BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

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| Application of Wisconsin Electric Power Company; Wisconsin Energy Corporation; and W.E. Power, LLC; for a Certificate of Public Convenience and Necessity for Construction of Three Large Electric Generation Facilities, the Elm Road Generating Station, and Associated High Voltage Transmission Interconnection Facilities to be Located in Milwaukee and Racine Counties | ) ) ) ) ) ) ) | Docket No. 05-CE-130 |

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**DIRECT TESTIMONY OF RICHARD R. GRIGG**

**ON BEHALF OF APPLICANTS**

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**Q. What is your name and title?**

A. My name is Richard R. Grigg, president and chief executive officer of We Generation and executive vice president of Wisconsin Energy Corporation (WEC).

**Q. Please describe We Generation.**

A. We Generation is a business entity of Wisconsin Energy, that encompasses all the corporation's power generation assets. This includes the generation facilities of We Energies, as well as the We Power subsidiary.

**Q. When was this entity formed and why?**

A. We Generation was formed in April 2003 to consolidate development and management of all of the corporation's generation in one organization.

**Q. What is the purpose of your testimony?**

A. My testimony describes the process WEC used to recognize the need for more electricity capacity and how we developed Power the Future as the plan to address the need. I will describe how the Oak Creek expansion plan fits within Power the Future for meeting

future electricity needs of We Energies' customers. I will talk about certain aspects of the Oak Creek expansion, specifically the selection of site, the selection of fuel and the selection of technology.

**Q. What is your educational background?**

A. I was graduated from the University of Wisconsin-Milwaukee (UWM) in 1970 with a bachelor's degree in mechanical engineering. I earned a master of engineering degree from UWM in 1975. I attended a number of post-degree programs, including the University of Wisconsin-Madison Executive Program in 1985, and the Nuclear Reactor Technology Program for Utility Executives at the Massachusetts Institute of Technology in 1994.

**Q. What is your employment background?**

A. I joined Wisconsin Electric in June 1970 as an engineer at Lakeside Power Plant. I progressed through the positions of maintenance supervisor, maintenance superintendent and general superintendent at various power plants and served as first manager of Pleasant Prairie Power Plant during design, construction, startup and initial operations, and then as manager of the Oak Creek Power Plant during its renovation phase. I was promoted to vice president of System Operations in June 1990. In July 1992, I was named vice president of the Customer Operations Department, and in 1994 was named group executive and vice president responsible for Customer Operations, Customer Services, Sales and Marketing. I was elected a member of the Wisconsin Electric board of directors effective July 1994 and elected president and chief operating officer of Wisconsin Electric and Wisconsin Natural Gas Co. and vice president of WEC in January 1995. I was elected to the board of directors of WEC in May 1995 and also served as

chief nuclear officer of Wisconsin Electric from December 1996 to April 1998, in addition to my responsibility as president and chief operating officer. In June 2000, I was elected senior vice president of WEC, and later that year, I assumed general responsibility for Wisconsin Gas Company in addition to my responsibilities at Wisconsin Electric. In July 2001, I was named president of Wisconsin Gas. In May 2002, I was named an executive vice president of WEC. In April 2003, I was named president and chief executive officer of We Generation, which includes utility and non-utility generating businesses.

**Q. In what professional organizations do you participate?**

A. I am a registered professional engineer in Wisconsin. I also am a member of the American Society of Mechanical Engineers and a member of the American Nuclear Society. In 1994, the UWM College of Engineering and Applied Science presented me the first granted Dean's Award for Outstanding Achievement. I have served as member and chairman of the Association of Edison Illuminating Companies' (AEIC) Committee on Power Generation and am currently a member of the committee and the AEIC's board of directors. I was a former member of the AEIC Committee on Power Delivery. I was a member of the Electric Power Research Institute's (EPRI) Generation & Storage Division Committee. I joined the board of directors of the Electric Power Research Institute in 1998 and served as chair of the board membership and strategic issues committee, and I also served on the board's executive committee until April 2003. I am on the board of regents of the Milwaukee School of Engineering and a member and chair of the UWM College of Engineering & Applied Science Industrial Liaison Council. I was awarded the UWM Distinguished Alumnus Award in 1998 and was named Engineer of the Year for

1999 by the Engineers & Scientists of Milwaukee. In 2001, I was named to the board of EPRI's Electricity Innovation Institute, a new organization aimed at fostering public-private partnerships to pursue affordable clean power technologies. I recently joined the National Coal Council, an advisory group to the United States Secretary of Energy. I am a past member and chair of the Wisconsin Utilities Association Power Generating Committee.

