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Third-Party Evaluation of the CNSC's Regulatory Framework's Readiness to Accept a License Application for a Fusion Reactor

For over a decade CNSC has been preparing its regulatory framework for the introduction of small nuclear reactors (SMRs) and advanced reactor technologies. These innovative technologies may replace current nuclear power plants, fossil fuel electrical generation plants, and be used for resource extraction projects and remote community energy needs. SMR projects all claim that they will be safer to operate and will create less waste than current reactors.

The CNSC needs to plan ahead for the regulation of SMRs, because they are likely to eventually be deployed in Canada. The CNSC has been approached by two fusion companies that are on a path with established utilities to prove the feasibility of commercial fusion technology. While the CNSC has done an internal review of its regulatory framework and found that it should be sufficient to regulate fusion, CNSC will also need to obtain a more in depth expert review of the CNSC's regulatory framework in order to assess its readiness for fusion technology. A successful review would help CNSC to receive and process future license applications for fusion reactors.

The CNSC worked with the nuclear consulting firm Kinetrics to carry out the review. The project involved the following steps: developing hypothetical models of fusion facilities covering a range of approaches to fusion; consulting regulators and stakeholders on their approach to regulation of fusion in the U.S., U.K., France and Japan; using the hypothetical models to assess the readiness of CNSC's regulatory framework to licence a fusion facility; and summarizing the results.

The legislative documents that were assessed were found to sufficiently address fusion facilities hazards, though it may be more appropriate to reclassify some fusion facilities. Potential gaps were also identified in regulatory documents where specific requirements and guidance have been developed specifically for nuclear power plants, defined as fission reactors. The scope and applicability of some regulatory documents in relation to fusion facilities is unclear which may lead to regulatory uncertainty. As a result of this project, the CNSC has established a Fusion Coordination Team to create a road map for the regulation of fusion technologies, coordinate international activity and to engage in dialogue with industry. This will enable CNSC to work towards a regulatory framework with more certainty, which will ease regulatory burden for industry through the use of performance-based requirements and a predictable regulatory framework for these innovative technologies.

