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REMARKS ON FUTURE OPPORTUNITY IN THE NUCLEAR INDUSTRY
BY
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Good afternoon, ladies and gentlemen. I appreciate the invitation to join you today at your annual Regional Conference in Milwaukee for the IBEW Centennial Year of the first Electrical Worker's Convention held in St. Louis on November 21, 1891. I understand that on that historic occasion, only ten delegates representing 286 members of the Electrical Workers attended the St. Louis Convention. In contrast to that rather slender beginning in 1891, the robust attendance and participation in Regional Conferences such as this one reveal the importance of the electrical industry to our nations's economic well-being and reflect the tremendous achievements of the International Brotherhood of Electrical Workers over the past century.

I wish to share some of my views with you today on commercial nuclear power regulation and the future of the nuclear industry in which the International Brotherhood is an important stakeholder. I believe that perhaps the most important element of retaining commercial nuclear power as a viable option for meeting the energy needs of our nation is leadership in the pursuit of excellence in nuclear safety. Excellence is achieved by the performance of People to standards or norms of high quality - people who develoP the advanced technologies involved, people who design the plants, people who construct the plants, people who operate the plants, people who maintain the plants, and people from my own organization, the Nuclear Regulatory Commission, who regulate these activities. As I am sure you are aware, the International Brotherhood of Electrical Workers (IBEW) participates in almost all of these phases - development, design, construction, operation, and maintenance - the single exception being that of federal

regulation. In short, we have many common objectives. There are some specific steps that I believe need to be taken both by the NRC and the industry in furthering these common objectives, and I will speak to these in a few moments.

First, let me reiterate that commercial nuclear power contributes a significant fraction of our nation's electrical energy needs today by providing approximately 20 percent of total electrical demand. In some parts of the country, nuclear power supplies as much as 65 percent of the electrical demand. This production of nuclear electrical generation has been accomplished with an excellent record of safety in the U.S.

Today, there are 111 nuclear power plants licensed for commercial operation,1 with 3 plants remaining in a construction status. The 111 operating plants represent about 100,000 MWe of electrical capacity which contribute approximately 570 Terawatthours (TWh) of electrical energy per year. The energy contribution to date from these 111 nuclear plants is equivalent to approximately 4.3 billion barrels of imported oil (resulting in savings of about $125 billion in foreign oil payments), approximately 1 billion tons of coal, and about 6.5 trillion cubic feet of natural gas displaced as fossil fuels for electrical generation. In 1989, nuclear plants in the United States reduced total U.S. CO2 emissions by almost 9 percent, and nuclear plants worldwide reduced total global COz emissions by over 7 percent. Without nuclear power in 1989, U.S. utility emissions of CO2 would have been 18 percent higher.3

Since initial operation of the original Shippingport Station in 1957 through December of 1990, licensed nuclear power reactors have generated a total of approximately 4,600 Terrawatthours of electricity in a remarkably safe manner. [In fact, the buildup rate of U.S. nuclear electrical generation has been unusually rapid at approximately 36 percent per year, or about five times as fast as that of oil and natural gas each as inputs to the U.S. primary energy supply.] The nuclear industry in the United States, including the contributions by the electrical workers, should be recognized for this successful accomplishment and the resulting contribution to our society from this new primary energy form.

However, there is more to be done. As you are aware, the U.s. Department of Energy (DOE) presented the final set of energy options in late December 1990 to the White House Economic Policy

1 Excludes the licensed but shutdown Shoreham and Rancho Seco Stations.

2 A Terrawatthour is equivalent to one billion kilowatthours.

3 "Energy Use and Global Warming," Science Concepts, February 1990.

