

A N N U A L R E P O R T

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FEDERAL PROGRAMS FOR THE MANAGEMENT OF  
HIGH-LEVEL RADIOACTIVE WASTE

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**Environmental Quality Board**

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**ANNUAL REPORT  
FEDERAL PROGRAMS FOR THE MANAGEMENT  
OF HIGH-LEVEL RADIOACTIVE WASTE**

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## Acronyms

ASLB	The NRC's Atomic Safety and Licensing Board
BWR	Boiling Water Reactor
CFR	Code of Federal Regulations
DEIS	Draft Environmental Impact Statement
DOE	Department of Energy
DOT	United States Department of Transportation
EIA	Energy Information Agency
HLW	High Level Waste
ISFSI	Independent Spent Fuel Storage Installation
IRP	Integrated Resource Plan
MPC	Multi Purpose Canisters, designed and certified for transportation, storage, and disposal.
MRS	Monitored Retrievable Storage
MTU	Throughout this report, the term "metric ton" of spent fuel is used as a short-hand for a more technical measurement called metric ton of heavy metal (MTHM), which is DOE's traditional measurement of spent fuel mass. MTHM refers only to the mass of plutonium, uranium, and thorium in the spent fuel. The actual mass of spent fuel is always larger than the mass of its heavy metals.
MWt	Megawatt Thermal
MWe	Megawatt Electric
NMC	Nuclear Management Company
NSP	Northern States Power Company
NRC	Nuclear Regulatory Commission
NWPA	Nuclear Waste Policy Act
OCRWM	DOE: Office of Civilian Radioactive Waste Management
PBMR	Pebble Bed Modular Reactor
PFS	Private Fuel Storage
PWR	Pressurized Water Reactor
SNF	Spent Nuclear Fuel
Xcel	Northern States Power Company, d/b/a Xcel Energy

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## I. Executive Summary

The U.S. Department of Energy's epic campaign to open a high-level nuclear waste repository at Yucca Mountain, Nevada shifted focus in 2003. After getting past the "site suitability" decision in 2002, the DOE faced the following three major challenges in 2003: (1) preparing the NRC license application; (2) surviving lawsuits, and (3) finalizing a national Strategic Transportation Plan.

**The NRC License.** In 2002, the Administration and Congress designated the Yucca Mountain to be a suitable *site* for a permanent nuclear-waste repository. However, the DOE must still obtain an NRC license for the Yucca Mountain *facility* itself. Officially, the DOE intends to submit a license application to NRC by December, 2004, and to open Yucca Mountain by 2010. Almost everyone except DOE, however, seems to believe that the earliest possible operation date for Yucca Mountain is actually about 2015. Any adverse court decisions could, of course, cause even further delays.

**Nevada Lawsuits.** In January 2003, the State of Nevada sued the federal government in the U.S. Court of Appeals for the D.C. Circuit, challenging the constitutionality of the 2002 site-suitability designation. The D.C. Circuit consolidated this case with five related Nevada lawsuits in 2003, and heard oral arguments in January, 2004. The parties expect a decision by mid-2004. A subsequent appeal to the U.S. Supreme Court is nearly certain, however, so these legal issues are not likely to be resolved until 2005.

**Nuclear Waste Transportation.** The DOE announced in early April, 2004 that it would use "mostly rail" to ship nuclear waste from sites across the country to Yucca Mountain. The DOE would still have to ship some nuclear waste by truck because not all nuclear facilities have rail access. However, in July 2003, the DOE also delayed the final release of its detailed "Strategic Transport Plan," which would identify specific truck and rail routes, until 2006 at the earliest. In December, 2003 the DOE did announce its preferred rail corridor within Nevada. This rail corridor—known as the Caliente corridor—would be used to connect an existing railroad track in Nevada to Yucca Mountain itself.

**Minnesota Developments.** In 2003 the Minnesota legislature authorized enough additional dry casks at Xcel's Prairie Island plant to allow it to operate until at least 2013 and 2014, when the NRC operating licenses of the two units expire. In addition, Xcel's Monticello plant will run out of spent fuel storage capacity by 2010, when its current NRC license expires. Therefore, if Xcel applies for an extension of its NRC license at one or both plants, and no national storage facility becomes available in time, Xcel may need approval for more on-site dry-cask capacity to keep the plants running past their current license periods. Under the 2003 legislation, the Public Utilities Commission determines whether to approve additional dry-cask storage capacity, and the legislature has the option of reviewing the PUC decision. If Xcel decides to pursue an NRC license extension for the Monticello plant, it anticipates filing a certificate-of-need application with the PUC for a dry-cask storage facility there by early 2005.

## **II. Introduction**

The Office of Strategic and Long Range Planning is directed by statute to file an annual report to the legislature that summarizes federal government efforts to manage high-level radioactive wastes. (Minnesota Statutes § 116C.712, subdivision 5.) The Planning Office was abolished in 2003. This year, the Environmental Quality Board (EQB), now part of the Department of Administration, prepared the report. The EQB has prepared such reports since 1987.

This 2004 Annual Report summarizes developments occurring over the past year. A list of resources is provided in Appendix B.

The January 2002 version of the Annual Nuclear Report provides a chronology of significant events regarding nuclear power beginning with the adoption of the Atomic Energy Act of 1954 and continuing through December 2001 (in Appendix A of the 2002 Report). The 2002 Annual Report also contains a detailed description of Minnesota's two nuclear power plants—the Prairie Island Plant and the Monticello Plant—both owned by Xcel Energy, and an analysis of potential nuclear waste transport routes and schedules. This information is not repeated here. The January 2002 report can be found on the web at :

<http://www.eqb.state.mn.us/eqb/EnergyFacilities/nuclear.html>

## **III. Yucca Mountain**

### **A. Background**

The federal government has been attempting to site and construct a national repository for spent nuclear fuel and other highly radioactive wastes since the Nuclear Waste Policy Act was passed in 1982. Under 1987 amendments to the Act, the Department of Energy is limited to studying only the suitability of the Yucca Mountain site in Nevada for housing a deep underground repository. Yucca Mountain is located about 90 miles northwest of Las Vegas, Nevada.

