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Written submission from David Winfield

In the Matter of

Decision on the scope of an environmental assessment of the proposed Micro Modular Reactor Project at the Canadian Nuclear Laboratories Ltd., in Chalk River

Hearing in writing based on written submissions

June 2020

Mémoire de David Winfield

À l'égard de

Décision sur la portée de l'évaluation environnementale pour le projet de microréacteur modulaire aux Laboratoires Nucléaires Canadiens ltée, à Chalk River

Audience par écrit fondée sur des mémoires

Juin 2020

Canada

Concerns and Comments on The Scope of the Environmental Assessment for the Global First Power Micro Modular Reactor™ Project at Chalk River (Registry Number 80182)

A written submission in the matter of
The Request for a Commission Decision on the Scope of the Environmental Assessment

1 June 2020

Submitted by

D. Winfield, & W. Turner

30 May 2020

Concerns and Comments on
The Scope of the Environmental Assessment for the Global First Power Micro Modular Reactor™ Project at Chalk River
(Registry Number 80182)

By D. Winfield & W. Turner

Executive Summary

To quote from the CNSC REGDOC 1.1.5, *Supplemental Information for Small Modular Reactor Proponents*, page 23:

> *The Commission is the final arbitrator of what represents reasonable risk when it comes to the development and use of nuclear energy and sources. The Commission makes the determination as to whether a project can be developed in a manner that meets the CNSC's requirements and protects the health, safety, security and the environment of Canadians and ultimately uses this determination to decide whether or not to issue a licence.*

Since GFP's proposed undertaking sets two presidents, (i) the licencing of a revolutionary reactor design (essentially a First-of-a-Kind) and (ii) the first environmental assessment of a power reactor in Canada, we suggest that both the proponent and the regulator must err on the side of caution.

We reviewed GFP's Project Description, their Licence Application, and CNSC staff's CMD 20-H102 and conclude that GFP's proposal, as presented, poses an unacceptable risk to "… *the health, safety, security and the environment of Canadians* …"

In support of this conclusion we present three arguments. Our arguments are:

- With several pieces of evidence, we suggest that GFP is not *"… qualified to carry on the activity that the licence will authorize the licencee to carry on…*" (NSCA, Section 24(4)(a) – a significant risk in itself.
- Since GFP has not received approval from AECL to use the land, it appears to be in contravention of Section 3(c) of the *Class I Nuclear Facilities Regulations.* Further, as GFP has not provided sufficient evidence that their proposed undertaking is feasible and meets CNSC regulatory requirements, we suggest the licence application is premature. Licencing a facility that has questionable feasibility issues and does not meet CNSC requirements is also a significant risk.
- In our review of the CNSC document CMD 20-H102, we identify several deficiencies in that document which suggests it is unreliable. Basing the scope of the EA on a questionable document is another significant risk.

While the first two of these arguments do not address the purpose of this hearing (that is deciding on the scope of the EA), they are critical to the assessing the adequacy of the licence application itself. Therefore, we suggest without appropriate supporting evidence provided by GFP on these two issues, conducting an EA at this time is somewhat meaningless, and determining the scope becomes useless.

We suggest that licencing a revolutionary design requires much more rigour than has been presented to date by GFP. Thus we are left with significant doubts as to whether the design is adequately safe, and whether it can meet all regulatory requirements.

Therefore, we respectfully request that the Commission suspend the licencing process until GFP provides evidence that (i) they are qualified to carry on the licenced activities, (ii) they have permission to use AECL's land, and (iii) their proposed undertaking meets regulatory requirements and is feasible.

We also request that the Commission direct CNSC staff to ensure that when an applicant applies for a license they can demonstrate they are qualified to carry on those licenced activities and that what is being licenced meets regulatory requirements and is feasible.

