WISCONSIN LEGISLATIVE COUNCIL

NUCLEAR POWER

Point Beach Energy Center
Two Rivers, Wisconsin

September 29, 2006
9:00 a.m. – 1:15 p.m.

[The following is a summary of the September 29, 2006 meeting of the Special Committee on Nuclear Power. The file copy of this summary has appended to it a copy of each document prepared for or submitted to the committee during the meeting. A digital recording of the meeting is available on our Web site at **http://www.legis.state.wi.us/lc**.]

Call to Order and Roll Call

Chair Montgomery called the meeting to order. The roll was called and it was determined that a quorum was present.

COMMITTEE MEMBERS PRESENT:	Rep. Phil Montgomery, Chair; Sen. Dave Hansen; Reps. Chuck Benedict, Mark Honadel, and Robin Vos; and Public Members Forrest Ceel, Michael Corradini, Charles Higley, Katie Nekola, John Orth, Terry Pickens, Brian Rude, Pat Schillinger, Susan Stratton, Bill Ward, and Jack Weissgerber.
COMMITTEE MEMBER EXCUSED:	Public Member Richard Shaten.
COUNCIL STAFF PRESENT:	David Lovell, Senior Analyst, and John Stolzenberg, Chief of Research Services.
APPEARANCES:	Michael Corradini, Professor and Chair of Engineering Physics, University of Wisconsin (UW)-Madison; Vicki Bier, Professor of Industrial Engineering, UW-Madison; David Lochbaum, Union of Concerned Scientists; Lake Barrett, L. Barrett Consulting; and Jeremi Suri, Professor of History, UW-Madison.

Approval of the Special Committee's September 14, 2006 Minutes

Senator Hansen moved, seconded by Representative Vos, that the minutes of the September 14, 2006 meeting be approved as submitted. The motion was adopted by unanimous consent.

Discussion of Materials Distributed

John Stolzenberg described the materials that had been distributed prior to the meeting, consisting of three documents from the Congressional Research Service (CRS) and two articles regarding the Price-Anderson Act. Chairperson Montgomery shared observations regarding federal appropriations for nuclear waste activities reported in the CRS documents.

Invited Presentation: Nuclear Technology*

Michael Corridini, **Professor and Chair of Engineering Physics, UW-Madison**, and member of the Special Committee, presented information regarding the technologies used to generate electricity from nuclear power. He said that the early prototype reactors are referred to as "Generation I" systems and the first commercial power reactors, including all of the currently operating reactors, are referred to as "Generation II" systems. He described the performance of the Generation II reactors, illustrating a history of increasing electricity production and capacity factors and decreasing production costs. Dr. Corradini briefly discussed the relicensing of existing reactors and potential construction of new plants in the United States and globally. He described the basic physics of energy production by nuclear fission and the general designs by which Generation II reactors use that energy to produce electricity. He also described the nuclear power fuel cycle and issues related to spent fuel, including the health and environmental effects of radiation.

Next, Dr. Corradini described advances in system designs, leading to the "Generation III" systems, the designs currently being proposed for construction. He then described advanced designs that are still under development and that are not likely to be commercially viable for 15 to 25 years, the "Generation IV" systems. These designs use different fuel cycles, reprocessing spent fuel for reuse. He described the great reduction in waste generation this accomplishes and noted that the spent fuel currently stored at nuclear plants across the country could be reprocessed for use in these systems. He said that reprocessing is currently used, for example in France, but that the current reprocessing technology produces weapons-grade plutonium, raising concerns regarding diversion of the materials for bomb making. President Ford suspended and President Carter halted development of reprocessing in the United States in part for this reason. He said that designs still under development may not have this problem.

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*[Note: PowerPoint presentations and other documents referred to by the speakers are posted on the committee's Web site.]

Dr. Corradini made a case in favor of nuclear power based on the many system improvements he had described. He concluded by describing the Global Nuclear Energy Partnership program proposed by President Bush, designed to use reprocessing of spent fuel to reduce nuclear waste while controlling fissile materials to protect against the proliferation of nuclear weapons.