The project calls for the construction of tunnels 1000 feet into the earth, where up to 77,000 metric tons of high level radioactive wastes would be stored. The amount of waste that is expected to be generated by operating nuclear power plants during their operating lives, considering re-licensing efforts, is about 105,000 MTU. Therefore, Yucca Mountain as presently authorized cannot hold all the waste that is expected to be generated. The wastes would be shipped by truck and rail to Yucca Mountain from locations around the country.

## **B. The 2002 Site Designation**

On February 14, 2002, twenty years after the passage of the Nuclear Waste Policy Act, DOE Secretary Abraham recommended to the President that Yucca Mountain is a suitable site for a permanent repository for high level nuclear waste. This historic step triggered a series of activities at the federal level. The next day, President Bush, per the NWPA requirements, notified Congress that he also considered Yucca Mountain to be qualified for construction authorization.

On April 8, 2002, Nevada Governor Kenny Guinn filed a “notice of disapproval” of the recommendation made by the President. Governor Guinn issued an eleven-page document citing reasons for disapproval including the state of the science of repository design, the legal status, four existing and two pending lawsuits by the State of Nevada, national security issues associated with transportation of the waste in the wake of 9/11, the existence of an alternative to Yucca Mountain, and waste ownership and storage by DOE at the reactor site.

After Nevada filed its disapproval of the President’s decision, Congress was forced to pass a Joint Resolution approving the Yucca Mountain site if the project was to continue. The House of Representatives passed the necessary resolution, House Joint Resolution 87, on a vote of 306-117. The Senate also voted to override Nevada’s veto, by a margin of 60-39. (S.J.R. 34).

On July 23, 2002, President Bush completed the process of overriding the veto of the State of Nevada by signing House Joint Resolution 87. This action moved the issue of a permanent repository from the political arena to the regulatory arena and set the stage for a license application by DOE to the NRC.

## **C. The NRC License**

Although the federal government determined that Yucca Mountain is a “suitable” site for a permanent high-level nuclear-waste repository in 2002, another major regulatory hurdle remains. That is, the U.S. Department of Energy must still obtain licenses for construction and operation of the Yucca Mountain facility itself. These licenses are issued by the independent federal agency with responsibility for ensuring the safety of nuclear facilities: the Nuclear Regulatory Commission (NRC).

### NRC License Timeline

Officially, the DOE maintains it will submit an application to the NRC for the Yucca Mountain construction license by December, 2004. The NRC licensing process is expected to take a minimum of three years. Theoretically, therefore, the NRC could issue a construction license for Yucca Mountain by early 2007, and the Yucca Mountain facility could begin accepting nuclear spent fuel as soon as 2010. Almost no one except DOE, however, seems to expect that the DOE will be able to submit an adequate license application by December 2004, or that the licensing and construction will occur as

planned. Most observers, including the federal General Accounting Office, believe that the earliest possible operation date for Yucca Mountain is actually about 2015.

### Pre-Licensing Consultation

The NWPA requires the DOE to interact with the NRC in pre-licensing consultation before submitting the application. The specific purpose of this pre-licensing consultation process is to allow the complex technical health and safety issues present at the potential repository site to be addressed early on in the review process. The NRC has structured this pre-licensing program around "key technical issues" such as volcanoes, earthquakes, and radioactivity transport. As of August 2002 all of the nine key technical issues identified by the NRC have been assigned a "closed-pending" status by NRC staff, which means that DOE has agreed to provide information that, in the NRC staff's view, should close the issue, but, at the same time, this characterization does not imply that the staff has prejudged the outcome of the review of that information. Details on the status of this technical pre-licensing review can be found at the following web site:

<http://www.nrc.gov/waste/hlw-disposal/reg-initiatives/list-status-kti.html>

Also, the NRC has put together a detailed plan for how it will review the Yucca Mountain license application once it receives it. That NRC plan can be found at:

<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1804/>

### **D. Litigation**

There are numerous Yucca-Mountain related lawsuits moving through state and federal courts. However, the most important currently are a series of lawsuits filed by the State of Nevada. In January 2003, the State of Nevada sued the federal government in the U.S. Court of Appeals for the D.C. Circuit, challenging the constitutionality of the 2002 site suitability designation. The D.C. Circuit subsequently consolidated this case with five previous Nevada lawsuits. On January 14, 2004, the DC Circuit heard more than three hours of oral argument in the consolidated cases. The D.C. Circuit is expected to decide these cases by sometime in mid-2004. However, since the losing party is certain to file an appeal to the U.S. Supreme Court, these cases are not likely to be resolved until 2005.

### The Nevada Arguments

The State of Nevada lawsuits can be broken down into the following six major issues:

1. *The Constitutional Case Against the United States*. Primary issue: Whether the federal government's decision to single out one state to bear an unwanted nationwide burden, allegedly without a compelling technical or other objective reason, violates the principles of federalism in the Tenth Amendment and other constitutional provisions. In this case, Nevada argues that "the national government lacks the power to require a sovereign state to singularly bear the burden, and thereby relieve all other states from bearing any burden, of resolving a perceived serious problem of national scope, unless either (1) the sovereign

State consents to the imposition of such a unique burden; or (2) Congress imposes such a burden on a particular State for compelling reasons justified by neutral, objective criteria.” During oral argument, the D.C. Circuit panel focused on the fact that the federal government actually owns the Yucca Mountain area, not the state.