**Q. How would you describe your professional expertise?**

A. I have had a variety of positions within WEC and its subsidiaries. Many of these have been in the area of power generation, and some have been in other areas or in general management. Most of my experience and expertise lies in the area of power generation. I have built and managed power generation facilities as well as generation fleets, all leading to my current position with We Generation. As a member of WEC's senior management team, I participated in the decision and planning for Power the Future.

**Q. Why was the Oak Creek project proposed?**

A. The Oak Creek expansion, as part of our Power the Future plan, continues our innovative tradition in meeting the needs of our customers for reliable and reasonably priced energy which, based on our forecasts, continue to grow.

**Q. In what way do you see growth on the We Energies system?**

A. Planning, building and operating a utility generation system requires that you look at load growth in energy usage, as measured in kilowatt-hours, and peak demand, measured in kilowatts. Peak demand is the maximum amount of energy taken at a moment in time. Energy usage is the amount of energy used over some extended period of time, such as a day, month or year.

**Q. Why are these two measures of energy growth important?**

A. Growth in demand or energy dictates what type of facilities are needed to meet it. The type of growth we are meeting helps determine the type of plant built.

**Q. Please elaborate on the types of generating plants.**

A. In developing a fleet of plants, efficiency requires matching certain types of plants to certain types of load. A certain amount of electricity is used around the clock, every day of the year. This is called base load. Plants to meet this type of load are typically the largest, low-cost and most reliable type. In our case, coal-based and nuclear power. During daytime hours when businesses and industries are operating, load rises higher than what the base load plants can supply. At that point, intermediate load plants are needed. These units are typically combined cycle combustion turbines fueled by natural gas. Sometimes, especially on hot days when cooling equipment is operating, even more power is needed than what the base load and intermediate load plants can deliver. This is called peak load, and we use smaller natural-gas-based combustion turbines to meet demand during these extreme periods.

**Q. In making decisions about what type of generation to build, what factors do you take into account?**

A. We take a look at our load characteristics and project where we will have deficiencies in our mix of base load, intermediate load and peak load facilities. Fuels to operate the plants are an important consideration because they impact cost, reliability and environmental performance. We strive for an efficient mix to ensure reasonable cost and reliable supply. Planning is critical in all generation additions but especially for base load

facilities because it takes six to eight years from determining the need to getting the plant on line. Timeframes are shorter for intermediate and peak load facilities.

**Q. What do your current projections tell you about what types of plants are needed?**

A. In 1999, our strategic planning began to indicate that we would soon need additional base load generation. We saw the need for power growing steadily at 2.5 to 3 percent each year, mostly driven by economic growth, population increases and greater electricity usage per customer. While we have steadily added peaking and intermediate capacity, we have not added any base load capacity since completing Pleasant Prairie Power Plant about 20 years ago. Base load generation, since it runs nearly continuously, must be the most cost-effective and most dependable in our mix of power plants. The backbone of our base load generation is coal-based and nuclear powered.

For many years, we met incremental increases in customer demand through additions in our peaking and intermediate generation. As I said before, peaking generation is used just for those few hours a day at certain times of the year when demand is extreme. Intermediate generation is used to meet other periods of high demand, typically during weekday hours. We built some peaking plants in recent years, and we also contracted peaking and intermediate capacity from other producers to meet increasing demand. All of this peaking and intermediate capacity is fueled by natural gas.

This approach also bought some time to sort through uncertainty about deregulation and whether we could remain in the generation business. Many states had separated generation from the utility business. Uncertainty also existed about environmental regulation. Despite the uncertainties, many of which are still to be

resolved, we knew the time had come to move forward so we could continue to fulfill our responsibilities and obligation to serve to our customers.