Council for the development of a national energy strategy and eventually for President Bush's consideration. The President may present some of the Administration's final policy decisions in his State of the Union Address to Congress in early February. In any event, the Department of Energy has testified to the Congress that additional electrical generation capacity will be needed shortly in some regions of the country to shore up dwindling reserve margins, sustain economic growth, and replace older existing capacity - both fossil-fired and nuclear. The Department believes that at least some of this additional capacity should be nuclear in light of: the increasing dependence of our country on imported oil, passage of the Clean Air Amendments Act which will impose additional costs on the production of fossil-fired generation, and increased environmental concerns about the long-term effects of "greenhouse effect" related gas emissions from fossil fuels used for electrical generation.

DOE projects that U.S. net nuclear capacity in thirty years or by the year 2030 will range from 134,000 to 184,000 MWE. The projection accounts for retirement of older nuclear plants, construction of new fossil and nuclear plants, and license extension of as much as 70 percent of existing licensed nuclear capacity for up to twenty years as these plants reach the end of their forty year license period. Provided that relicensing of nuclear plants does not displace new nuclear plant orders, the

Department projects an upper bound for nuclear capacity of 202,000 MWe.

As International Officers, Local Union Officers, and Staff Representatives of the IBEW, you should recognize the challenge that this massive electrical capacity construction program will present to your membership. You should also consider the skills, knowledge, and abilities that this construction program will require of the electrical industry, and how the IBEW can help the industry meet these requirements. I will offer some suggestions in this regard shortly.

While the utilities will make the decisions as to type of electrical generation, let me speak to several conditions that I believe will be required for selection of the nuclear option. First, our existing nuclear power reactors must continue to operate safely. Second, the nuclear industry must improve the reliability and the safety of its new advanced reactors which are to be certified under the new Part 52 of Title 10 of the Federal Code of Regulations entitled, "Early Site Permits; Standard Design Certifications: and Combined Licenses for Nuclear Power Plants". Third, plant construction schedules and associated construction costs of the new advanced power reactors must be established by industry with a high degree of confidence. This effort must include

discussions with representatives of organized labor. Fourth, we

Federal regulators must demonstrate that stability and predictability of the regulatory, certification and licensing process has been achieved. State regulatory bodies must provide confidence that dollars invested in constructed plants __. __ recovered. Finally, the Federal Government and the States must work together to resolve high level radioactive waste transportation and disposition issues by demonstrating that these wastes can be safely transported and disposed of in a licensed geologic repository.

To achieve the first condition, the utility industry, through its Institute of Nuclear Power Operations (INPO) and its Nuclear Management and Resources Council (NUMARC), is working with the NRC to ensure the operational safety of currently licensed plants. Meanwhile, the reactor manufacturers and architect-engineer-constructors are improving the safety and reliability of those reactors which they intend to submit for design certification under Part 52. They are also developing the necessary degrees of confidence in the construction schedules and costs of new advanced reactors, thus addressing the second and third conditions I have mentioned.

The new Part 52 of the Commission's regulations should go a long way in meeting the fourth requirement by offering stability and predictability in the regulatory process. The standard design certification is similar in concept to that conducted by the Federal Aviation Administration for new commercial aircraft developed by the aviation industry. A number of issues remain to be resolved with respect to Part 52 implementation, including a challenge of the legality of one important element of the new regulation - the requirement for a post-construction hearing, prior to operation of the plant, in every circumstance.

To meet the fifth condition, DOE is developing a comprehensive high level waste transportation program and making renewed efforts to gain access to the Yucca Mountain Nevada site to determine its suitability as a geologic repository for high level wastes. The NRC has been actively involved in reviews of the DOE Site Characterization Plan for Yucca Mountain and in the rulemaking necessary to license such a facility. The public has every right to demand that advanced nuclear technology, including the entire nuclear fuel cycle, will be safe as well as economically viable.

