



Nuclear Energy Information Service

Illinois' Nuclear Power Watchdog for 26 years

Office and Mail: 3411 W. Diversey Avenue, #16, Chicago, IL 60647-1245
(773)342-7650; -7655 fax

www.neis.org

neis@neis.org

ANALYSIS OF HB2971 AMENDMENT 1

April 11, 2008

Prepared by David A. Kraft, Director

Nuclear Energy Information Service (NEIS) is a 27 year-old nuclear power watchdog organization based in Chicago. We wish to register our opposition to the proposed HB2917 Amendment 1 to revise the Public Utilities Act, introduced on April 1, 2008 by Rep. JoAnn Osmond (61st Dist., Antioch). This Amendment would repeal a moratorium (hereafter referred to as the Moratorium) on the construction of new nuclear reactors in the State of Illinois. For the reasons stated below this ill-conceived effort adds nothing of benefit to Illinois, its citizens, environment or economy; while contributing greatly to potential public harm. The measure should be rejected.

I. General Considerations:

A. The original Purpose and continued Necessity for the Moratorium have been justified by experience.

The original Moratorium language (Sec. 8-406.c) in the Public Utilities Act was enacted in 1987 to protect the Illinois public from the hazards associated with the excessive buildup of high-level radioactive wastes (HLRW) generated by nuclear reactors within Illinois borders. The 1987 suspicions that the federal government would not provide a viable operating permanent deep-geologic disposal facility for these wastes by 1998 proved correct. Currently no "demonstrable technology or means for the disposal of high-level nuclear waste" exists. As a result over 8,000 tons of "spent" reactor fuel are now in temporary storage within Illinois' borders at sites operated by Exelon Corporation (6 reactor sites) and General Electric Corporation (the GE Morris Operation – GEMO). That inventory expands by roughly 600 tons per year as Exelon's 11 operating reactors create more spent fuel.

For once foresight and hindsight matched perfectly – the Moratorium currently provides a valuable, realistic benefit to Illinois by insisting on corporate and governmental accountability and responsibility to reduce the harm to Illinois associated with the generation and *storage* of high-level radioactive wastes. As in many other industries, if you cannot demonstrate that an operational *disposal* system is available and working to handle wastes, you are not permitted to create more of the wastes. While existing reactors are granted an exemption from this common-sense dictum, adding to the inventory by building more reactors sensibly is not exempt.

The situation has not changed. The federal government indicates that a permanent deep-geologic disposal facility will not be available until 2017 at the earliest – *assuming* that the controversial and defective Yucca Mt. Nevada site is selected by the Dept. of Energy (DOE) to serve in this capacity. There is strong reason to believe that Yucca Mt. may ultimately be rejected, necessitating a new and further time-consuming search for a new site on which to build such a facility.

Therefore, the conditions the Moratorium was designed to address continue to persist, and because of the interim build-up of spent-fuel at Illinois reactor sites and delays in opening a permanent disposal facility, they are actually worse. It is therefore highly illogical to repeal the Moratorium at this time.

B. The Moratorium has not inhibited the development of nuclear power.

The notion that the existing Moratorium somehow has inhibited the growth of the nuclear industry in Illinois has no basis in fact:

1.) As an April 7, 2008 legislative analysis done for the Committee on Natural Resources of the California State Assembly points out:

Many other states enacted conditions, moratoria or bans (e.g. Connecticut, Illinois, Kentucky, Maine, Massachusetts, Minnesota, Montana, New Jersey, Oregon, West Virginia, Wisconsin) in response to the economic and environmental problems plaguing nuclear power in the 1970's. ***However, nuclear power has not thrived in the many states without any legal limitations on its development.*** [1- emphasis ours]

The main reasons for nuclear power's lack of expansion remain its lack of public acceptance, high construction cost, and unresolved waste issues.

It should also be noted that the two bills introduced in California attempting to repeal their Moratorium – AB1776 and AB2788 -- were both soundly rejected by the California State Assembly the week of April 7, 2008.

