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MEMORANDUM

Date: July 8, 2020

To: The Ohio Manufacturers' Association

From: John Seryak, PE and Ryan Schuessler (RunnerStone, LLC)

RE: Overview of Substitute House Bill 104

Substitute House Bill 104 (Sub. HB 104) was successfully passed out of the Ohio House of Representatives on June 9, 2020. Sub. HB 104 establishes the Ohio Nuclear Development Authority (ONDA) within Ohio's Department of Commerce. The ONDA is charged with making Ohio a leader in "new type" advanced nuclear reactors, the commercial production of medical isotopes, and in nuclear waste reduction and storage. To carry out its mission, the ONDA is given the charge of developing public-private partnerships, developing education programs, and authorizing joint-development agreements. In addition, the ONDA is given the weighty responsibilities of approving nuclear reactor component designs, assuming regulatory powers from the federal Nuclear Regulatory Commission (NRC), the Department of Energy (DOE), and the US military, and superseding radiation control duties from the Ohio Department of Public Health. ONDA is also intended to "address matters of public necessity for which public moneys may be spent and private property acquired." ONDA's decisions would be made by a nine-member board comprised of industry appointees.

Sub. HB 104 offers multiple serious concerns for manufacturers. Sub. HB 104 is circumspect in how ONDA would influence expenditure of public moneys and acquisition of private property. Sub. HB 104 does not describe which regulatory powers ONDA would assume from the US military, the NRC, the DOE, and the Ohio Department of Public Health, and ONDA does not have staff of its own for such serious regulatory duties.

It should be noted that Sub. HB 104 appears to be primarily supported by advocates of thorium and molten salt reactor nuclear technologies. The federal government halted development of these technologies in the 1960s, and Oak Ridge National Laboratory states that the designs "are not fully mature" and have a wide range of known hazards and unknown risks.

In the remainder of this memorandum we describe Sub. HB 104's provisions, list concerns for manufacturers, and provide context and background of the bill's proponents and molten salt reactor technology.

Establishment of the Ohio Nuclear Development Authority

Sub. HB 104 establishes the Ohio Nuclear Development Authority (ONDA) within the Department of Commerce. The founding purpose of the ONDA is twofold. First, the ONDA is to be an educational resource to the United States Nuclear Regulatory Commission (NRC), all branches of the military, and the United States Department of Energy (DOE) regarding advanced-nuclear-research reactors and isotope technologies.[1] Second, the ONDA aims to make Ohio a leader in the development and construction of new-type advanced-nuclear-research reactors; a national and global leader in the commercial production of medical isotopes; and a leader in the research and development of high-level-nuclear waste reduction and storage technology.

The ONDA is given the following duties to carry out its purposes, including:[2]

- fostering partnerships between states public institutions of higher education, private companies, federal laboratories, and nonprofit organizations,
- development of education programs related to Ohio's isotope industry,
- assumption of regulatory powers delegated from the NRC, DOE, military, or other similar agency governing the construction and operation of noncommercial power-producing nuclear reactors and the handling of radioactive materials,
- acting in place of the governor in approving joint-development agreements, and
- approving designs for the commercialization of nuclear reactor components.

The powers conferred to the ONDA are considered "the performance of an essential governmental function and address matters of public necessity for which public moneys may be spent and private property acquired."[3]

Sub. HB 104 states that the authority shall be made up of nine members, representing nuclear engineering and manufacturing stakeholder groups including safety, industry, and engineering research and development.[4] These members are appointed by the governor and confirmed by the senate. Members of the authority are not compensated for their service and are not required to forfeit their current employment.[5]

Concerns with Sub. HB 104

<u>ONDA Authority Supersedes the Ohio Department of Health for the Radiation Control Program</u>

Chapter 3748 of the Ohio Revised Code details Ohio's radiation control program, which includes in its purview the licensing and inspection of handlers of radioactive material, identifying levels of radiation that constitute an unreasonable or unnecessary risk to human health or the environment,

