# OHIO HOUSE OF REPRESENTATIVES

## HOUSE BILL 104

*Advanced Nuclear Technology Helping Energize Mankind (ANTHEM)*

**TESTIMONY TYPE:** Proponent

**TESTIMONY DATE:** November 22, 2020

**ADVOCATE NAME:** David Amerine

**TESTIMONY:**

Dear Members of the Energy and Natural Resources Committee,

My name is David Amerine and I want to testify regarding the energy source, nuclear power.

In an effort of full disclosure, I was an unpaid volunteer consultant to the eGeneration Foundation until my wife was diagnosed with ALS in November of 2014 and I became her full time caregiver. The eGeneration Foundation was a non-profit organization mentioned in the original submission of HB104 and, if passed, eGeneration would have initially acted as an agent to market the State initiated for-profit Public Benefits corporation. For this marketing effort, they would have received compensation. I am unsure of where that relationship stands today and am no longer involved.

I retired from the nuclear industry in 2011 after a 45-year career in which I started as an operator and rose to executive positions for several companies including my last job as President of Nuclear Fuel Services (NFS) located in Erwin, TN. NFS is the sole provider for our Navy's nuclear fuel for its submarines and aircraft carriers. I am a graduate of the United States Naval Academy and served in the nuclear submarine force before entering the civilian nuclear industry. That career was split about evenly between the commercial nuclear industry and the Department of Energy nuclear complex. I was a member of the new leadership team or the new leader brought in to lead the recovery of eight different nuclear power plants or nuclear projects that found themselves in some degree of management or operational difficulties. Besides NFS, those facilities include the Replacement Tritium Facility, which at one time was our nation's only source of tritium for the nuclear weapons program, the Defense Waste Processing Facility (DWPF), which still is the largest vitrification facility in the world for immobilizing highly radioactive waste in bora-silicate glass, and the Davis-Besse Nuclear Power station in the mid 80's and the Millstone Nuclear Power Station in the late 90's.

I have dedicated my life to nuclear endeavors and, of course, I believe very strongly that nuclear energy should be an important part of our national energy portfolio going forward for the following reasons:

1. Nuclear plants in the U.S. are fundamentally safe
2. Nuclear plants are environmentally benign
3. Nuclear power plants are extremely reliable
4. Over the life of the plant, nuclear plants are economically sound
5. Being a world leader in nuclear technology is strategically vital to the U.S.
6. Nuclear power is the foundation for other nuclear applications like medical isotopes
7. The next generation of reactors are passively safe and more economical
8. Nuclear waste is the good news with respect to electrical generation because, relatively speaking there is so little of it produced and we know exactly what to do with it as we have been doing safely at DWPF since 1997.
9. There is enough nuclear fuel to last very, very long time

The safety record of nuclear energy in the United States is unmatched by any other industry. No civilian has ever been harmed by nuclear generation of power in this country. The workers at nuclear facilities are the best trained, most tightly screened, highest monitored of any workforce anywhere. The nuclear industry created an instrument for self-monitoring and improvement called the Institute of Nuclear Power Operations or INPO. As a result of information sharing, increased training, increased oversight, using lessons learned at one plant to benefit all other facilities, the safety and efficiency statistics have steadily improved ever since. Just one example would be capacity factor (CF), a measurement of generation reliability and output, which for nuclear plants now averages between 90 and 95 % year in and year out. The next most reliable CF belongs to coal fired plants at ~55%, then natural gas at ~40%.

Let me briefly set the national context. While the numbers may vary at any point in time, there are ~450 operating reactors in 36 different countries in the world today. Nuclear power provides ~12% of the global electrical generation. Before the glut of natural gas and several premature reactor plant shutdowns, nuclear provided ~20% of the electrical generation in the United States. A total of 65 countries have expressed an interest to the IAEA to build new reactors. Presently there are 60+ reactors under construction and another ~160 planned over the next three decades. Of those significant numbers, in the United States only two reactors are being built and another 2 to maybe 4 are potentially under consideration.

One thing these numbers indicate is that the United States is losing its position as the leader of nuclear technology. We exported our technology in the beginning of the nuclear era and provided expertise, equipment, fuel, and other commodities that other countries are now providing. There is one other very, very important thing the United States also provided that may suffer as the leadership shifts to other countries, and that is the standards in safety, quality, and conduct of operations. These standards are what

keep nuclear power plants safe and reliable. Chernobyl and Fukushima are good examples of what can happen when those standards suffer.

The new reactor designs, called Generation IV, incorporate passive cooling systems, which are functional for >72 hours following a worst case upset condition without operator or equipment intervention, even with full station blackout, and can be maintained indefinitely with simple operator actions. Gen IV nuclear plants can demonstrate passive safety features, which could lead to the potential elimination of extremely robust containment structures and complex, redundant safety systems, all of which will greatly reduce costs and improve safety. Additionally, Gen IV designs lend themselves to in-factory assembly and Small Modular Reactor (MSR) systems, further reducing costs while adding safety and flexibility.

The barriers to deployment of new designs are significant with both technical and institutional challenges to overcome. These challenges range from licensing issues to fuel and materials research. The size of investment and the payback periods are beyond typical venture capital horizons, making the investment challenges higher than in other industries or endeavors, therefore, necessitating some government partnering. Government support and resources are needed to facilitate demonstration of new engineering, regulatory, and business models for new reactor designs, new construction approaches, licensing streamlining, and active promotion. An aggressive public/private partnership to deploy these new designs is needed.

This is where HB104 comes in. The proposed innovative approach to address the issues above can abet the efforts of the Department of Energy and give some relief to the Nuclear Regulatory Commission. It will definitely put Ohio in the forefront of resurrecting the vital, even essential, resource nuclear knowledge represents across a spectrum of important fields, including energy and medicine. For any of these scenarios to come to pass, there needs to be leadership resolve and understanding, creating a national will to support the investment, research, and long term strategy to make these next generation reactors a reality. This is a situation that cries for vision and leadership. Ohio can provide both.

Thank you for allowing me this opportunity to provide testimony for HB104.


## David Amerine

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