One of the factors contributing to public concern and opposition to nuclear power has been the lack of understanding of the general concept of acceptable risk by our society. As officers and staff of the electrical workers, you are aware that virtually all human activities embody some level of risk. Dr. D. Allan Bromley, Assistant to the President for Science and Technology, has recently

pointed out that in a technological society such as ours - one which has given us longer, healthier, and more comfortable lives than most humans have ever known - some level of risk-taking is not only inevitable but desirable. As Dr. Bromley has recognized, if we

were to attempt to eliminate completely all areas of risk, we would also reduce the potential for future advances. He notes that Americans spend far more time worrying about risks of very small magnitude - such as nuclear accidents or the most recently discovered carcinogens - while continuing to engage in such individual risky behavior as smoking, driving, and eating improperly without giving them a second thought.

Professor H.W. Lewis points out in his new book Technological Risk, that we live in a culture where "[h]alf of the American people believe in lucky numbers . . . less than half of us know that the Earth goes around the sun once a year . . . and that American industry spends as much on remedial mathematics education each year as is spent on direct mathematics education in elementary schools, high schools, and colleges." Dr. Bromley believes, and I agree, that there are a number of reasons for improving the scientific and technical literacy of the American public, one of these being greater public literacy about risks.

As Dr. Bromley reminds us, in a participatory democracy such as ours, public perceptions inevitably are reflected in public policies. I would therefore urge the IBEW to do all that if can to support local and regional educational efforts whose purpose is to improve scientific and mathematical literacy in curricula at the elementary and secondary education level and to foster an appreciation of how these relate to our technologies. The IBEW should also seek opportunities to explain that risk does not equate to a 50-50 chance of occurrence of an adverse event, and that if the public tends to view an adverse event with a one-in-a-million chance of occurring as having a 50-50 chance of occurring, societal priorities about resources spent on preventing that risk are likely to be excessive.

Having said this, with increasing demand for electricity, it is reasonable to anticipate new nuclear orders at some future date. The question, you may ask, is what will be the electrical worker's share of this new commercial nuclear program? Industry's approach to the Advanced Light Water Reactor (ALWR) plants is to have at least 70 percent of the design complete for design-certified ALWR plants prior to construction start; the NRC's design certification process may require an even higher level of design completion. Typical construction schedules are projected to range from three to five years depending on the degree to which modularity is employed in design and construction, the size of the unit, and possibly other site-related factors.

Based upon information made available from the Department of

Energy, it appears that the large evolutionary nuclear plants will require 10 percent less electrical craft on-site manhours than the best 1300 MWe nuclear reactors built in the late 1970's and early 1980's. Information also made available by the Department indicates that the small passive nuclear plants under development will

require 30 percent less electrical on-site manhours than the best 600 MWe nuclear power plants built in the late 1970's and early 1980's. DOE attributes these reductions to four principal factors:

Use of a standardized approach to design and construction

With 70 percent or more of engineering completed prior to the owner's commitment to build and 90 percent of engineering completed prior to construction start, less rework, greater on-site productivity, and a reduction in the number of supervisors per site laborer are anticipated.

Use of modular factories

The adoption of modular construction will decrease site activity and will reduce site laborers. The electrical craft offset at the modular factory, while not yet quantified, will ameliorate the reduction in total craft labor hours.

Shorter construction schedules

The decrease in schedule duration is accompanied by a decrease in site activity.

Reduction in electrical commodity content

The reduction in cable quantities resulting from the use of distributed microprocessors and data highways for instrumentation and control circuits will reduce the amount of on-site labor required.

To ensure that these new plants will be accepted by the public and actually constructed, the existing nuclear power reactors must continue to operate safely. Safe operation of our existing plants will require continued excellence in performance, demanding both leadership and quality performance in operations and in maintenance. Maintenance of nuclear plants is an operational area in which the Commission believes further improvements by the industry can and should be made. I need not tell this Convention that human lives are at stake wherever maintenance of high energy equipment and systems is not adequate, nor that nuclear$ safety is directly related to reliability of plant equipment and structures. Thus I urge continued support of the IBEW in emphasizing the critical importance of good maintenance to the nuclear industry.