2. *The Site Suitability Case Against the DOE.* Primary issue: Whether the U.S. Department of Energy’s (DOE) site suitability rules<sup>1</sup> violate the Nuclear Waste Policy Act because, allegedly, they are primarily based on the long-term safety of waste containers and other engineered barriers rather than site-specific geologic criteria. Nevada argues that the DOE should have declared the Yucca Mountain site unsuitable in 1998-1999 when it discovered the location was geologically unfit.
3. *The EIS Case Against the DOE.* Primary issue: Whether the Department of Energy’s Environmental Impact Statement is procedurally and substantively deficient for numerous reasons, thereby violating provisions of both the National Environmental Policy Act and the Nuclear Waste Policy Act. Nevada claims that DOE’s repository design, which includes a temporary above-ground storage facility, is contrary to law and that the EIS was released without a Record of Decision.
4. *The Recommendation Case Against the DOE.* Primary issue: Whether the Department of Energy’s recommendation that Yucca Mountain is a suitable site for a nuclear-waste repository and the President’s subsequent determination are void because of the inadequacies described in the *Site Suitability* and *EIS* cases above. Nevada claims that the decisions were based on unlawful DOE rules that fail to follow procedures established by the NWPA.
5. *The Radiation Standard Case Against EPA.* Primary Issue: Whether the Environmental Protection Agency’s (EPA) radiation exposure standards for Yucca Mountain, which were issued in 2001, are adequate to protect the public’s long-term health and safety as defined in the Nuclear Waste Policy Act and other laws. Nevada claims that the primary radiological protection standards are based on a 10,000 year regulatory time period, which is contrary to the one million year recommendation of the National Academy of Sciences. During oral argument, the D.C. Circuit did partly focus on EPA’s rationale for limiting the risk calculation to a 10,000 year time period, when the maximum threat of exposure allegedly occurs much later.

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<sup>1</sup> *General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories; Yucca Mountain Site Suitability Guidelines*; 10 C.F.R. Parts 960 and 963,” published at 66 Fed. Reg. 57,298 (Nov. 14, 2001).



6. *The Licensing Standard Case Against the NRC*. Primary Issue: Whether current Nuclear Regulatory Commission licensing standards for Yucca Mountain,<sup>2</sup> promulgated in 2001, violate crucial provisions of the Nuclear Waste Policy Act, the National Environmental Policy Act and other laws. This case challenges the NRC's final rule on numerous health and safety grounds.

Summaries of the lawsuits are available on the State of Nevada's web pages. However, the most comprehensive information, including legal briefs, can be found at the following web site:

[http://www.citizen.org/cmep/energy\\_enviro\\_nuclear/nuclear\\_waste/hi-level/yucca/articles.cfm?ID=10882](http://www.citizen.org/cmep/energy_enviro_nuclear/nuclear_waste/hi-level/yucca/articles.cfm?ID=10882)

#### Other Litigation

1. *The Nuclear Energy Institute v. Environmental Protection Agency*. The Nuclear Energy Institute, a nuclear industry group, has also taken the Environmental Protection Agency to court regarding its radiation protection standards. The NEI objects to the EPA ground water standard as overly strict, saying the rules had little scientific backing and don't comply with current law. The lawsuit asks that the ground water standard be deleted. The case has been combined with other lawsuits challenging EPA regulations.
2. *United States v. State of Nevada*. (District Court Nevada, filed 2000). This case challenges the State of Nevada's denial of a water use permit to the DOE.

#### **E. Nuclear Waste Fund**

The Nuclear Waste Fund (NWF) is a separate account set up under the NWPA that was originally intended to be a dedicated source of funds for locating and constructing a national repository for high level nuclear wastes. Monies in the fund come primarily from fees paid by the owners and generators of civilian nuclear power plants. The fee is 1 mill (0.1 ¢) per kilowatt-hour of electricity generated and sold. Other monies in the fund include any appropriations made by the Congress into the NWF. Funds for DOE expenses associated with Yucca Mountain have come out of the Nuclear Waste Fund and from Department of Defense appropriations.

Consumers of nuclear-generated electricity pay nearly \$775 million a year into the Nuclear Waste Fund to finance the repository program, and interest on the fund is accruing at about \$400 million annually. But despite pressures to expedite the Yucca Mountain process, Congress has historically appropriated an average of less than one-fourth of the fees paid by consumers for the program over the past five years. The fund has a balance of more than \$14 billion, monies that Congress has used to fund other

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<sup>2</sup> *Disposal of High-Level Radioactive Waste in a Proposed Geologic Repository at Yucca Mountain, Nevada*, 10 C.F.R. Part 63, published at 66 Fed. Reg. 55732 - 55816 (Nov. 2, 2001).

programs. Minnesota's total contribution to the fund was \$473 million through June 30, 2003.

### Legislative Efforts

Several parties in 2003 again pushed Congress to reclassify the NWF such that it could no longer be used for purposes other than developing a permanent repository. First, in a Nov. 24, 2003 letter to the Office of Management and Budget (OMB), the National Association of Regulatory Utility Commissioners (NARUC) urged President Bush to change the funding mechanism for the federal Nuclear Waste Fund as part of the DOE budget request for fiscal year 2005. Also, Illinois Reps. John Shimkus and Bobby Rush have introduced a bill (H.R. 3429) that would ensure that funds paid to the Nuclear Waste Fund by consumers are spent on the proper disposal of the nation's used nuclear fuel and allow for appropriate funding increases to keep the planned Yucca Mountain repository on schedule.

The Shimkus-Rush legislation contains provisions for reclassifying the treatment of the Nuclear Waste Fund by defining fund contributions as offsetting collections between the 2005 and 2010 fiscal years. According to this approach, only net spending above the annual fee income, now about \$750 million, would be subject to discretionary budget caps. The bill also would allow the fund balance for a given year to be rolled over into succeeding years and would give the program access to the fund's income as needed. In February, 2004, DOE Secretary Abraham proposed similar legislation. Additional details and briefings on the funds status and future can be found on the Nuclear Energy Institute web site at: [www.nei.org](http://www.nei.org).