Invited Presentation: Safety and Security of Nuclear Power Plants

Vicki Bier, Professor of Industrial Engineering, UW-Madison, discussed nuclear power safety in terms of probabilistic risk assessment, a model of how a plant responds to disturbance during operation. She said that most estimates of the probability of a nuclear reactor core melt-down are around one in 10,000 years for any one reactor. With three reactors in Wisconsin, this means a risk of a core melt-down in Wisconsin of about one in 3,000 years. Dr. Bier said that an accident at a nuclear reactor could have severe off-site consequences, but noted that this is true of other industries, usually under much less regulation than nuclear power. She recalled the chemical plant disaster at Bohpal, India, as an example. She said that many nuclear reactor accidents are the result of operating a system outside its intended design envelope or of making approved or unapproved *ad hoc* operational changes in response to specific problems. She emphasized that the "organizational culture" of a plant, in particular, whether or not that culture focuses on safety, has as much to do with safety as the design and construction of the plant.

Dr. Bier presented two case studies to illustrate the importance of a "culture of safety." First, she contrasted two very similar facilities, the Pilgrim and Millstone nuclear plants. Based on a 1987 review by the *Wall Street Journal*, she said that the Pilgrim plant was plagued by closures for various reasons, attributed to poor management, and as a result was very unproductive. In contrast, the Millstone plant was well managed and had an excellent performance record. The second example related to the more recent problems at the Davis-Besse nuclear plant. She said that the lack of a safety culture at the plant had allowed serious corrosion of the reactor vessel head to go undetected for years. She concluded that nuclear power plants can be operated safely and that careful review and prioritization of safety problems help minimize risks.

David Lochbaum, Union of Concerned Scientists, presented the findings of his recent report on nuclear plant shut-downs lasting one year or more. He presented information on the occurrence and causes of these shut-downs. He said that they occur at plants of all ages and have occurred from the early years of nuclear power to the present, concluding that the problem is neither isolated nor obsolete. He said that this problem makes nuclear power more expensive than it should be.

Dr. Lochbaum said that there are four levels of defense of quality: the individual work group; supervision management; internal oversight; and external oversight (i.e., the Nuclear Regulatory Commission (NRC)). He said that, by the time an NRC inspector finds a problem, the three internal levels of defense have failed. He said that problems do get found and corrected this way, but faulted the NRC for not identifying and correcting the problems in the organizational culture of the plant that allowed the problems to go undetected at any of the three levels of internal control. In response to a question from Ms. Nekola, Dr. Lochbaum said that the Point Beach nuclear plant has many safety problems and that the NRC views Point Beach as the worst performing plant in the nation right now. He also noted the good news is that Point Beach's problems have been identified and the plant has a plan to address them. He said that he is more concerned about ***unknown*** problems at nuclear plants.

Chair Montgomery asked how the safety culture differs between plants owned by investor-owned utilities (IOUs) and those owned by independent power producers (IPPs). Dr. Bier responded that IPPs have the potential to be safer, since the trend is for individual companies to operate several nuclear plants, which concentrates experience in those companies. She said, though, that she would have some concerns about safety during the transition to this scenario. She said that Generation III designs have more passive safety elements than current plants, offering fewer opportunities for operator or mechanical failure. Dr. Lochbaum added that there will nonetheless be a learning curve as Generation III designs are brought into use.

Interactive Presentation: Societal Responsibilities Related to Nuclear Power

Lake Barrett, L. Barrett Consulting, addressed responsibilities that society must accept if it chooses to use nuclear power. He said that these responsibilities are to ensure the safety of nuclear power production and the security of nuclear plants, safeguard nuclear materials, and protect the environment. The responsibilities are to both current and future generations, and in the case of high-level radioactive materials, to generations very far in the future. The responsibilities are also both national and international. He presented broad principles of ethics to guide a nuclear society in meeting these responsibilities, including principles regarding intergenerational equity, intragenerational equity, sustainability, the "polluter pays" concept, and the "precautionary principle."

