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## The Challenges of Radioactive Waste Transportation

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It was my privilege to serve as Chairman of the Electric Utility Companies' Nuclear Transportation Group from 1981 through 1987. In that position, I had the opportunity to deal with issues in which many of you are involved, and which indeed are the subjects, either directly or indirectly, of this Symposium.

My involvement in radioactive material transportation dates back to the mid-1970's when I worked for the State of Connecticut Department of Planning and Energy Policy. One day, a truck carrying low-level waste had an accident at a railroad bridge. No one was injured, and no radioactive materials were released. The only damage was to an empty plywood crate that was destroyed when it didn't clear the overhead. When the Governor found out that she had no control over, or knowledge of, the shipment of radioactive materials in the State of Connecticut, she gave me 24 hours to prepare legislation. Notwithstanding the provisions of the Federal Hazardous Materials Transportation Act (HMTA) and the preemptive affect of that statute over inconsistent state and local regulations, I was determined to develop legislation that was reasonable and fair, that would satisfy the Governor's needs, and that would withstand legal challenge. The next day I submitted that legislation and the following day it was passed into law. One of life's interesting ironies is that a year later I was hired by Northeast Utilities, which serves about 1.3 million customers in Connecticut and Massachusetts, and one of my responsibilities was to provide advice and counsel about that blankety-blank state transportation regulation. I should mention that I continue to believe that that legislation was reasonable, and fair, but I must note that last year, after twelve years, the U.S. Department of Transportation (DOT) determined that that regulation was in fact preempted by the Hazardous Materials Transportation Act. My colleagues remind me of that old song about "two out of three ain't bad."

For those of you who are not familiar with the Nuclear Management and Resources Council (NUMARC), we are the organization of the nuclear power industry that is responsible for coordinating the combined efforts of all utilities licensed by the U.S. Nuclear Regulatory Commission (NRC) to construct or operate nuclear power plants in all matters involving generic regulatory policy issues and on the regulatory aspects of generic operational and technical issues affecting the nuclear power industry. Every utility responsible for constructing or operating a commercial nuclear power plant in the United States is a member of NUMARC. In addition, NUMARC's members include major architect engineering firms and all of the major nuclear steam supply system vendors.

Experience has proven that, as a subject, any activities involving radioactive materials command special attention, notwithstanding the fact that these materials are more closely regulated than any

other hazardous material, and are probably better understood than any other hazardous material. I'm told that there are eight federal executive departments, two independent commissions and five federal regulatory agencies, as well as twelve U.S. Senate committees and subcommittees, and sixteen House committees and their subcommittees, that directly or indirectly are involved with the use of and control over radioactive materials. Someone viewing this situation from afar might assume that this issue needs that much attention because of the great volume of problems associated with it. Those experienced with hazardous material transportation, however, look longingly at the safety record of the transportation of radioactive materials in relation to the transportation of other hazardous materials. I think it's instructive that of the more than 2,000 types and categories of hazardous materials listed by the U.S. Department of Transportation in Title 49 of the Code of Federal Regulations, eight of those listings are associated with radioactive materials. Yet, it is these materials that cause the most public concern and outcry, despite the fact that the safety record of radioactive materials transportation, as compared to other hazardous material transportation, is exemplary.

There are 2,000,000 - 3,000,000 shipments of radioactive materials conducted each year, but public anxiety has been focused on spent fuel shipments, which are a very small percentage of the number of waste shipments. The U.S. industry's track record in shipping spent fuel is admirable: we are now at the point that over 6,000 spent fuel assemblies have been shipped without a single release of radioactive materials in a transportation accident—the safety record of shipments in other countries is similarly unblemished. As Dr. Aherne and Mr. King so aptly observed, public perception of the risk is out of line with the actual risks. Whatever the reason for this, it is crucial that we work to bring perception in line with reality.

No one in this room, however, needs to be reminded of how quickly a record like that can be broken. The memory is all too vivid of how one single significant accident (significant, that is, from the perspective of the perception of the public)—Three Mile Island—impacted the nuclear industry and shook the public's confidence in that industry.

The famous atomic physicist, Niels Bohr, is said to have once remarked that "it is very difficult to make predictions, ... especially about the future." Regardless of one's political persuasion or technical training, I don't think there is any question that spent fuel must be moved, sooner or later, somewhere. It is in the best interest of all that those shipments be made safely, and economically, ... and by economically I don't mean cheaply but I mean with the proper attention to doing it right and not needlessly wasting resources, including money.

When I think of transportation and the transportation system, I think there are really three, interrelated dimensions to the situation: the technical, physical side; the business (that is, the economic) side; and the institutional side.

The physical interface is the most readily understood, and for us engineers, the most fun to deal with. To engineer is to identify and solve a problem, and the results are tangible. However, complex challenges, like the high level waste program, require close coordination. In its simplest terms, we need to ensure that various groups developing criteria for the cask don't end up with the inner diameter of the container being greater than the outer diameter—a physical impossibility but a time-consuming problem to resolve if the right hand doesn't know what the left hand is doing.