[1] R.C. 4164.10
[2] R.C. 4164.11
[3] R.C. 4164.04
[4] R.C. 4164.05
[5] R.C. 4164.08

standards for decommissioning funding plans, and procedures for filing complaints among other responsibilities.[6] Sub. HB 104 adds language giving rulemaking precedence to the ONDA over the Department of Health.[7] This is a shift in responsibility for protecting the public welfare from the Ohio Department of Health to the ONDA, an entity comprised of nine private citizens representing nuclear industry stakeholders.[8]

Of special note is that Ohio's two nuclear power plants are required to maintain decommissioning funds, and that whether their decommissioning plans were fully funded was a point of contention in the recent FirstEnergy Solutions (now Energy Harbor) bankruptcy. The ONDA would have some influence over nuclear plant decommissioning funding plans.

ONDA Membership Results in an Inherent Conflict of Interest

The authority is comprised of nine members representing nuclear engineering and manufacturing stakeholder groups. These members are not compensated for their service and are not required to forfeit their position of employment to serve as a member of the authority. The members are granted regulatory authority over their own industry, creating an inherent conflict of interest.

Grants the ONDA Ability to Assume Regulatory Authorities

Sub. HB 104 is opaque regarding the limitations of the ONDA's powers and purview. The specific regulatory function of the authority is not outlined, and accountability measures are undetailed. However, ONDA is allowed to assume regulatory duties given to it by the US NRC, DOE, and the US military. The only accountability measure mentioned is the requirement of an annual report to be issued on the 4th of July[9]. Otherwise, the authority is given "extensive power to fulfill its nuclear technology purposes specifically with respect to advanced nuclear reactor commercialization, isotope production, and nuclear waste reduction."[10]

Positions the State of Ohio to Approve of Nuclear Reactor Component Designs

Sub. HB 104 proposes that the state of Ohio, via the authority, approve designs for a long list of advanced nuclear reactor components including reactors, core management technology, accident-management regulations, and storage of spent fuel among others. It is concerning that the state would be in the position of approving designs rather than the commensurate federal government agencies.

Defines ONDA Actions as an "Essential Government Function" Relating to Public Expenditures and Property Acquisition

As discussed, ONDA's duties are "the performance of an essential governmental function and address matters of public necessity for which public moneys may be spent and private property acquired." It is unclear what exactly it means to "address matters of public necessity", and what the

[6] R.C. 3748.04
[7] Sub. HB 104 PH R.C. 3748.23
[8] Sub. HB 104 PH R.C. 4164.05
[9] The 4th of July is a Federal and State holiday. Thus, it is not clear that the ONDA can issue its annual report on this day.
[10] LSC – Bill Analysis – Sub. HB 104 PH

public moneys are spent on, how those monies are raised and from whom, and how much money is to be raised.

As introduced to the House, Sub. HB 104 originally directed a $1 million annual budget specifically to an advocacy group called eGeneration, not including additional discretionary spending.[11] While this language was removed from the substitute bill, Sub. HB 104 does permit the ONDA "to foster innovative partnerships and relationships in the state and among the state's public institutions of higher education, private companies, federal laboratories, and nonprofit organizations, to accomplish the purposes set forth."[12] Thus, Sub. HB 104 would still permit the flow of public money to organizations, such as eGeneration, with unclear oversight or restraints outside of future legislative efforts.

Grants the ONDA the Ability to Acquire Private Property

Again, ONDA's duties are "the performance of an essential governmental function and address matters of public necessity for which public moneys may be spent and private property acquired." Sub. HB 104 is silent on why private property is needed, why it is needed to be acquired, how it will be acquired, how much public monies are needed, etc. Worryingly, as introduced, Sub. HB 104 explicitly gave the authority "the right of eminent domain in acquiring lands with which to meet its responsibilities as defined in this chapter."[13] This clause was removed in the sub bill as passed by the House.

It is unclear whether the classification of the ONDA's duties as essential government functions would allow for the acquisition of privately held property through eminent domain. The ambiguity is concerning in that the potential remains for the authority to procure property from private owners for the development of a test reactor or for the storage of nuclear waste.

Context and Background Information

Items Eliminated from Previous Iterations of Sub. HB 104

Significant changes were made to Sub. HB 104 from when it was first introduced to the House compared to the version introduced to the Senate. However, the intent behind the original language could remain. A few major changes are highlighted below.