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Acronyms

AECL	Atomic Energy Canada Limited
AOO	Anticipated Operational Occurrences
CEAA	Canadian Environmental Assessment Act
CNL	Canadian Nuclear Laboratories
CNSC	Canadian Nuclear Safety Commission
CRL	Chalk River Laboratories
FCM™	Fully Ceramic Microencapsulated™ (fuel) [1]
FOAK	First-of-a-Kind
GFP	Global First Power
LCOE	Levelized Cost of Electricity
MMR™	Micro Modular Reactor™ [1]
NSCA	Nuclear Safety and Control Act
PBMR	Pebble Bed Modular Reactor
PD	Project Description [2]
TRISO	Tristructural-isotropic (fuel)
USNC	Ultra Safe Nuclear Corporation

[1] The terms "FCM", "MMR" and "Micro Modular Reactor" are trademarks of Ultra Safe Nuclear Corporation.

[2] Global First Power, *Project Description for the Micro Modular Reactor™ Project at Chalk River*, CRP-LIC-01-001, Rev 2, 8 July 2019.

1 Our Request

We recognize that Sections 2 and 3 below are not within the scope of the current licence hearing [3]. However, the issues summarized in these two sections raise questions as to the licencing process itself. We, therefore, respectfully request that the licencing process be suspended until the regulator receives appropriate evidence from the applicant that it:

- is qualified to carry on the activities for which it is requesting licence approval,
- has received permission from AECL to use their land, and
- has provided sufficient information and data to support the conclusion that their project meets all applicable legislation and is feasible.

In Sections 2 and 3 below, we provide evidence that Global First Power (GFP) has failed to provide such evidence.

In Section 4 below, we provide comments on CMD 20-H102 [3], arguing that it is incomplete and unreliable.

Therefore, we respectfully request that the Commission delay its decision on the Scope of the Environmental Assessment until:

- the CNSC staff has updated the CMD 20-H102 to ensure it is complete and reliable.

2 Concerns with the Licencing Process

2.1 Setting a Precedent

The CNSC document, *The Canadian Nuclear Safety Commission's Strategy for Readiness to Regulate Advanced Reactor Technologies* [4], recognizes that nuclear legislation has changed since 1946. This is depicted in Figure 1, copied from [4].

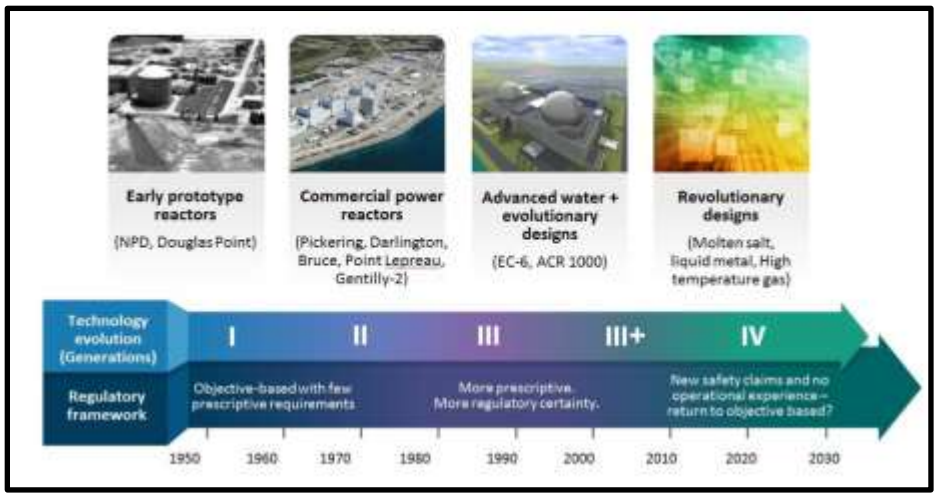

Figure 1: Evolution of reactor designs and the CNSC's regulatory framework

Similarly, Canada's environmental assessment legislation has developed, from the Canadian Environmental Assessment Act in 1992, through to the most recent, Impact Assessment Act (2019).