### 2005 Budget

For Fiscal Year 2005, the Administration has requested \$880 million—a 50% increase in DOE's Yucca Mountain budget compared to last year's budget. The following web site and related links contain detailed information on historic and current Yucca Mountain budgets:

<http://www.ocrwn.doe.gov/pm/budget/money.shtml>

### Nuclear Waste Fund Litigation

DOE was required by the Nuclear Waste Policy Act to begin acceptance of spent fuel by January 31, 1998, in return for the nuclear utilities paying into the Nuclear Waste Fund. Further, DOE entered into contracts with each of the utilities with agreements to accept the spent fuel from each in a certain sequence over a period of years. When that date passed a number of the utilities sued for partial breach of contract. Federal courts found in two separate cases that the government had an unconditional obligation to accept the

waste and should be held liable for damage payments to the contract holding utilities.<sup>3</sup> By late 2002, sixty separate lawsuits had been filed making claims totaling several billion dollars. In January, 2004, there was an additional last-minute flurry of utility filings as the applicable six-year statute of limitations approached.

*Indiana Michigan Power* is the first case that has come to trial to determine the amount of damages. The U.S. Court of Federal Claims began proceedings on March 1, 2004. The plaintiff seeks \$107.7 million. In initial arguments there was disagreement between the parties on when the repository will be ready to accept waste. DOE maintains that its target date of 2010 is achievable. However, an expert witness for the plaintiff forecasts that initial waste acceptance for this first-of-a-kind facility may be 2015 or later, an assessment that is similar to that of the Congressional General Accounting Office.

## **F. National Transportation Plan**

The Department of Energy announced in the April 8, 2004 Federal Register its decision to ship nuclear waste to Yucca Mountain by “mostly rail.” Some nuclear waste, however, would still have to be shipped to Yucca Mountain by truck because not all nuclear facilities have rail access. Once the NRC issues the required licenses for Yucca Mountain, DOE anticipates that private contractors will be used to transport the spent nuclear fuel from their current storage sites, a process in which every state in the continental United States will be crossed with rail or truck shipments of the high-level radioactive wastes.

### 2003 Transportation Activities

While DOE did announce in early 2004 its decision to use a “mostly rail” mode of transportation, it also decided in 2003 to delay its decision on which specific transportation routes to use. The DOE had planned by September 2004 to announce both its preferred nuclear waste transport mode and routes in a “Strategic Transportation Plan.” However, in July 2003, the DOE announced that final decisions on the detailed strategic plan were on hold for two or three more years. So, DOE will not be issuing its detailed transportation plan until 2006 at the earliest.

The DOE also made two other transport-related announcements. In November 2003 the DOE released a *Guide to Stakeholder Interactions*. This document describes how the DOE will involve the public as it develops the detailed transportation strategic plan. In addition, in December 2003 the DOE announced its preferred rail corridor within Nevada. This rail corridor—known as the Caliente corridor—would connect an Nevada existing railroad track to Yucca Mountain itself. See map attached as Appendix C. The DOE announced its decision to do an EIS on the route to be used within the Caliente corridor in the same April 8, 2004 Federal Register it announced its

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<sup>3</sup> *Indiana Michigan Power Co. v. Department of Energy*, 88 F.3d 1272 (D.C. Cir. 1996); *Northern States Power Company, et.al, Petitioners, v. United States Department of Energy and United States of America*, 128 F.3d 754 (D.C. Cir. 1997).

“mostly rail” transport-mode decision. Finally, of course, the NRC would have to grant a license for the Yucca Mountain facility itself before DOE could begin construction of the new track on whatever route was selected.

### Transportation Safety

The General Accounting Office (GAO), an investigative arm of Congress, issued a study in August 2003 that concluded that the likelihood of widespread harm to human health and the environment from nuclear waste transport is extremely unlikely. See <http://www.world-nuclear.org/opinion/gao-transport.pdf>. The State of Nevada and various watchdog groups, of course, dispute these findings—stating that the GAO did not take into account terrorist issues and other available research properly. See <http://www.state.nv.us/nucwaste/trans.htm>

### Likely Shipping Dates and Routes

Xcel now assumes for planning purposes that the Yucca Mountain site will most likely not be available until 2015. The rate at which waste can be shipped to Yucca Mountain from all locations in the U.S. is known as the waste acceptance rate. The most recent acceptance rate published by DOE is 3000 MTU/year. A detailed description of likely national and state transportation routes, and timelines is provided in the 2003 Annual Nuclear Report. Appendix C of the 2003 Annual Report includes two scenarios for final waste removal: one that may represent the least time to remove all waste from the plant site, and one that represents a longer timeframe for removal, based on extended operations of the Minnesota nuclear plants and Yucca Mountain becoming available in 2015. In the second, “maximum spent-fuel” scenario, Prairie Island would continue operating until 2034. Under this scenario, about 30 dry-casks of a new type would be required at Prairie Island, and the last shipment would leave Prairie Island for Yucca Mountain in about 2062.

The 2003 report is available at:

<http://www.eqb.state.mn.us/pdf/2003/nuclearwastereport2003.pdf>

## **IV. Monitored Retrievable Storage**

### **A. Background**

The 1987 NWPA amendments authorized the use of a centralized Monitored Retrievable Storage (MRS) facility to store spent fuel temporarily until a permanent repository is available. And since the early 1990’s there have been several public and private efforts to open just such a national above-ground “interim” storage site. In 1996, for example, the nuclear industry pressed for NWPA amendments that would have required DOE to construct an above-ground interim storage facility near Yucca Mountain. President Clinton, however, said he would veto the bill, effectively ending the DOE effort. Currently, the NWPA prohibits DOE from building any interim facility until it is certain

that a permanent repository will be built, and also requires that any MRS facility not be located in the State of Nevada.