**Q. In deciding to build, and what type of plant to build, you had to consider the existing fleet. What assumption did you make about those plants?**

A. My staff considered existing plants and made assumptions regarding their future operations. Another witness, Mr. Scott Patulski, describes this process in more detail. I must emphasize, however, these are planning assumptions based on the best current knowledge about longevity of plants, impact of environmental rules and type of operation. We conduct detailed evaluations of all these factors, and from time to time change assumptions about how long certain plants or units can be economically run. The assumptions of Mr. Patulski, as used by Mr. Knitter, are those which are most reasonable, in light of current knowledge.

**Q. How did you consider the options regarding fuel choice?**

A. We began by looking at the long-term view of electric generation, watching with interest a project conducted by the Electric Power Research Institute (EPRI) that considered environmental and fuel supply issues. In the long-term view of this project, the optimal mix of electric generation was projected to be a combination of renewable, nuclear and gas-fueled power plants while factoring in conservation. The gas likely would be natural gas as well as gas created through a process called coal gasification.

While renewable energy is being more widely deployed–including in our Power the Future plan–and development of coal gasification technology is making progress, we learned that those technologies are not yet able to meet the requirements of base load generation -- low cost and high reliability. Nuclear power, on the other hand, still

presents challenges concerning used fuel, and under Wisconsin law, new nuclear power projects cannot now be built. Although our plan does assume relicensing of our Point Beach Nuclear Plant, we will not make a final determination about relicensing until later this year.

Because of the technological and political uncertainties related to renewables, coal gasification and nuclear power–and the longer time frame they would require–we turned our attention to more traditional but modern design base load energy sources -- coal and natural gas.

**Q. Why was coal chosen rather than natural gas to fuel the base load units?**

A. Up to 2000 – about the time we proposed Power the Future – the overall energy cost comparisons between base load coal plants and base load natural gas plants were close. However, the picture changed dramatically in the winter of 2000, when natural gas prices spiked. We have seen another sharp spike this past winter. Such volatility -- and the long-term projections for natural gas supply -- made it clear that natural gas would not be a good choice for base load generation.

With demand for natural gas projected to rapidly increase -- driven primarily by increased use for power generation -- and domestic production from traditional sources gradually declining, we determined that the natural gas industry was going to be in a significant long-term struggle to keep pace with demand. New sources would be needed in the future. These would include:

- **Imports:** The U.S. already gets about 15% of its natural gas from Canada and a small amount in liquefied form shipped from other countries.

- **Alaska and the Rocky Mountains:** Supply exists in these locations, but they are environmentally sensitive areas, and drilling in these places faces considerable opposition.
- **Deep drilling in the Gulf of Mexico:** Traditional off-shore sources are being depleted and the best remaining sources will require deep drilling that requires special rigs and must overcome environmental opposition.
- **Other potential sources:** Extracting natural gas from pockets trapped in ice beneath the oceans, and obtaining it from coal, sand and shale are possibilities, but they require technological developments, which add to complexity and cost.

Even if enough supply could be found to meet demand that is expected to jump from about 23 trillion cubic feet per year to nearly 31 trillion cubic feet by 2020, concerns exist about the infrastructure to deliver it. For the volume of natural gas needed to supply homes, businesses, industry and power plants, more pipelines would be needed. Determining routes and building such facilities is a lengthy and uncertain process, requiring large investments, environmental concerns and public opposition.

Wisconsin is essentially at the end of the natural gas pipeline network, making us more vulnerable to possible disruptions, whether related to supply or delivery. There are just five major pipelines into the state and a failure at just one of the pipelines could put natural-gas-fueled power plants out of commission. While such risk can be managed when it comes to peaking and intermediate load plants, loss of fuel for a base load plant would have much greater consequences. In addition to these delivery infrastructure issues, gas fueled base load plants require extensive back-up fuel storage on site.

In contrast, coal can be delivered by train, boat or truck, and reserves can be stored safely on site. Coal also has the advantage of ample supply and stable prices.

**Q. But even considering all this, isn't gas better for the environment than coal?**

A. No, only if you focus exclusively on air emissions and ignore all other factors; and, in that case, you would build new nuclear units for base load. The other factors are extremely significant—fuel diversity is critical to reliability and price is important to the customer. And it is important to consider that the existing power plants–even to the extent that they adhere to strict environmental requirements—are much different than the new generation plants. Keep in mind that the "youngest" plant in our system is 20 years old, and major advances in technology have occurred in those years. Our commitment to advanced coal technology was made with the belief that the impact on the environment could be well managed and, ultimately, not be much different than that of gas.