2.) The Moratorium has not prevented Exelon from spending over \$1,000,000 to process its Early Site Permit before the federal Nuclear Regulatory Commission (NRC) for a proposed reactor at the current site of the Clinton-1 reactor in central Illinois. This money was spent with Exelon's full recognition that the Illinois Moratorium existed. The Moratorium appears to have had no inhibitory function whatsoever on stifling Exelon's intentions or plans.

3.) Three cancelled reactors in Illinois (Clinton-2; Carroll County 1 & 2) were the result of corporate decision making, not the result of the Moratorium. Evidently nuclear power had considerable downsides at play long before the enactment of the Moratorium in 1987.

C. HB 2971 Amendment 1 -- Task without a Mission, Solution without a Problem

It is worth examining the current energy situation in Illinois before deciding to repeal this Moratorium:

- No utility has definitively expressed intent to actually build a new nuclear reactor in Illinois.
- Illinois does not currently suffer from an energy shortage; and the recently passed Renewable Energy Portfolio Standard indicates that by 2020, 25% of existing capacity MUST be from renewable sources – largely yet to be constructed. This implies that an active plan is already in place to meet Illinois's energy needs at roughly 2% growth per year from new renewable energy resources. Therefore, no energy shortage is anticipated.
- No foreseeable solution to the nation's HLRW problem is envisioned much before 2017; meaning that the negative conditions the Moratorium was created to address still exist and continue to worsen.

Given these existing conditions, repeal of the Moratorium is a "solution" in desperate need of a problem to solve.

II. Specific Concerns relating to repeal of the Moratorium

A. High-Level Radioactive Waste (HLRW) Situation:

The U.S. Dept. of Energy (DOE) does not expect to have a functional deep-geologic HLRW repository in operation before 2017 at the earliest. This assumes that the controversial site at Yucca Mt. NV is chosen for this facility. There is no reason for optimism for this assumption:

"But [DOE director of the Office of Civilian Radioactive Waste Management (OCRWM), Edward] Sproat said the Department has abandoned its "best achievable" goal of having a repository opened by 2017. Now, he said, DOE is reluctant to set a new target.

"A firm date cannot be set until the funding issue is resolved," Sproat said in a speech to the National Association of Regulatory Utility Commissioners, the organization of state public service officials." [2]

As a result it is likely that HLRW will continue to build up at reactor sites across the nation where the wastes will have to be temporarily stored.

The situation is made worse by NRC granting 20-year operational license extensions to aging reactors, such as Exelon's Dresden 2 & 3, and Quad Cities 1 & 2. Exelon has announced it will seek license extensions for its other operating reactors as well. This will result in more HLRW being created, and by necessity, stored at reactor sites, which in Illinois are along major rivers.

Exelon and other utilities have sued the DOE for its failure to take title and possession of the HLRW in 1998 as originally agreed. The utilities seek compensation from the nuclear waste funds collected to at least store these wastes on site until such time as a permanent national disposal facility is in operation. Pro-nuclear advocate Sen. Pete Domenici has stated he intends to divert funds out of the nuclear waste fund to examine options other than Yucca Mt. [3] These financial diversions will have an effect on the ability to construct a facility anywhere.

The premature addition of NEW nuclear reactors into this chaos will only add to the national problem, and to the constantly growing Illinois HLRW inventory piling up at Exelon's reactor sites.

B. Costs

1.) *HLRW*: As described above not only are the costs escalating for the proposed Yucca Mt. facility (estimated to reach \$50 billion at completion), but payouts to nuclear utilities are expected to reach over \$7 billion in storage fees under the most optimistic (and totally unrealistic) scenario of an operating facility by 2017:

“If the repository opens in 2020, the damages would come to about \$11 billion, [OCRWM director Edward Sproat III] said, and for each year beyond that, about \$500 million more. The industry says the total could reach \$35 billion.