[3] CNSC, *Request for a Commission Decision on the Scope of an Environmental Assessment for Global First Power Micro Modular Reactor at Chalk River*, CMD-20-H102, 29 April 2020

[4] CNSC, *The Canadian Nuclear Safety Commission's Strategy for Readiness to Regulate Advanced Reactor Technologies*, Canadian Nuclear Safety Commission, Ottawa, 2019 December.

The CEAA (1992) included various regulations including the Law List Regulations [5] in which the issuing licence under the NSCA would trigger an environmental assessment

No reactor, involving "Advanced water + evolutionary designs" (the third category shown in Figure 1) or "Revolutionary designs" (the fourth category) have been licenced in Canada. Therefore, licencing GFP's proposed Micro Modular Reactor™ (MMR™) using TRISO fuel, molten salt and high temperature gas (by definition, a "Revolutionary design") is a Canadian precedent.

As shown in Figure 1, all prototype and commercial power reactors in Canada became operational prior to the enactment of Canada's first Environmental Assessment Act in 1992. Thus, with respect to conducting an Environmental Assessment, GFP's proposed reactor is setting another precedent.

Therefore, GFP's proposed reactor sets two precedents; (i) the process to obtain a licence, and (ii) the conduct of an EA. Consequently, in accordance with Canada's *A Framework for the Application of Precaution in Science-based Decision Making about Risk*, the guiding principles for the application of precaution should be applied by the Regulator [6].

2.2 Fitting GFP's Revolutionary Design into the CNSC's Regulatory Strategy

Figure 2 (copied from Reference [4]) depicts the development lifecycle for a new technology, from the initial lab tests through to an "Nth-of- a-kind" commercial product.

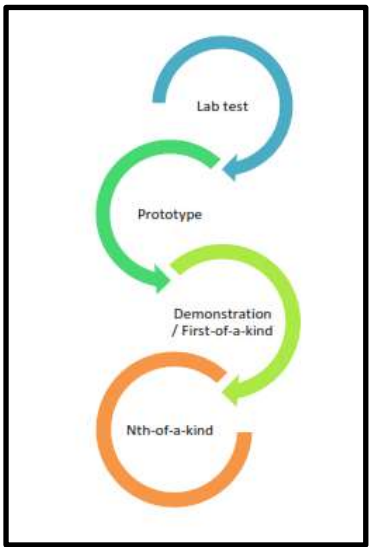

Figure 2: Development Lifecycle of a New Technology

Since no relevant information can be found in the PD [2] or in the licence application [7], identifying where GFP's proposed reactor is in the CNSC's Development Lifecycle, is unclear. Recently, however, GFP's web page described the reactor as a "Demonstration" or "First-of-a-Kind" (FOAK). To quote:

> *The MMR™ Project at Chalk River is a commercial demonstration project under development by GFP. The project will deploy USNC's MMR™ technology at the Chalk River Laboratories site in Ontario.* [8]

[5] Government of Canada, *Law List Regulations*, SOR/94-636

[6] Government of Canada, *A Framework for the Application of Precaution in Science-based Decision Making about Risk*, Ottawa, Canada, 2003

[7] Global First Power, *Licence to Prepare Site Initial Application: MMR Nuclear Plant at Chalk River*, RP-LIC-01-002, Rev 1, 27 June 2019.

[8] Link - https://www.globalfirstpower.com/proposed-project-at-chalk-river-ont (accessed, 2020 May 20)

To add to the confusion regarding where to locate their reactor in this lifecycle, in a recent telephone town hall hosted by GFP, Eric McGoey of GFP stated the following:

> *"… the project that we are doing at Chalk River isn't a science experiment, it really is a business experiment."* [9]

Since the purpose of any experiment is to address unknowns, GFP appears to concede that their proposed undertaking lacks critical information. But then, what are those knowledge gaps that this business experiment is designed to address? GFP provides no information as to the design of this experiment.

For the purposes of this document, we consider GFP's reactor to be a FOAK.