Our study of advanced coal technology took us to Germany, Japan, China and Australia to see advanced supercritical coal-based facilities, and we traveled to each of the world's four coal gasification plants in Indiana, Florida, the Netherlands and Spain to learn more about this evolving technology. In both cases, we studied their performance -- operationally and environmentally. We learned that the new supercritical units were much more efficient and cleaner than the units we built in the 1980s. The new technology removes 99.9% of particulate matter, 95% of sulfur dioxide, 85% of nitrogen oxide and 80% of mercury, allowing such units to easily meet air quality standards. Emissions from gasification technology can be even better, but this technology is not ready for the scale and reliability we require in the first phases of our plan. We do expect it to be ready by the time we need the last unit.

The improvements we saw in coal-based power generation led us to develop our Power the Future plan that uses a combination of fuel sources -- coal for base load and natural gas for intermediate load as well as expanded use of renewable energy and a stronger focus on conservation.

**Q. In planning, how far did you extend your forecast in determining overall costs?**

A. We looked at the total lifecycle costs of the proposed plants. We used EGEAS (electric generation expansion analysis system), a long-range planning model for least-cost planning. The long-range view is what makes base load coal appropriate. Though costlier to build, coal-based units help customers save money in the long run because of lower fuel costs. We estimate savings at more than $1.8 billion over the life of the plants.

Many companies now use shorter-range planning models, which may explain why many power companies have been shortsighted in making plans for extensive use of natural gas -- a premium fuel with more important uses. Though we were among the leaders in taking a new look at coal-based generation, we are seeing others in the industry reconsidering their plans for natural gas, and some, including two Wisconsin-based entities that now have coal-based plants in their plans.

When we began Power the Future, there were conflicting views about natural gas supply issues. Our view, which raises concerns about supply, price and delivery, is increasingly shared by others. Recent forecasts from Energy and Environmental Analysis, Inc., agree with our forecast. As the cost difference between natural gas and coal widens, the advantages of coal become greater.

**Q. How did you consider environmental impacts in your fuel choice decision?**

A. We considered the ability to effectively control emissions from modern coal units, which we believe is strong and improving. We also considered the impact that new drilling for natural gas and new gas pipeline construction would have on the environment.

**Q. What type of coal-based facilities are proposed?**

A. The advanced technology, coal-fueled base load units would total 1,800 megawatts through an expansion of the existing Oak Creek Power Plant. The first two units would use modern, supercritical, pulverized coal technology, which is similar to the technology used at our existing units but more efficient. The units use pulverized coal that is blown into a boiler where it is burned to produce steam. To improve efficiency, the two units will use supercritical boilers, which use higher pressures and temperatures. This means less fuel is required for a given output, making the units more cost effective while producing fewer emissions per unit of output.

The third unit would use an evolving integrated gasification combined cycle technology, which uses a combination of chemical processes and fuels to create a gas that is cleansed of sulfur and mercury. This gas is then used to generate electricity. The power production portion of the plant uses technology similar to what we are installing at Port Washington. Rather than burn natural gas, the plant would produce its own gas from coal, which is heated in a controlled atmosphere so the coal does not burn but is partially oxidized, which creates a synthesis gas and molten slag. An extensive system would be used to cool and clean the gas prior to burning it in the combustion turbines.

**Q. What impact would the addition of these facilities have on Oak Creek emissions?**

A. We have steadily decreased emissions over many years and despite the increase in generation, our emissions reductions will continue. Through some changes in fuel and

equipment, Power the Future is reducing emissions on existing units so that after the new units are added, the overall total emissions will be less than they were when we began Power the Future in 2000.

Because emissions tend to be a regional issue, the impact on system-wide emissions is an important consideration. After retiring old coal-based units, adding advanced technology coal-based base load units, adding combined-cycle natural-gas-based intermediate load units, improving existing plants and increasing renewables, we will decrease system-wide emissions and increase our electricity production nearly 65% by 2012. Specifically, our sulfur dioxide and nitrogen oxide emissions will decrease 60%, mercury will decrease 35% and our particulate matter will decrease 20%. Ms. Krause will testify to additional details on emissions reduction.