“The rate-payer has paid for it,” said Michael Bauser, the associate general counsel of the Nuclear Energy Institute, the industry's trade group. “The Department of Energy hasn't done it, and *now the taxpayer is paying for it a second time.*” [4, emphasis ours]

Prematurely allowing new nuclear reactors to be constructed in Illinois without the demonstrated and operational HLRW solution in place – as the proposed repeal of the Moratorium would do -- will add to this double-penalty to Illinois ratepayers.

2.) *New Reactors*: Although not as bad as some of their contemporaries in the 1970s and 1980s, Illinois' existing reactors are no strangers to cost overruns. In this regard it is notable what *Crain's Chicago Business* quoted former Illinois Power Chairperson Wendell J. Kelly telling his shareholders in 1982:

“If I knew (10 years ago) what I know today, we (Illinois Power) wouldn't have started a nuclear plant. And if I had to make the decision today, Clinton II (a second nuclear unit not yet started) would be over.” [5]

The Clinton-1 reactor project ballooned from an initial estimate of \$429.4 million to a completion cost of over \$3 billion when completed seven years behind schedule in 1987. The Clinton-2 project was in fact canceled in 1983.

Today, the nuclear industry claims to have become more efficient in new construction, and NRC has streamlined the regulatory process to aid nuclear industry construction ambitions. Costs are supposed to be lower; construction times less; and standardization the buzz-word. Has this made a difference? Apparently not:

- The 2003 report on nuclear power done at MIT predicted the costs for a 1000 mW nuclear reactor to be \$2 billion
- A 2004 report done at the University of Chicago estimated a cost of \$1.5 billion for a 1000 mW reactor
- A January 2007 estimate from the CEO of Duke Energy placed the estimate at \$2.6 billion [6]
- A joint fact-finding seminar moderated by the Keystone Center in June, 2007 estimated that the real costs for construction would be in the range of \$3.6 - \$4.0 billion [6]
- Constellation wants to build a \$5 billion, 1600 mW reactor next to its Calvert Cliffs nuclear station in Lusby [7]
- An October 2007 estimate from Moody's placed the costs at \$5.0 - \$6.0 billion per 1000 mW [6]

- In March/April 2008, Florida Power and Light proposed building two nuclear units totaling 2200 mW for a cost of \$24 billion -- \$ 5,780/kW to \$8,071/kW depending on the scope of the project and inflation. [8]

While one can quibble over the differing assumptions built into the estimates as an explanation for their diversity, the *trend* seems clear – the newer the estimate, the higher the projected cost for new nuclear reactors.

Nuclear advocates might simply write these estimates off as merely being paper projections, since no US company has started let alone completed construction of a new reactor. However, the real world seems to bear out these numbers, and even the old trends of cost-overruns and delay. The Olkiluoto -3 EPO reactor being built in Finland by the French company AREVA has hit considerable delays and cost overruns:

“Analysts have estimated the cost of the overruns at €1.5 (\$2.37) billion, half the reported €3 (\$4.74) billion value of the project. The plant is not expected to open until 2011, compared with the initially scheduled date of 2009.” [9]

Finally, while one can attempt write off the mounting negative image of new nuclear construction as merely an artifact of the anti-nuclear movement, it would be of use to consider the words of Jeffrey Immelt, chairman and chief executive of General Electric, which itself is a nuclear reactor manufacturer:

"If you were a utility CEO and looked at your world today, you would just do gas and wind," Mr. [Jeffrey] Immelt says. "You would say [they are] easier to site, digestible today [and] I don't have to bet my company on any of this stuff. You would never do nuclear. The economics are overwhelming." [10]

Immelt went on to state his belief that only a third of those 32 reactors being proposed today in the US would come to fruition. [10] This sentiment was echoed by Charles Pardee, chief of nuclear operations for Exelon Nuclear in his remarks at the Deane Conference on the Future of Nuclear Power at lake Forest College, March 27-28, 2008. [11]