Mr. Barrett described the nuclear fuel cycle and the sources of radioactive materials that arise from nuclear power generation. He described the development of U.S. policy regarding the management of nuclear materials and spent nuclear fuel in particular, including the early effort to site two waste repositories, one in the east and one in the west, and the later focus on development of the Yucca Mountain, Nevada site. He next discussed spent fuel reprocessing, describing both the advantages due to resource conservation and reduced environmental impacts and concerns related to the possible proliferation of nuclear weapons, transportation of spent fuel, and unproven economics of fuel reprocessing. Since nations with nuclear weapons of concern to the United States have obtained the fissile materials for these condors from research reactors or centrifuge processes. He doubted that nuclear power plants will be a proliferation concern. Mr. Barrett concluded with a discussion of President Bush's proposed Global Nuclear Energy Partnership (GNEP), intended to maximize the benefits of fuel reprocessing while protecting against nuclear weapons proliferation and even reducing the world's stocks of nuclear weapons by using the fissile materials they contain to generate electricity.

Jeremi Suri, Professor of History, UW-Madison, discussed concerns regarding the proliferation of nuclear weapons in the context of global energy challenges. He observed that all states are pursuing energy supplies, with much interest in nuclear power, citing China, India, and Iran, in particular. He noted that nuclear power plant safety and security are very poor in many countries, especially China and Russia He said that many of the nations that pose the greatest proliferation threat, Libya and Iran in particular, also have major oil reserves; they have used the oil reserves for geopolitical purposes and Dr. Suri predicted that they would treat nuclear capabilities similarly. He said that the large number of poorly secured plants in Russia plus that country's stated intention to use its energy resources for export make Russia a major proliferation threat, as well.

Dr. Suri described the Nuclear Nonproliferation Treaty (NPT), which was designed to limit nuclear weapons to the five states that had them at the time the treaty was negotiated. The main provisions of the treaty are designed to prevent the spread of nuclear weapons to states that lack them,

dismantle the weapons of those that have them, promote the peaceful use of nuclear power, and monitor the activities of signatory states. He said that the treaty lacks sufficient enforcement mechanisms.

Dr. Suri concluded by addressing local and state implications of the potential for nuclear weapons proliferation. He said that, with the close of the Cold War era, we are now in a nuclear-prone world and that, consequently, the security of nuclear power plants and the safeguarding of fissile materials is critically important. He noted that the scientists and engineers operating nuclear programs that pose risks of weapons proliferation were trained in American and Western European universities and said that safeguarding this scientific and technical knowledge is also of utmost importance. Dr. Suri said that he considers the disposal and especially the transportation of nuclear waste to be a serious security threat. He said also that there should be better coordination between state and federal agencies in preparation for the possibility of a nuclear incident. He concluded by saying that states must be actively involved in the national discussion of these important topics.

Committee Discussion

Chair Montgomery opened the floor to discussion. Representative Vos stated that the presentations on global warming, electric power demand, and other topics indicates to him the need to keep the current nuclear plants in operation and possibly to consider construction of new plants. Representative Honadel agreed, but noted the need to resolve the issue of waste disposal.

Mr. Barrett said that there are numerous bills relating to nuclear power pending in Congress. He noted the main provisions of a bill offered by Senator Domenici, of New Mexico, which generally would facilitate the licensing and opening of the Yucca Mountain repository. He predicted that facility will eventually be opened.

Mr. Schillinger commented that the committee needs to focus more on future energy demand, and the options for meeting that demand. Ms. Nekola said that society is working on the untested assumption that we cannot meet our energy needs through energy efficiency and renewable resources, but that we do not know what could be accomplished if those approaches were supported to the same extent that the federal government supports and subsidizes nuclear and coal energy.

Other Business and Plans for Future Meetings

The next meeting is scheduled for ***Wednesday, November 15, 2006, at 9:00 a.m., in Room 411 South, State Capitol***.

Adjournment

Chair Montgomery adjourned the meeting at 1:15 p.m.

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