## **B. Private Fuel Storage, Inc.**

Several private waste storage initiatives have been proposed over the years, but the most prominent proposal currently is one put forth by a consortium of eight nuclear utilities, led by Xcel Energy. The group, Private Fuel Storage, Inc., applied to the NRC in 1997 for a license to build a commercial spent fuel storage facility on the Utah reservation of the Skull Valley Band of Goshutes. The level of commitment by some of the utilities and the status of the NRC license application for this private facility remains uncertain, however.

### Participant Commitment

In 2002, during Senate debate on the Joint Resolution, six of the eight utilities announced their intention to withdraw from participation in the private facility as long as Yucca Mountain proceeded in a “timely fashion.” The only two utilities not to announce withdrawal were Xcel Energy and Dairyland Power Cooperative. Since the six utilities signing the letter did not define what they meant by “timely fashion,” their long-term interest in the Utah project is unclear.

### NRC License

The Atomic Safety and Licensing Board (ASLB), the technical review board of the NRC, made several initial rulings in 2003 in the project’s favor. However, in March 2003, the ASLB ruled that the possibility of a fighter jet from the nearby Air Force training range crashing into the proposed above-ground facility presented a credible safety risk. The ASLB therefore required an analysis of the potential consequences of such a crash if one did occur. The ASLB, in late 2003 delayed its decision on this complex matter, but may rule on the issue in the first half of 2004.

More specifically, the NRC licensing process in 2003 included the following activities:

- On March 10, 2003 the ASLB ruled that it could not recommend a license for the PFS facility unless PFS presented further evidence that the consequences of a hypothetical aircraft crash at the site would not exceed federal safety limits. PFS is appealing the ruling at the same time it is moving forward with a request for an ASLB decision on the issue of the consequences of the impact of such a crash;
- In separate 2003 rulings, the ASLB found that (1) the PFS facility is designed to withstand earthquakes, (2) that PFS has the financial ability to build and operate the facility in accordance with regulations, and (3) the PFS proposed rail line route was the best alternative available;

- In November, 2003 the NRC Commission (1) directed the ASLB to attempt to complete hearings and issue decisions by the end of 2003 (although the ASLB has not met this deadline), and (2) allowed intermediate rulings by the ASLB to be immediately reviewed by the NRC instead of waiting for final ASLB decision; and
- In January, 2004, the U.S. Court of Appeals for the D.C. Circuit heard arguments in a State of Utah suit challenging whether the NRC even has the authority to license a private “away-from-reactor” nuclear spent fuel storage facility.

According to Xcel, if the NRC issued a construction license in 2004, construction could start in early 2005 and operation could start in 2007.<sup>4</sup> Overall, though, the fate of this private interim storage effort remains uncertain.

## **V. The United States Nuclear Power Industry**

### **A. Number of Facilities**

There are still 103 operating reactors in this country, the same as a year ago. There are still 104 plants licensed to operate. The Tennessee Valley Authority, however, continues to move ahead with a restart plan with the Nuclear Regulatory Commission, started in June 2002, for its Browns Ferry Unit #1. The North Alabama plant has been idle since 1985. TVA estimates that it will cost \$1.8 billion to recondition the reactor and restart it by 2007.

### **B. Financial Outlook**

On March 9, 2004, Moody’s Investor Service issued a report concluding that existing nuclear power operators in the United States have a stable rating outlook, as they continue to improve the operating performance of their plants and offer cost competitive electricity. Moody’s also says the movement to concentrate plant ownership and operation among fewer companies is a positive for the industry, as is the wave of plant operating license extensions that are either being granted or applied for and the general increase in operating performance.

Moody’s generally views the movement towards concentrated ownership as supportive to credit quality because it leads to companies with larger technical staffs and therefore greater expertise; second, it spreads shared knowledge across multiple plants; and, third, ownership of multiple plants reduces the impact, should there be a plant outage. Moody’s stated that because Nuclear Energy Institute statistics show the average total running costs for nuclear power were about 2.2 cents per kWh in 2002, and performance continues to rise, existing nuclear power facilities that extend their NRC licenses should continue to compete well against almost any form of power with perhaps the exception of hydro, which has no fuel costs.

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<sup>4</sup> *Annual Nuclear Waste Management Report*, Xcel Energy, MPUC Docket No. E002/CN-91-19, August 12, 2003.

The report also concluded, however, that prospects for investment in new nuclear plants, even with substantial new federal subsidies, will be influenced primarily by the pace at which a permanent waste disposal facility is developed and completed.

### **C. Incidents**

In March 2002 plant workers at First Energy's Davis Besse Power plant near Toledo, Ohio discovered a cavity in the head or top of the reactor vessel while repairing control rod tubes which pass through the head. Cracks in the tubes had allowed leakage of boric acid and subsequent corrosion to the reactor vessel head. The corrosion created an irregular cavity about 4 inches by 5 inches and approximately six inches deep. The cavity penetrated the carbon steel portion of the vessel head, leaving only the stainless steel lining. Following the Davis Besse discovery, the NRC initiated a series of measures directed to all the pressurized-water reactors of this type in the country and towards the Davis Besse plant in particular.

On March 9, 2004, after a two year shut-down and extensive repairs at the Davis Besse plant, First Energy began the first of a series of steps to restart the plant's reactor. The startup activities began after First Energy received authorization to restart the plant from the Nuclear Regulatory Commission (NRC).