C. Security

Every Exelon reactor in Illinois is between 6 and 27 minutes of normal-looking flight time to O’Hare Field – the world’s busiest to second-busiest airport [*see map at end of Report*]. NEIS has long been critical of the NRC’s lack of concern over the susceptibility of not just reactors, but the far more vulnerable HLRW spent-fuel pools and dry casks to accidents and terrorist attacks involving the use of aircraft. [12] This concern was underscored last year with the goodwill arrival of the French Airbus A-380 aircraft at O’Hare Field – all 500 tons and 300,000 litres of aviation fuel worth of aircraft. It is NEIS’ contention that, accelerated to the speeds estimated for the aircraft striking the World Trade Towers and the Pentagon [13], crashes involving such aircraft would shred Exelon’s Illinois spent-fuel pools and initiate fires that would distribute the sizeable radioactive inventory of the spent-fuel pools into the surrounding countryside.

To date NRC has refused to consider such accident scenarios, considering them “unlikely.” This is nearly the exact same language used by Condoleezza Rice in describing her thinking about the World Trade Center and Pentagon attacks. NEIS submits that whatever has already happened is therefore possible, and not unlikely.

NRC has also refused to consider enhanced onsite HLRW storage techniques suggested by the environmental community described as “HOSS” -- “hardened on-site storage.” The HOSS proposal acknowledges that we must make the best of the bad alternatives for HLRW management the regulators, the government and the nuclear industry have foisted upon the public, and responsibly and safely maintain the HLRW at reactor sites until it can be permanently disposed of. But it also acknowledges the inadequacy of the current methods used by the nuclear industry and licensed by the NRC.

This unwillingness of the NRC regulators to actually pro-actively regulate on so serious and nationally sensitive an issue is a disturbing indication of how dysfunctional the NRC truly is. In June 2006, the 9th Circuit Court of Appeals ruled that the Nuclear Regulatory Commission erred when it refused to consider additional security risks when it ignored NEPA and licensed a high-level radioactive waste facility on the California coast. [14] Regrettably, this is a long standing pattern for NRC. That the NRC had to be forced by the Courts to regulate on issues of reactor and HLRW security bodes ill for Illinois -- the most nuclear reliant State in the US. It shows that the NRC is more inclined to support industry interests

over those of state and local jurisdictions. Under such an abdication of responsibility, the State of Illinois must take the initiative to look out for its own interests; it can and should expect no help from the federal NRC.

Regardless of whether or not the NRC and Exelon take more responsible action for HLRW onsite storage, premature construction of new reactors with HLRW stored onsite makes Illinois far less safe, and adds to the risks already present.

D. Water issues

As mentioned above all Illinois operating reactors are adjacent to major Illinois river networks. New reactors would also be sited on these waterways, both to obtain water for cooling the reactor and to make steam, and to discharge heated water. In some cases cooling lakes are used to mitigate this heat discharge.

Several points relating to water use are worth bearing in mind, which apply not only to proposed new reactors, but to the existing reactors as well:

1.) *Siting*: By necessity all of these reactors lay in flood plains. This makes them susceptible to potential flooding, although this concern is required to be examined in the licensing process. With the shift in climate due to global warming, both precipitation amounts and severity/frequency of events are expected to be far more unpredictable. Current climate models predict more precipitation in the Midwest/Great Lakes Region; however, this increase is expected to come in more powerful and less-frequent deluge-type events. This kind of precipitation pattern will alter flood patterns; probably making them worse and more severe, and more frequent than before. This in turn has an effect on the functionality – or desirability -- of siting reactors (and their accompanying HLRW storage facilities) on our river systems.