The Nuclear Waste Policy Act of 1982 (NWPAA) requires the U.S. Department of Energy (DOE) to accept discharged irradiated fuel from commercial nuclear power plants as part of its responsibilities to develop and operate one or more facilities associated with the permanent disposal of irradiated fuel in a geologic repository. Because of this Congressional mandate, DOE's plans are increasingly becoming the focal point of concerns regarding the transportation of radioactive materials. Because the transfer of spent fuel will take place at the nuclear power plant, spent fuel handling limitations (for example, cask weight limits, pool configuration, vertical clearance) as well as local transport conditions (for example, local access roads and bridges, rail facilities, barge capability) that currently exist at each commercial nuclear power plant will have an impact on the design of the

federal waste management system. It goes without saying that it is equally important to take into account overall utility system costs and ensure that necessary operating flexibility is provided.

This situation reminds me of an old Asian saying; "When elephants fight, the grass suffers; ... but when elephants make love, the grass also suffers." The federal government and its agencies are clearly the elephants, as are the state governments and their agencies—what the state elephants lack in size they certainly make up for in numbers. And who is the grass? With respect to the Nuclear Waste Policy Act, it's the utilities and their long-suffering ratepayers.

The second dimension of the challenge is the business side. In this dimension, I would include concerns relating to the choice of ownership of transport casks, the selection of the appropriate transport mode, route selection, the negotiation of shipping rates, and the actual conduct of transportation operations.

An obvious significant "business" concern is the regulatory fabric within which the business must be conducted. By that, I mean primarily the regulation of the design and construction of casks and transport vehicles and their operation. This necessarily involves principally the U.S. NRC and the U.S. DOT. However, many other federal and state agencies have or likely will attempt to have a role in that process.

The third dimension is the institutional situation, and this is where the real challenge lies. In this dimension, facts are frequently far less important than perception. The fact is that the public, in general, either doesn't know the facts about the safety record and extensive regulatory precautions associated with the transportation of spent fuel, or they don't care about those facts. I'm reminded of the person who, when told that 90% of all accidents happen within a 10 mile radius of one's home, sold his house to move to a different neighborhood. This is not to suggest that a properly conceived and executed public information program cannot mitigate the concerns of most of the general public. The record of the past several years suggests that solid performance, and effective public education, can produce very tangible benefits.

There are now more than 300 states, municipalities, bridge and turnpike authorities or other governmental entities that have enacted restrictions, and in some cases prohibitions, against the transportation of spent fuel, notwithstanding the very favorable statistics associated with the shipment of spent fuel compared to the shipment of other hazardous materials, or for that matter any types of materials. One must also consider the insistence by most railroads on the imposition of a long list of special conditions on shipments of spent nuclear fuel, which seems based in large measure on the railroads' perception of what the institutional issues (for that, read "public concerns") are.

When I think of transportation restrictions, I'm reminded of the 1902 Nebraska law that required an automobile driver, upon approaching a team of horses, to stop and cover his vehicle with a camouflaged tarpaulin; if the horses balked at passing, the driver was required to, and I quote, "take his machine apart as rapidly as possible, and conceal the parts in the grass." Overreaction? Yes! Understandable? Also, yes ... because the legislators, who, contrary to public belief are really just people (rather than minor deities), were responding to the unknown, to the feared.

The decision-makers and scientists in the nuclear industry, and government officials, are not respected as the holders of the eternal truth. There is no evidence, however, that they are not, in general, dedicated, competent people doing a frequently thankless job. Unfortunately, the rate of problem creation seems to be significantly greater than the rate of problem resolution. An important fact of life that must not be overlooked is that those who oppose a particular site or facet of transportation activities can file a lawsuit a month, and they only have to win one to cause a significant perturbation in the system and the schedule, while those trying to make progress have to win every single one of the battles in which they are joined. DOE's responsibilities under the NWPA to Congress, the utilities and the public put them in a unique situation. It's not unlike that

of a battlefield commander who is required to call periodic meetings with the enemy to ensure that the enemy's weapons, and ammunition, are properly allocated.

Comedian Fred Allen once defined a conference as "A gathering of important people who singly can do nothing, but together decide that nothing can be done." Not an unreasonable observation, but not necessarily a valid prophecy, particularly with the caliber of people at this conference. It behooves all of us to work together to try to identify the depth and breadth of each of the dimensions of the transportation situation I've described and to work together to resolve the resulting issues.

One of the great philosophers of modern time in America, in my judgment, was a possum in the cartoon strips named Pogo. He is most noted for observing that "we have met the enemy, and he is us." But when I think of the situation in which we in the nuclear industry, and particularly those involved in transportation, find ourselves, I take solace in a different, less well known, of Pogo's observations that, and I quote, "What we are surrounded with is insurmountable opportunities."

Thank you very much.

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