### **D. Security Issues**

Security at the nation's civilian nuclear reactor and waste storage facilities continues to be a major issue for the long-term viability of the industry. On February 25, 2002, the NRC formalized in an order to reactor operators the enhanced security measures that had been previously directed as prudent interim measures in the aftermath of September 11, 2001. On January 7, 2003, the NRC issued a second order related to operating plant security measures. In April 2003, the NRC issued new orders that limit the hours security personnel may work each week. At the same time, the NRC increased the training requirements for security guards, including that for weapons proficiency. Subsequently, the NRC modified certain fitness-for-duty requirements for security personnel in July, 2003 and again in October 2003. These NRC orders are available at:

<http://www.nrc.gov/reading-rm/doc-collections/enforcement/security/#1>.

The State of Nevada continues to emphasize what it believes are important security risk issues related to the transportation of spent fuel in its comments on the DOE transport strategic plan and in its lawsuits regarding the selection and licensing of the Yucca Mountain facility itself.

## **E. National Re-licensing Activities**

On March 11, 2004, Nuclear Management Company, LLC submitted an application to the NRC to renew the operating licenses for the Point Beach, Wisconsin nuclear power plant for an additional 20 years. NMC operates the two-reactor station, located 100 miles north of Milwaukee, for We Energies. With the Point Beach application, 42 of the nation's 104 reactors have applied for license extensions. Of these, 23 have already been approved and 19 are under review by the NRC. The NRC has also received notice of intent to file extension applications for 25 additional reactors, which are to be filed on or before mid-2005. Details on the NRC re-licensing applications, schedules, Environmental Impact Statements and Safety Evaluation Reports can be found at: <http://www.nrc.gov/reactors/operating/licensing/renewal/applications.html>

## **F. New Reactor Technologies**

The long-term viability of the nuclear industry largely depends not only on solving the nuclear-waste disposal issue, but also on the development of cost effective new technologies. There are many sources of information on technologies under various stages of development, such as Argonne National Laboratory's web site, at: <http://www.era.anl.gov/advnuclear/reacttech.html>, and the NRC licensing information on new reactor designs, at: <http://www.nrc.gov/reactors/new-licensing/license-reviews/design-cert.html>

## **VI. Minnesota Nuclear Facilities**

### **A. Prairie Island**

In 2003 Xcel Energy requested, and the Minnesota legislature authorized,<sup>5</sup> enough additional dry casks at the 1,050 megawatt Prairie Island plant to allow it to continue to operate until at least 2013 and 2014, when the NRC operating licenses of the two units expire. This means Xcel is likely to add a minimum of about 12 more dry casks to the 17 full casks already on site. In return, the 2003 legislation requires Xcel, among other things, to provide \$16 million annually to the statutorily required renewable development account,<sup>6</sup> and \$2.5 million annually to the Mdewakanton Dakota Tribal Council for acquiring new tribal trust land for "housing and other residential purposes."<sup>7</sup>

### Background

Prairie Island Unit 1 began commercial operation in December 1973; Unit 2 began in December 1974. Prairie Island was originally designed to handle up to 198 fuel assemblies in the spent fuel pool. The initial idea was that the federal government would establish reprocessing facilities so spent nuclear fuel could be shipped from the nuclear

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<sup>5</sup> Minnesota Session Laws 2003, 1<sup>st</sup> Special Session, Chapter 11, Section 2, Subd. 1.

<sup>6</sup> See Minn. Stat. 116C.779.

<sup>7</sup> Minnesota Session Laws 2003, 1<sup>st</sup> Special Session, Chapter 11, Section 3



power plants to the reprocessing facility to make room for more storage in the pools. However, with the absence of reprocessing facilities in the country, the pool at Prairie Island quickly began to fill up. On several occasions, the Minnesota Public Utilities Commission authorized NSP to expand the pool capacity, and today NSP has been authorized to store up to 1386 fuel assemblies in the pool. Xcel estimates that a potential third re-racking would create storage space in the pool for a total of 1920 storage spaces.

In 1994, the Minnesota Legislature authorized NSP to store spent nuclear fuel in “dry-casks” installed at a storage site constructed next to the Prairie Island power plant. Although NSP initially requested authorization for up to 48 casks, the Legislature authorized NSP to install only 17 casks at the site. In July 2002, Xcel Energy installed the last of the 17 casks, and today there are 680 fuel assemblies stored in the casks at Prairie Island. Xcel could operate the plant until 2007 with the combination of the existing pool storage and currently authorized dry cask storage. Then, as mentioned above, with this deadline looming in 2003 Xcel requested and was granted enough additional storage capacity to allow it to continue to operate both Prairie Island units until at least 2013 and 2014, when existing NRC licenses expire.

#### Future Additions To On-Site Storage Capacity

Xcel may in the future request additional dry-cask storage capacity at Prairie Island if two events occur: (1) neither Yucca Mountain nor an interim spent-fuel storage facility becomes available by 2010 or even 2015, and (2) Xcel applies for, and is granted, an NRC license extension allowing it to operate Prairie Island beyond 2014. For this reason, the 2003 Minnesota legislature also addressed the issue of who has jurisdiction to approve further additions to dry-cask storage capacity in Minnesota. Specifically, the 2003 legislation gives the Public Utilities Commission authority to allow any further storage capacity increases, but the legislature will retain oversight and can vote to reverse the PUC decision. The Environmental Quality Board is responsible for preparing an Environmental Impact Statement prior to a PUC decision. Importantly, this PUC approval provision also applies to any future increases in dry-cask storage capacity at Xcel’s Monticello nuclear plant.