- The ONDA was originally founded as a non-profit, not a state agency, funded by the solicitation of grants and aid and was explicitly granted the power of eminent domain in fulfillment of its purpose.
- A consortium was to be founded by the authority as a for-profit entity. The Treasurer of State's Office was required to provide an initial stock offering of 20 million shares at $50 per share – a $1 billion valuation. eGeneration would act as the agent of the consortium, able to encourage investment, educate the public, lobby the federal government, and expend Consortium funds

[11] Sub. HB 104 IN R.C. 4164.50
[12] Sub. HB 104 PH R.C. 4164.11
[13] Sub. HB 104 IN R.C. 4164.05

up to $1 million annually. A tax credit would be offered for investments in the Consortium.

- Finally, the creation of state run non-profit and for-profit organizations was intended to serve as a model to further the pursuit of innovative research and development for other industries in the state.

Background on Proponents and their Testimony

Most of the proponent testimonies (10/13) have some connection to the eGeneration Foundation, a 501(c)3 non-profit dedicated to the decentralization of nuclear reactor research and development.

eGeneration argues that the "DOE has not developed a common regulatory pattern with State governments for the research and development of new nuclear technologies…because no State has created an entity specifically tasked with asking the DOE to create these regulations."[14] Additionally, "prodding or signaling to the Federal Government is essential as the Federal Government and its agencies are never the first to move in granting such authority to a state without substantive state legislation passage."

eGeneration's testimony continues: "The eGeneration Foundation's discussions with the United States Department of Energy has led us to believe that there is support for the Federal government's decentralization of nuclear technology research and development. Passage of HB104 could position Ohio to be the first State in the union to take advantage of such decentralization efforts."[15]

Thorium advocate Don Larson extols an optimistic future resulting from Sub. HB 104: "There will be a company that develops the technology that gives us a Terawatt of electricity, abundant medical isotopes and global manufacturing advantages. It is inevitable that electricity becomes too cheap to meter."[16]

Background on Molten Salt Reactors (MSR)

A specific type of nuclear reactor, a molten salt reactor technology, is advocated for in proponent testimony. The concept of molten salt reactors was initially developed from the 1940s to the 1970s, starting with the 1946 Nuclear Energy for Propulsion of Aircraft (NEPA) and the 1951 Aircraft Nuclear Propulsion (ANP) programs.[17] The designs developed as part of these programs were leveraged in the Civilian Molten Salt Power Reactor program, and eventually lead to the Molten Salt Reactor Experiment (MSRE). The MSRE demonstration was considered successful, reached criticality in June of 1965 and was shutdown in December of 1969. The program was restructured to focus on tritium management and alloy development to address tellurium cracking, and then was terminated for budgetary reasons.[18] To date, "only two relatively small MSR test reactors have ever been operated."[19]

[14] eGeneration – https://egeneration.org/decentralization/
[15] Jon Morrow – Proponent Testimony
[16] Don Larson – Thorium and Molten Salt Reactor Association – Proponent Testimony
[17] History of the ORNL Molten Salt Program – Dr. Jess C. Gehin – ORNL
[18] History of the ORNL Molten Salt Program – Dr. Jess C. Gehin – ORNL
[19] Review of Hazards Associated with Molten Salt Reactor Fuel Processing Operations – ORNL – page 55

A recent study on the hazards associated with molten salt reactor fuel procession operations concludes that "fuel salt processing involves a wide range of hazards depending on the fuel salt, processing operation, fissile material concentration, radiation level, and presence of other toxic or hazardous materials." "Also, key reactor specific hazards such as inadvertent criticality while performing initial fuel transfer into the reactor vessel have no direct antecedents in solid fueled reactors." Finally, "MSR designs are not fully mature; nor are the designs for the primary and ancillary support systems for the synthesis and treatment of molten salt fuel."[20] Molten-salt reactors are often associated with using thorium as fuel.

A key takeaway for manufacturers is that thorium and molten-salt reactor technologies have not been developed for commercialization.

[20] Review of Hazards Associated with Molten Salt Reactor Fuel Processing Operations – ORNL – page 55