**Q. Why was the Oak Creek site chosen for expansion?**

A. Making use of an existing site takes advantage of existing infrastructure to reduce costs and minimize disruptions associated with greenfield development. Our Oak Creek site has the necessary space, water access, load proximity and transmission system that make this site the least-cost option. Oak Creek also has access to three forms of fuel delivery -- rail, water and road to ensure reliable fuel supply. The area's skilled work force also is an important feature.

**Q. Did you consider other sites?**

A. Other sites considered included our property in Haven and an expansion at Pleasant Prairie. Our alternate site is in Caledonia, adjacent to the existing site. Mr. Mihm's testimony will describe the site selection process.

**Q. Why did you choose to build rather then outsource the project?**

A. We have been in the generation business a long time. We have a long history of innovation, quality and operational excellence. We pioneered one of the nation's first central generating stations in 1882. We also developed the concept of pulverized coal as a boiler fuel, making low-cost central station electric service possible in the early 1900s. In later years, our coal-based generation set world records for efficiency.

We have the expertise to build plants and operate them. Such expertise would be diminished, if not lost, if all future generation needs were met by non-utility companies, typically by non-Wisconsin companies. Power the Future allows us to build much of the needed capacity within WEC companies.

Even though we are using our expertise to construct the plant, we will still use many Wisconsin based sub-contractors, all of whom were chosen after a competitive bidding process that considers price and ability to meet strict building requirements. There are further reasons why we choose not to outsource completely, and these are explained in the testimony of Messrs. Patulski and Damon.

**Q. Were there alternatives to this building program considered?**

A. Other ways of meeting demand were considered. Specifically, power purchased on the open market, construction by another entity with Wisconsin Electric providing a long-term commitment to purchase power, energy efficiency and renewable options.

**Q. Why were these rejected?**

A. Such options have not been rejected. They all fit into a long-term energy strategy for We Energies and for Wisconsin. However, they do not provide the reliability required now to ensure meeting future demand.

**Q. Is Wisconsin Energy doing anything to promote energy sources other than generating stations?**

A. We are. We have an Office of Energy Options, a department within the company which is actively exploring many alternate sources of energy. We fully expect that wind power, various forms of renewables, energy efficiency and conservation will play a part in meeting future energy needs. We have examples of all of these on our system now. Just as power plants have different characteristics and fill different needs, so do the various forms of energy options. We must take advantage of all forms in meeting future energy demand.

**Q. The company chose a lease between W.E. Power and Wisconsin Electric. Why not build in the utility?**

A. Based on the financial conditions necessary to undertake such a significant project, the lease structure is the most efficient for all stakeholders involved because it will allow us to build a high-quality plant at a reasonable price. This approach was contemplated by the legislature, and approved by the Commission in its order approving the Port Washington project.

**Q. What happens if the pending Elm Road project is not approved?**

A. First, valuable time is lost. Current projections show that we will need these facilities in the time frame they have been planned. With the long lead time associated with construction, it is likely that delays in this project will result in capacity shortages in four to five years. In such an event, it is probable that relatively higher-cost energy options−peaking supply and purchased power−will be used to meet demand. There will be other economic consequences too. The expansion of the Elm Road Generating Station

will create over 700 full-time construction jobs in Wisconsin, and it will create an additional 1,200 jobs in other Wisconsin industries. We also expect the project to generate over $53 million in tax revenue to the State of Wisconsin. If the project were not approved, these benefits would be lost.

**Q. Are there other matters regarding the PTF plan that you wish to address?**

A. Yes. I have one other item, the agreement reached with the City of Oak Creek. The Company has had a long history of being sensitive to the needs of the communities where we operate. With that in mind, the Company met with city officials to discuss concerns that they might have regarding the expansion. Those discussions resulted in an agreement which cover various matters, including certain payments to the city in connection with the expansion. Others can describe these agreements more fully.

**Q. What does the Company request regarding these payments?**

A. The Company requests, as a matter of equity to the City of Oak Creek as the host city, and further as a matter of good public policy, that the Commission approve these payments as legitimate costs of providing utility service. This should be accomplished by including the amounts supported by Mr. Hesselbach and Ms. Wolter in the lease between Wisconsin Electric and W.E. Power.

**Q. Does this conclude your prefiled direct testimony?**

A. Yes, it does.