#### **B. Monticello**

Xcel’s operating license for Monticello expires in 2010. Xcel estimates that, using temporary spent-fuel racks, it can operate Monticello through its licensed life in 2010. Because the application process for a license extension could take five years or more, Xcel must decide by early 2005 whether to pursue re-licensing. Operation of the Monticello plant past 2010 would also require construction of an independent spent fuel storage facility outside the plant—such as at Prairie Island. This means that the PUC would have to grant a Certificate of Need for the necessary dry-cask storage capacity before such an on-site storage facility could be built. In September, 2003, Nuclear Management Company's, LLC (NMC), which maintains and operates the Monticello and Prairie Island plants for Xcel Energy, submitted an “Advance Notice of Intent to Apply for Renewal of Operating License” to NRC. Xcel anticipates making a filing with the

PUC for dry cask storage capacity at Monticello in early 2005 if in fact it decides to pursue a NRC license extension.

### Background

The Monticello 600-megawatt facility began commercial operation on June 30, 1971. Between 1984 and 1987, a total of 1058 spent fuel assemblies were shipped from Monticello to a General Electric storage facility in Morris, Illinois. Because NSP was able to ship these spent fuel assemblies to Illinois, there is more storage capacity available at Monticello. As of July 31, 2002, there were 1342 spent fuel assemblies stored in the pool at Monticello.

### NRC Advance Notice Filed

In September, 2003 NMC submitted an “Advance Notice of Intent to Apply for Renewal of Operating License” for Monticello. This notice included the following statement:

This notification is submitted at the direction of the utility asset owner. The asset owner has not made a final decision related to license renewal; however, previous studies have indicated that license renewal is in the best interest of its ratepayers. Further study is being conducted and the asset owners decision whether to actually make the renewal filing will be made upon completion of this work. Based on the timing of the work effort, in the event of a final corporate decision by the asset owner to file, it is our current intention to submit the License Renewal Application for the MNGP in the first quarter of 2005. The MNGP Operating License expires at midnight, September 8, 2010. We will keep the NRC informed of any changes to this schedule to assist in resource planning.<sup>8</sup>

## **VII. Additional Upcoming Activities**

### **A. Department of Energy Report**

The NWPA (Sec 161) requires the DOE to report to the President and to Congress on the need for a second repository. That report is required no sooner than January 1, 2007, and no later than January 1, 2010.

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<sup>8</sup> <http://www.nrc.gov/reactors/operating/licensing/renewal/applications.html>

## **B. Federal Legislation**

The still-pending federal "Energy Policy Act of 2003" (S. 14) includes important nuclear-energy related provisions, including the reauthorization of the Price Anderson Act and various incentives for new nuclear power plants and reactor technology research.

### Price Anderson Act

Originally enacted as part of the Atomic Energy Act of 1957, the Price Anderson Act limits plant owner liability from accidents for new nuclear facilities,. Without this type of liability protection, it is unlikely new facilities would be constructed. Both Houses of Congress passed versions of the reauthorization in 2002, but the matter failed to get out of a conference committee.

### Nuclear Energy Incentives

The current draft of the proposed federal Energy Policy Act also includes a number of subsidies and incentives for the nuclear industry including the following provisions:

- Title IV, Subtitle B: New Nuclear Plants. Sections 421-425: Authorizes the Department of Energy to provide loans up to 50% of costs to build new reactors.
- Title IV, Subtitle C: Advanced Reactor Hydrogen Co-Generation Project. Sections 431-435: Using nuclear power to produce hydrogen. Allocation: \$1.1 billion over 5 years, including \$635 million for industry research.
- Title IX, Subtitle D: The Advanced Fuel Cycle Initiative. Section 943: Advanced Fuel Cycle Initiative, including funds for reexamination of reprocessing spent commercial nuclear fuel. Allocation: \$865 million over five years.

As of March 2004, these and many other provisions of the Energy Policy Act of 2003 remain topics of intense debate, and the ultimate fate of the proposed federal energy bill and its many provisions remains uncertain.

## **Appendix A**

### **Nuclear Waste Management Chronology**

#### **1954 – 2002**

See the 2002 and 2003 Annual Reports for a list of events for these years. Available at <http://www.eqb.state.mn.us/resource.html?Id=1782>

#### **2003**

In January 2003, the State of Nevada sued the federal government in the U.S. Court of Appeals for the D.C. Circuit, challenging the constitutionality of the 2002 site suitability designation. The D.C. Circuit subsequently consolidated this case with five previous Nevada lawsuits. On January 14, 2004, the DC Circuit heard more than three hours of oral argument in the consolidated cases. A decision is expected in mid-2004.

On January 7, 2003, the NRC issued a second order related to operating plant security measures. In April 2003, the NRC issued new orders regarding the hours security personnel may work each week. Subsequently, the NRC modified certain fitness-for-duty requirements for security personnel in July, 2003 and again in October 2003.

On March 10, 2003 the NRC's Atomic Safety Licensing Board, (ASLB) ruled that it would not recommend a construction license for the proposed Private Fuel Storage facility in Utah due to the risk of fighter jets from the nearby Air Force training facility crashing into the site. The ASLB, therefore, required review of whether the consequences of a hypothetical aircraft crash at the proposed interim facility would exceed federal safety limits. PFS is appealing the ruling at the same time it is providing information to the ASLB on the issue of the consequences of the impact of such a crash. Separately, in several 2003 rulings, the ASLB found that (1) the PFS facility is designed to withstand earthquakes, (2) that PFS has the financial ability to build and operate the facility in accordance with regulations, and (3) the PFS proposed rail line route was the best alternative available.

In May, 2003 the Minnesota legislature authorized enough additional dry casks at the 1,050 megawatt Prairie Island plant to allow it to operate until at least 2013 and 2014, when its current NRC license expires. The 2003 legislation also gave the Minnesota Public Utilities Commission jurisdiction over future on-site capacity increases.

In July 2003, the DOE announced that final decisions on its Strategic Transportation Plan were on hold for two or three more years. So, DOE will not be announcing its final decision on transportation routes or methods until 2006 at the earliest.

