PRE-LICENSING REVIEW OF NEW NUCLEAR POWER DESIGNS, WHAT IT MEANS FOR UKRAINE AND THE WORLD

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With challenges concerning climate change, arise new and unique solutions to de-carbonizing energy. Solar panels, wind turbines, biofuels and other so called "renewable" energy sources currently hold trend for new power stations. However, they come with a few drawbacks such as lack of ability to provide reliable base power. For such applications large plants that are working constantly are best. Such plants include big coal-fired plants, gas-fired plants and nuclear power plants. First two, obviously do not provide carbon free energy, but nuclear might be the answer after all.

With concerns over safety and high price new and new solutions pop up in the nuclear industry – Generation IV. Small Modular Reactors, Micro Reactors, new types of fuels. There are 100s of new projects currently in development. The principle of permissibility (Law of Ukraine, Article 5) requires that all nuclear installation go through a licensing process, for their construction and operation. This process might take quite a lot of time, money and in some cases (for licensing in US (US NRC, 10 CFR 2.704) for example) provide a proprietary information to the public view. For easing of this process additional optional service is often provided by licensers – Pre-licensing.

Pre-licensing is a service that allows for analysis of design on early stages, and allows to rapidly develop systems that are compliant with regulatory requirements. This requires much less money, allows to begin work on licensing topics much earlier, and provides safety to proprietary secrets of plant designers. Currently there are quite a few countries that provide pre-licensing overview: United States with Nuclear Regulatory Commission (US NRC Site, 2023), Canada with Canadian Nuclear Safety Commission (CNSC Site, 2023), United Kingdom and as of recently

Ukraine through State Nuclear Regulatory Inspectorate of Ukraine. Ukraine is a newest addition to pre-licensing service “family”. The basis of pre-licensing is borrowed from Canadian experience in its Vendor Design Review program (SNRIU Site, 2023).

The pre-licensing process is often committed in several stages. For this example, have been taken Canadian process as it is the one which will be used in Ukraine. The process is divided into 3 phases (CNSC Site, 2023):

– Phase 1: Initial Evaluation of Regulatory Compliance: This initial phase includes a comprehensive evaluation of the vendor's nuclear power plant design in comparison to the latest CNSC design requirements for new nuclear power plants in Canada.

– Phase 2: In-Depth Assessment of Licensing Feasibility: In this phase, we delve deeper into the design, with a specific focus on pinpointing any fundamental obstacles that might impede the licensing of the vendor's nuclear power plant in Canada.

– Phase 3: Post-Assessment Actions: Phase 3 provides the vendor with the opportunity to address specific findings from Phase 2, allowing for corrective actions and adjustments as necessary.

For Ukraine it opens a new market, and allows for faster appropriation of new nuclear technologies and experience with it. Regulators now will be able to familiarize themselves with brand new technologies, acclimatize to new approaches in nuclear energy, and develop new and relevant regulations for advanced nuclear power technologies.

As a conclusion: with new, safe and ecological technologies comes new need for fast iteration and development, the approach of pre-licensing allows for nuclear technologies to be in line with the regulation right away with adoption of said technologies. These activities serve as a crucial foundation, not only for ensuring the safety and security of nuclear power plants but also for fostering public trust and confidence in the nuclear energy sector.

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