Consider the first two steps of the lifecycle depicted in Figure 2. A search of GFP's PD [2] and its Licence Application [7], provided no evidence that any lab tests have been performed and that a prototype reactor has been built. These two development phases for GFP's reactor, illustrated in the CNSC strategy document [4] thus appear to have been bypassed, and is out of compliance with Section 8.1.2 of RD-367 [10]. To quote:

> *"The fuel shall be qualified for operation, either through experience with the same type of fuel in other reactors or through a program of experimental testing and analysis, to ensure that fuel assembly requirements are met. Fuel design and design limits shall use a verified and auditable knowledge base using data from experiments and from experience with irradiation …".* and
>
> *"Fuel assemblies shall be designed to permit adequate inspection of their structures and component parts prior to and following irradiation…".*

Without any evidence gained from lab testing programs on the fuel assemblies in particular and from construction and operation of a prototype, many key MMR design, construction, commissioning and operational issues remain unknown. Thus, GFP's FOAK design lacks sufficient evidence to demonstrate this novel reactor can be operated safely (see also Section 3.2 below).

At the time of writing, where are we on the *Evolution of the CNSC's Regulatory Framework* depicted in Figure 1? By avoiding the first two lifecycle steps suggests we are back to a time before even the "Objective based with few prescriptive requirements" were in place.

Apparently, for GFP's proposed reactor, the Regulator has not applied Canada's precautionary framework [6] (see also Section 2.1 above).

2.3 Does GFP Meet the Requirements for a Licence under NSCA?

In accordance with the Nuclear Safety and Control Act (NSCA), the CNSC is required to evaluate GFP's application against the provisions of Section 24(4) of this Act. The following quotation is from the Act:

> *(4) **No licence shall be issued**, renewed, amended or replaced — and no authorization to transfer one given — **unless**, in the opinion of the Commission, **the applicant** or, in the case of an application for an authorization to transfer the licence, the transferee*
>
> *(a) **is qualified to carry on the activity** that the licence will authorize the licencee to carry on; and*
>
> *(b) will, in carrying on that activity, make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.* [emphasis added]

To determine whether GFP meets the qualification requirements of Section 24 (4)(a) of NSCA, evaluation criteria are needed. The following two CNSC Regulatory Documents provide relevant criteria:

- RD-367, Design of Small Reactor Facilities [10]
- REGDOC-2.1.1, Management System [11]

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[9] Global First Power, Transcript of the *Micro Modular Reactor Project at Chalk River Community Telephone Town Hall*, May 20, 2020. link - https://2fd19a5b-d4ba-460a-ae87-124539f0ba42.filesusr.com/ugd/8c5308_ec1bd8c99cdf47a288f6e8c9e6eb8d3b.pdf

[10] CNSC, *Design of Small Reactor Facilities*, RD-367, Canadian Nuclear Safety Commission, Ottawa, June 2011.

[11] CNSC, *Management System*, REGDOC-2.1.1, Canadian Nuclear Safety Commission, Ottawa, May 2019

It is clear from Section 1.2 of RD-367 that this document applies to GFP's proposal. To quote:

> *A small reactor facility is defined as a reactor facility containing a reactor with a power level of less than approximately 200 megawatts thermal (MWt) that is used for research, isotope production, steam generation, electricity production or other applications …*
>
> *The scope of RD-367, Design of Small Reactor Facilities … address*[es] *the interfaces between reactor design and topics such as environmental protection, radiation protection, aging, human factors, security, safeguards, transportation, and accident and emergency response planning.* [10]

It is also clear from Section 1 of REGDOC 2.1.1 this document also applies to GFP's proposal. To quote:

> *"The Canadian Nuclear Safety Commission (CNSC) defines "management system" as "the framework of processes, procedures and practices used to ensure that an organization can fulfill all tasks required to achieve its objectives safely and consistently." Management system requirements provide overall direction to the licensee organization for developing and implementing sound management practices and controls for the organization. An effective and well-implemented management system helps to assure the CNSC that licensees will conduct their licensed activities safely."* [11]

RD-367 defines the design requirements and REGDOC 2.1.1 defines the management system required to ensure the organization will manage the interfaces between the design and the *"…environmental protection, radiation protection, aging, human factors, security, safeguards, transportation, and accident and emergency response planning …*" effectively.

