

Nuclear Energy Institute Comments on Michigan Nuclear Feasibility Study Report

Case No. U-21358

Submitted January 12, 2024

On behalf of the Nuclear Energy Institute, we appreciate the opportunity to review and offer feedback on the draft Nuclear Feasibility Study Report prepared by Enercon. Please see our comments and suggested edits below:

- 1) [Page 17] Figure 1 Diagram of a BWR from Wikimedia Commons [7] is misleading as it shows a condenser ahead of the turbines in the steam flowpath. The condenser would follow the turbines, typically shown below them in a diagram. See NRC examples here:
 - <https://www.nrc.gov/reading-rm/basic-ref/students/multimedia/animated-images-plants-pwr-bwr.html>
 - <https://www.nrc.gov/reading-rm/basic-ref/students/for-educators/03.pdf>
- 2) [Page 19-21] Section 1.5.b credits nuclear for being the most efficient land usage of different energy sources, but then notes there are additional land considerations for the EPZ. The text relevant to SMRs is noted below and does not note that the EPZ for SMRs could be the site boundary.

and public behavior to determine the needed EPZs. Through a review of five separate small modular reactor (SMR) technologies and previously approved early site permits by the NRC, their EPZ was reduced to a two to five mile radius, while still ensuring the public's safety [32]. This is a considerable decrease, a quarter of the land required, from the land usage for the current fleet of operating nuclear reactors and should allow for easier land management and siting of these future nuclear power plants.

The reference included is from 2020 so it predates the NRC SMR EPZ finding. The next paragraph in the document notes this point, but it becomes confusing and makes it seem like no one knows what the EPZ will be. We'd recommend the following text instead of the existing 1.5 paragraphs:

Small modular reactor (SMR) technologies have more inherent safety features than existing large light water reactors and are expected to have smaller EPZs, in some cases nothing extending past the site boundary, that still ensure the public's safety. This is a considerable decrease and should allow for easier land management and siting of these nuclear power plants.

- 3) [Page 25] Section 1.5.i, we recommend the following change: "Uranium can be found in deposits that are ~~most rocks and precious metals~~ mined from the earth, and once manufactured into a pellet..." It resolves a few issues with nuance.
- 4) [Page 28] Section 1.6.b, a sentence states, "There are technologically-achievable options to ultimately reduce the quantity of this waste if reprocessing/recycling were to become commercially viable in the U.S., which would require some shifts in federal policy." It would be helpful to add language to explain what federal policies would need to be changed. There is no law against recycling nuclear fuel in the U.S. and the

reference cites [Ref 72] which is an NRC webpage on the transportation of spent fuel. The authors may be alluding to DOE's involvement of spent fuel but it's not clear as currently written.

- 5) [Page 29] Section 1.6.c is misleading and should be rewritten. Most, if not all, the new reactors that will be available for commercial deployment in the U.S. will allow flexible operations. The current U.S. fleet was expected to only run in baseload operations and flexibility was not emphasized in the designs the way it was in other countries, such as France. The section could use more clarification as to when you're talking about existing reactors versus SMR technologies. We suggest deleting the sentence, "Additionally, with the fuel cycles of nuclear power plants, there is no economic incentive to operate at lower power levels to save fuel for later." Fuel is routinely inserted for multiple cycles of use precisely because core designers have an economic incentive to use this fuel in future cycles and smooth reactor neutronics. In fact, the very next sentence undercuts the preceding quoted sentence, "This characteristic of nuclear fuels causes operating cycles to be determined primarily by economics rather than solely on the basis of technological capabilities."
- 6) [Page 31] The parenthetical in the section title for 1.6.f "(We Almost Lost Detroit)" is alarmist and unnecessary. We suggest deleting it from the section title. The later treatment of the topic and reference to the book is fine with the provided context of the text.
- 7) [Page 32] What is the point of Section 1.6.g? EPZ is already covered elsewhere and it's not clear what it's trying to convey here.
- 8) [Page 38] Section 3.1.a incorrectly denotes the Fermi nuclear generating station as "...on the western shore of Lake Huron..." The plant is located on the western shore of Lake Erie.
- 9) [Page 39] Section 3.1.c on the Palisades nuclear plant mentions the restart but not that Holtec is already planning to build two SMRs here, which will nearly double the site's total generation capacity. The target commissioning date for the first SMR-300 is mid-2030s.
- 10) [Page 40] Section 3.2 includes a sentence that says, "It should be noted that the only reactor undergoing decommissioning currently is Palisades." The wording should be changed since Holtec has made clear its intent to restart the plant. Language should also clarify that Palisades is the only reactor "in Michigan" granted decommissioning status given that there are other reactors in the U.S. that are currently undergoing decommissioning.
- 11) [Page 66] implies that Fermi 3 did not receive its Combined Operating License (COL). This would be an incorrect interpretation as the Fermi 3 COL was issued May 1, 2015:
 - <https://www.nrc.gov/reactors/new-reactors/large-lwr/col-holder.html>
 - <https://www.nrc.gov/reactors/new-reactors/large-lwr/col-holder/ferm3.html>

We recommend rephrasing this sentence and noting the COL issuance date like other examples in this paragraph.