In August 2003, the General Accounting Office (GAO), an investigative arm of Congress, issued a study that concluded that the likelihood of widespread harm to human health and the environment from nuclear waste transport is extremely unlikely.

In September, 2003 Xcel submitted an “Advance Notice of Intent to Apply for Renewal of Operating License” to NRC for its Monticello nuclear plant. Xcel anticipates making a certificate-of-need filing with the PUC for dry-cask storage capacity at Monticello in early 2005 if it decides to pursue a NRC license extension at that plant.

In November 2003 the DOE released: a *Guide to Stakeholder Interactions*. This document describes how the DOE will involve the public as it develops its Transportation Strategic Plan for shipping nuclear waste from existing sites to Yucca Mountain.

In November, 2003 to expedite a final decision on the license for the Private Fuel Storage facility, the NRC (1) directed the ASLB to attempt to complete hearings and issue decisions by the end of 2003 (although the ASLB has not met this deadline), and (2) allowed intermediate rulings by the ASLB to be immediately reviewed by the NRC.

In Nov. 24, 2003 letter to OMB, the National Association of Regulatory Utility Commissioners (NARUC) urged President Bush to reform the funding mechanism for the federal Nuclear Waste Fund. By February, 2004 DOE Secretary Abraham proposed similar legislation, and at least on major Nuclear Waste Fund reform bill had been introduced in Congress.

In December, 2003 the DOE announced its preferred rail corridor within Nevada. This rail corridor—known as the Caliente corridor—would connect an Nevada existing railroad track to Yucca Mountain if the DOE selects rail as its preferred method.

## **2004**

In January, 2004, the U.S. Court of Appeals for the D.C. Circuit heard arguments in a State of Utah lawsuit challenging whether the NRC even has the authority to license a private “away-from-reactor” nuclear spent fuel storage facility.

In February 2004, the Administration requested a 50% increase in DOE’s Yucca Mountain Fiscal Year 2005, budget compared to FY 2004, for a total of \$880 million.

On March 9, 2004, after a two year shut-down and extensive repairs at the Davis Besse plant, First Energy began the first of a series of steps to restart the plant's reactor. The startup activities began after First Energy received authorization to restart the plant from the Nuclear Regulatory Commission (NRC).

## **Appendix B**

### **Principal Resources**

Department of Commerce, “Background on Nuclear Power in Minnesota.”  
[http://www.state.mn.us/mn/externalDocs/Nuclear\\_Power\\_121702090354\\_NuclearBackground.pdf](http://www.state.mn.us/mn/externalDocs/Nuclear_Power_121702090354_NuclearBackground.pdf)

DOE, Office of Civilian Radioactive Waste Management: <http://www.ocrwm.doe.gov>

Energy Information Administration: U.S. Nuclear Reactors  
[http://www.eia.doe.gov/cneaf/nuclear/page/nuc\\_reactors/reactsum.html](http://www.eia.doe.gov/cneaf/nuclear/page/nuc_reactors/reactsum.html)

Energy Information Administration: Monthly U.S. Nuclear Generation by Reactor by State, 2001 [http://www.eia.doe.gov/cneaf/nuclear/page/nuc\\_generation/usreact.html](http://www.eia.doe.gov/cneaf/nuclear/page/nuc_generation/usreact.html)

Energy Information Administration: Monthly Energy Review, January 2003  
[http://www.eia.doe.gov/emeu/mer/pdf/pages/sec8\\_3.pdf](http://www.eia.doe.gov/emeu/mer/pdf/pages/sec8_3.pdf)

Eureka County, NV, Nuclear Waste Page: <http://yuccamountain.org/new.htm>

House Research Department, “Nuclear Energy and Xcel Energy’s 2002 Resource Plan”, January 2003, <http://www.house.mn/hrd/pubs/nucxcel.pdf>

Michigan PSC staff report: Nuclear Waste Fund Payments by State:  
<http://www.cis.state.mi.us/mpsc/lic-enf/nuclear/>

State of Nevada Yucca Mountain Litigation Information:  
[http://ag.state.nv.us/agpress/2003/03\\_0109b.pdf](http://ag.state.nv.us/agpress/2003/03_0109b.pdf)  
[http://www.citizen.org/cmep/energy\\_enviro\\_nuclear/nuclear\\_waste/hi-level/yucca/articles.cfm?ID=10882](http://www.citizen.org/cmep/energy_enviro_nuclear/nuclear_waste/hi-level/yucca/articles.cfm?ID=10882)

Nuclear Energy Institute: [www.nei.org](http://www.nei.org)

Nuclear Energy Institute, List of Plant sales;  
[http://www.nei.org/documents/Nuclear\\_Plant\\_Sales.pdf](http://www.nei.org/documents/Nuclear_Plant_Sales.pdf)

Nuclear Regulatory Commission Licensing Renewal:  
<http://www.nrc.gov/reactors/operating/licensing/renewal/applications.html>

Office of Civilian Radioactive Waste Management, FY 2002 Year End Report  
<http://www.ocrwm.doe.gov/pm/budget/MonSumSep2002.pdf>

Office of Civilian Radioactive Waste Management, Spent Nuclear Fuel Transportation  
[http://www.ocrwm.doe.gov/wat/pdf/snf\\_trans.pdf](http://www.ocrwm.doe.gov/wat/pdf/snf_trans.pdf)

State of Nevada, Nuclear Waste Project Office:

<http://www.state.nv.us/nucwaste/index.htm>

Next Generation of Nuclear Generation Technologies

<http://www.nrc.gov/reactors/new-licensing/license-reviews/design-cert.html>

<http://www.energy.gov/engine/doe/files/import/overviewGIF.pdf>

Xcel Energy 2002 Integrated Resource Plan, PUC filing, December 2, 2002.

# Appendix C