I believe that you have much to offer in this important activity by assisting industry in incorporating applicable human factors practices in maintenance and operation. Good human factors considerations, if taken seriously, can improve designs from both a constructability and maintainability point of view. For example, human factors effects would appear to be especially important in

Instrumentation and Control (I&C) systems, which in nuclear plants require periodic human intervention for calibration and operability confirmation tests. The NRC also strongly supports training programs and believes that an important element of effective training programs is repetitive, on-going practice of skilled operators using control room simulators and skilled maintenance technicians using actual or mockups of equipment to be maintained. IBEW support of and input to the development of the scenarios used in such repetitive training programs are contributions that would be highly valued.

A second area for which I call for continued IBEW support is on-the-job "Fitness for Duty". You represent not only construction workers in nuclear power plants but also maintenance workers and licensed control room operators. An important element in assuring that plants are constructed, operated, and maintained is assurance that workers are not impaired by drugs or alcohol. Also, the fitness-for-duty of nuclear workers is essential to public confidence in the adequacy of construction and operation of nuclear facilities. Public confidence in the safe construction of several facilities, including Seabrook, Shearon Harris, and Comanche Peak, was significantly impacted by allegations of chemical or substance abuse and physical impairment involving a few members of the work force. We cannot afford such failures of billion-dollar construction projects, nor can we allow projects in which the safety of the construction workforce and the public, may be compromised.

As to control room operators, I note that a Local of the IBEW petitioned the NRC that personnel of the Diablo Canyon Station be exempted from the random drug testing called for in the NRC's fitness-for-duty rule. Local 1245 of the IBEW argued that the Diablo Canyon operators should be granted an exemption from the testing requirements of 10 CFR 26 based on the plants's "[s]afety record, the fitness-for-duty policy that had previously been in effect at the plant prior to the effective date of 10 CFR 26, the asserted absence of evidence of drug or alcohol abuse among plant employees, and the fact that 10 CFR 26 would apply to workers stationed beyond radiologically controlled areas or involved in work that would not create challenges to safety systems or complicate the response to off-normal conditions." The information reported to the NRC showed that in the first six months of 1990, there had been in fact two positive random drug test cases and three positive for-cause tests at Diablo Canyon. Moreover, in its

denial the agency pointed out that an exemption for Diablo Canyon would invite similar petitions from collective bargaining units at other plants, essentially nullifying 10CFR26.

I cite this example in some detail simply as a reminder that you, as International and Local Officers and Staff Representatives, have an important responsibility to continue efforts of educating your membership to the dangers of chemical or substance abuse. Recent

news media accounts of alcohol and drug impairment by operators in the transportation industry and the resulting public furor, even where no deaths, injury, or property damage resulted, are an indicator of societal acceptance of and insistence on the basic tenants of the NRC rule. Thus I call for continued IBEW support at National, Regional, and Local levels for the fitness-for-duty rule as an essential element to ensure construction quality and operational safety, both of which will be necessary for public acceptance of additional nuclear power.

In my visits to all 60 of the licensed U.S. plant sites as well as to nuclear plants in seven foreign countries, I have become convinced that <u>people</u>, as well as technology, are essential to safety in plant operation. We need your recognition of the importance that we at the NRC, and the American public we represent, attach to the unique and key contribution of electrical workers, highly-skilled electrical maintenance technicians, and licensed nuclear power plant operators to safe nuclear operations.

At the NRC we believe that a safe plant is a reliable plant is an economic plant. We hope that you also accept this reasoning and that you will assist us in convincing State public utility commissions and the American people of this fact. IBEW continued commitment to quality workmanship in construction, in maintenance and in performance of control room operations will ensure not only the continued success of existing nuclear plants in supplying vitally needed electrical power, but will also help ensure the successful introduction of a new class of safer, more economic, and improved nuclear power plants for our nation's future energy growth requirements.

I am honored that you invited me to share some of my views with you on the future of the nuclear industry and the essential requirements for nuclear safety. I wish you a successful and rewarding conference in the remainder of your sessions. I would be pleased to answer a few questions that you may have if time is available. Thank you for your attention.

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