2.) *Heat load*: Historic evidence is already available demonstrating that nuclear reactors in Illinois operate poorly under conditions those resembling a global warming world. The summer of 1988 (10 days > 100° F.; 30+ days > 90° F.) saw river levels and volumes severely depleted. As a result over 100 days of reactor operations were either curtailed to no more than 30% operating capacity; or saw total shutdown of some reactors. [15] This was because the discharge water into the rivers was too hot, and exceeded EPA standards for heat load. Thus, when the reactors were needed the most to provide load for air conditioning, they were rendered useless by – the weather; weather which resembled what is predicted in a global warming Midwest.

This situation was nearly repeated in the drought year of 2005; and for a brief period in 2006. EPA was considering the shutdown of some Illinois reactors. Across the Lake in Michigan, the Donald C. Cook reactors automatically shut themselves down during the 2006 summer heatwave because the internal temperatures in the reactor containment buildings exceeded safe levels for safe operation of the reactors. The reactor experience in Europe in 2003, 2005 and 2006 (Spain, France, Germany, several East European countries) was similar: during the drought and heatwaves, reactors were either allowed to exceed thermal discharge limits (essentially killing the rivers locally and downstream), or they had to shut down when they were needed most.

Adding more reactors prematurely to a river network already at serious risk due to climate change will only worsen this already-experienced situation. The only possible solution to protecting the rivers is to add enormous costs to the new reactors for different kinds of cooling systems. Yet, these additional costs defeat the very purpose for which the reactors were supposed to be built – low-cost baseload power.

Finally, the new advanced reactor designs that have the possibility to use less water are not those being chosen by nuclear utilities today, either in the US or internationally.

E. Global warming and nuclear power

From the previous sections B.2 (New Reactor Costs) and D.2 (Water-Heat Load), it can be readily seen that new reactors in a global warming world appear to be a lose-lose investment. Reactors are too costly and take too long to build to make an appreciable difference on global warming efforts. Further, they only remove about 1/6 amount of global warming effect per dollar spent compared to energy efficiency and conservation. [16]

If nuclear experts Jeffrey Immelt of GE and Charles Pardee of Exelon are correct in their predictions, then the US nuclear industry will only add 10 reactors by the year 2020 at the earliest. This represents an incremental increase of 9.5% in the number of nuclear plants over present, assuming no current reactors close. This cannot amount to more than a 2% increase in electrical generation over today's total US production values – hardly enough to make any appreciable dent in the nation's – let alone the world's -- greenhouse gas production. Mr. Pardee admitted [17] that this minuscule increase in generation by 2020 would not enable the world to go from 450 ppm of CO2 down to 350 ppm – the level we must achieve by 2017 to stabilize atmospheric carbon currently advocated by NASA's James Hansen.

What new nuclear reactors WILL achieve however is far more damaging from a global warming perspective:

- Reactors will hog up enormous quantities of limited investment capital and construction resources, making both unavailable for other more productive and effective energy resources like efficiency and sustainable renewables;
- New reactors will monopolize a significant market share of electrical demand in the region, denying this share to renewable energy resources, thus denying them the ability to reduce costs through economies of scale;
- By these two actions, new reactors would in essence undercut – perhaps deliberately – the Renewable Portfolio Standard legislation passed in Illinois in 2007, calling for 25% of the electricity produced in Illinois to be from renewable energy resources by the year 2020.

III. Conclusions and Recommendations

A. Conclusions: Given these considerations NEIS concludes the following:

- HB 2971 Amendment 1 is purposeless legislation, meaningfully or rationally addressing no present or future urgent problems, while exacerbating the historic problems regarding HLRW disposal.
- Were it to pass, HB 2971 would have definite negative impacts on the economy, environment and the public health and safety of the people of Illinois.
- HB 2971 Amendment 1 directly – perhaps intentionally -- subverts the intent of the Renewable Energy Portfolio standard, passed by the Illinois Legislature in 2007.