- 12) [Page 67] Section 4.1.a includes an overview and pictures of the GIF concept. We are unclear how this would be helpful to the reader given that many of these designs are not being pursued and will not be commercially available anytime soon. It seems like an unnecessary addition that will confuse the reader. A more helpful approach might be to focus on the leading designs being commercialized in the U.S.
- 13) [Page 73] Section 4.1.c has two mentions of “Project Pele,” one in the text and another in Table 4. Pele is the name of a DoD project and wouldn’t be applicable. However, referencing the civilian version of the technology “BANR” as done elsewhere would be appropriate.
- 14) [Page 74] Section 4.1.c, it’s noted that Ultra Safe Nuclear Corporation has five major projects in the U.S. and overseas to produce test reactors. This isn’t technically accurate. The first deployment can be characterized as a demonstration reactor (full scale), but the others are normal deployments moving along the learning curve. We recommend removing ‘test’ and restructuring the rest of the sentence, but the idea that these deployments will provide information that would make a deployment in Michigan easier is true.
- 15) [Page 76-81] Section 4.1.e provides summary information from the NEA SMR dashboard report on reactor designs being licensed and built outside the U.S. With no current plans to use these reactors in the U.S. market, it’s not clear why including this information in the report is helpful to decisionmakers in Michigan. This information continues in Tables 6 and 7. NEI does not agree with how all the information in the NEA report is presented generally since the various aspects of deployment readiness are not consistent in all countries. For the purposes of this report, the discussion should be limited to designs that have a reasonable prospect of deployment in the U.S.

Additionally, saying a Chinese, Korean, Argentina design, for example, is further along the regulatory process is meaningless especially when noting that deploying such a design in Michigan would require U.S. NRC licensing, not foreign regulatory licensing. We recommend removing these designs from the report, or regenerating the scores in the tables so that they are reflective of their applicability to Michigan. It’s noted in Section 4.3 but should also be here.

- 16) [Page 81-82] Section 4.1.f discusses licensing of SMRs, specifically Part 53 rather than the safety and security aspects of SMRs as noted in the title. It’s not clear why the Part 53 information is needed but may create an impression that this new licensing framework is a requirement to deploy SMRs, which is not accurate. If the intent is to highlight the use of risk-information in design (and licensing basis development), we suggest that this paragraph be adjusted to focus on the variety of methodologies available along the spectrum of “traditional deterministic” to “risk-informed, performance-based” (Licensing Modernization Project), and adjust the section title.

- 17) [Page 95] Section 4.3, the bullet on Microsoft says “soft plans” which is a strange statement considering they’re already partnering with Helion (a fusion company) on a PPA, and they already have hired staff focused on nuclear. We recommend deleting “soft.”
- 18) [Page 96-102] Section 5 discusses plant deployment timelines and proceeds to mix different designs and countries to state 114 months is the deployment estimate, which includes feasibility study and project plan. This work is primarily on large LWRs and doesn’t fully account for all the benefits of SMRs and microreactors, which is the focus of this report. EPRI is leading studies on nuclear island separation which would further reduce site-specific work scope and therefore reduce the overall project duration. It may also be helpful to reference NEI’s report and efforts on construction best practices, which will help new reactors apply lessons learned and achieve faster deployment:
- <https://www.nei.org/news/2022/ask-an-expert-new-nuclear-power-construction>
- 19) [Page 101] Figure 12 is confusing given that it’s been copied from a different paper and invites misinterpretation. The longest bars on the chart are cases in which a plant began construction, construction was halted and only later (sometimes much later) restarted. For example, Watts Bar 2 was not being actively built for more than three decades. We don’t see how including this figure is useful for Michigan decision making.
- 20) [Page 120] In light of the Michigan Clean Energy Future Package, we recommend including a reference to the Vibrant Clean Energy report which examines the role of nuclear in a carbon-free grid:
- <https://www.vibrantcleanenergy.com/media/reports/>