millions of years components of the waste remain radioactive will not exceed one in a million per year.

The “deep disposal” concept is based on the eventual dilution and dispersion of radiation throughout the environment. In other words, it is clear that radioactivity will leak from a deep dump, and will inevitably contaminate the environment. Even those in favour of "deep disposal" admit this. “Deep disposal” relies on being able to accurately predict the rate at which radioactivity will leak out of the dump and contaminate the environment. But the evidence indicates that, despite many decades of expensive research, we still cannot accurately predict at what rate radioactivity will leak. Deep disposal is, therefore, not an acceptable solution to the UK Nuclear Waste problem.

### **So what is the alternative?**

An environmental approach to nuclear waste management would first and foremost stop the production of this dangerous waste. As Yucca Mountain demonstrates, even if such a large repository is ever built, it does little more than make room for more waste to be produced.

As for existing nuclear waste, the issue should not be about finding a better site than Sellafield where the hydrogeology is better understood and where computer models can predict with greater confidence water movement through the repository. It should be about how best to contain nuclear waste and isolate it from the environment.

Dumping or discharging nuclear wastes into the sea, rivers or groundwater passes nuclear pollution on to future generations. It is no ‘solution’ at all.

Storage on the surface is, therefore, the least environmentally damaging and most responsible option. For the foreseeable future, above-ground storage is the only method of nuclear waste management which can begin to meet the principal of sustainable development. If future generations are truly to have a choice about how our nuclear legacy is managed, nuclear waste needs to be in stores, above ground where it can be constantly monitored and retrieved and re-packaged if necessary. Placing nuclear wastes below ground cuts off the options for future generations.

The nuclear industry will be using the Yucca Mountain proposals in the hope that it can demonstrate that the nuclear waste problem has been ‘solved’. This is far from the case. Yucca Mountain is simply another attempt to implement the discredited ‘deep disposal’ concept.

**For more information please contact Greenpeace Press Office on 0207 865 8255**