B. Recommendations: NEIS makes the following recommendations:

- If it ain't broke, don't fix it. Leave the Moratorium on new reactor construction in place until such time as its conditions concerning HLRW disposal are met.
- Given the numerous drawbacks associated with the historic and future construction of new nuclear reactors in Illinois articulated above, to protect the economy, environment and health and safety of the Illinois public, the Legislature should consider strengthening such a Moratorium to add additional performance clauses regarding cost, water use and restrictions, and post 9-11 security assessment.
- Obey and enforce the law – aggressively implement the already passed 2007 Renewable Energy Portfolio Standard. Make it mandatory as a condition to do energy business in Illinois; and enact stiff penalties to utilities not in compliance towards achieving this final goal, and intermediate targets assessed in 3-year increments between now and 2020. The penalties if financial should be placed in an escrow account, dedicated to making re-investments in renewable energy resources and efficiency.

We are available to answer any questions this report may engender. Please feel free to contact us at our office by phone or e-mail. Visit our website for additional materials which are freely downloadable.

Ver. 4/11/08-b

SOURCES

1. Analysis of AB 1776 (DeVore) – As Amended: February 19, 2008; Prepared by: Lawrence Lingbloom / NAT. RES. for the ASSEMBLY COMMITTEE ON NATURAL RESOURCES, State of California, Date of Hearing: April 7, 2008.
2. “Lack of money spells uncertainty for Yucca nuke dump, DOE says,” *By Steve Tetreault, Stephens Washington Bureau, Las Vegas Review-Journal, Feb. 19, 2008.*
3. “Domenici pans Yucca-only approach -- New Mexico senator touts recycling,” *By Steve Tetreault, Stephens Washington Bureau; Las Vegas Review-Journal, Apr. 10, 2008*
4. “As Nuclear Waste Languishes, Expense to U.S. Rises,” Matthew Wald, *New York Times*, Feb. 19, 2008.
5. “IP Cool on Nuclear Plants,” *Crain’s Chicago Business*, April 19, 1982.
6. “Nuclear Power Costs: Higher and Higher,” *Science for Democratic Action*, V. 15, #2, January, 2008.
7. “Constellation nuclear plans in fiscal peril,” *Baltimore Sun*, July 23, 2007.
8. “FPL says cost of new reactors at Turkey Point could top \$24 billion,” *Nucleonics Week*, 02/21/2008.
9. “TVO says won't share nuclear reactor cost overruns with Areva,” *Forbes.com*: <http://www.forbes.com/markets/feeds/afx/2007/09/28/afx4165822.html> ; AFX News Limited, Sept. 28, 2007.
10. “US utilities are skeptical over nuclear energy revival,” *Financial Times*, Nov. 19, 2007
11. Remarks by Charles Pardee, Chief Nuclear Officer, Exelon Nuclear, at the Deane Conference on the Future of Nuclear Power, March 27-28, 2008, Lake Forest College, IL. Conference materials to be posted online soon at: <http://www.lakeforest.edu/academics/deane>
12. See NEIS Testimonies to the NRC on NEIS website: <http://www.neis.org/literature/Reports&Testimonies/NEIS-Comments-on-Aircraft-Attacks-to-New-Reactors-12-17-2007.pdf>
And our reactor-(in)security page at: <http://www.neis.org/Content/NuclearInsecurity.htm>
13. The 911 Commission Report, <http://www.9-11commission.gov/report/911Report.pdf>
14. Mothers For Peace, et al, v. U.S. NRC; 2006
15. Can be verified by examining the NRC Daily Reports sheets, summer of 1988.
16. Keepin, Bill, Rocky Mt. Institute, “Greenhouse Warming: Efficient Solution or Nuclear Nemesis?”, testimony before U.S. House Subcommittee on Science, Research and Technology, June 29, 1988.
17. Private conversation with Charles Pardee, Chief Nuclear Officer, Exelon Nuclear, at the Deane Conference on the Future of Nuclear Power, March 27-28, 2008, Lake Forest College, IL

NUCLEAR ILLINOIS –

SHOWING FLIGHT TIMES FROM O'HARE FIELD TO ILLINOIS NUCLEAR REACTOR SITES