To determine whether GFP meets these criteria, consider the Organization Chart given in Appendix C of GFP's Licence application [7], reproduced below in Figure 3.

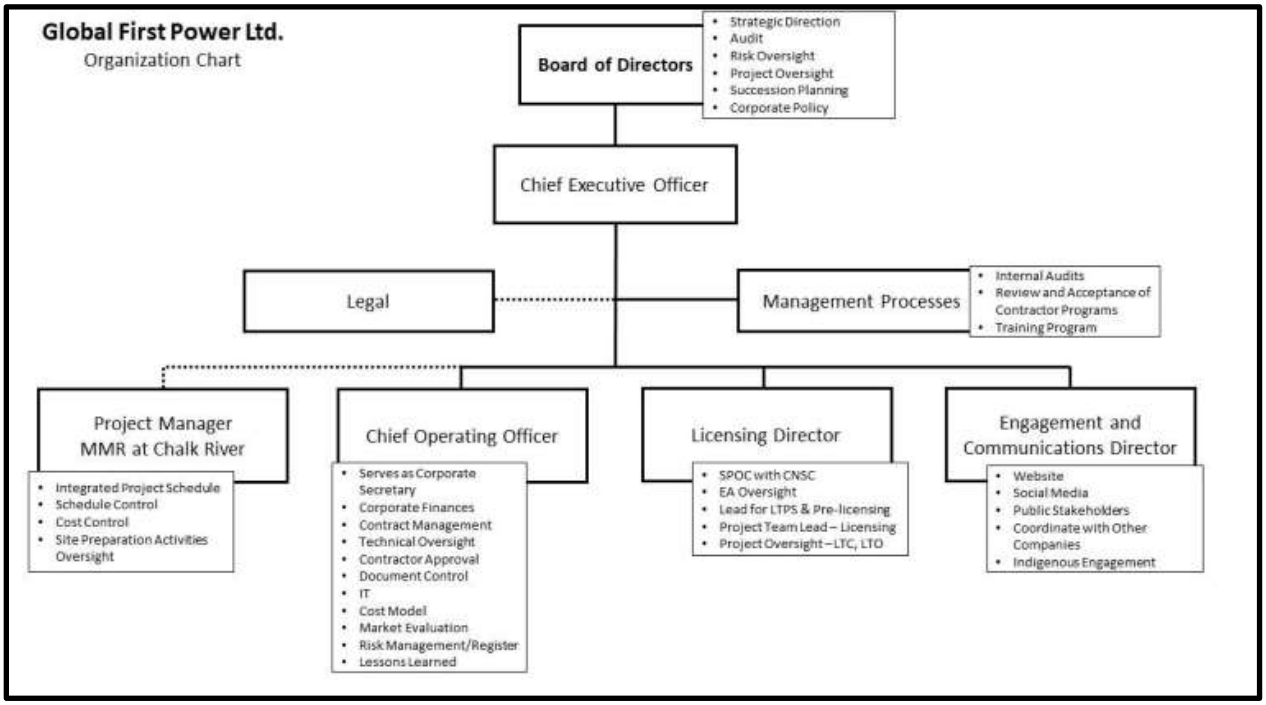

Figure 3: GFP Organization Chart

While there are several positions that have responsibilities with respect to costs and finances, none are assigned the responsibility for the activities required in RD-367 [10] or REGDOC 2.1.1 [11]. For example, these activities:

- reactor design
- implementation of the design
- commissioning and operations
- monitoring and measuring
- health, safety and the environment

- emergency response
- security
- safeguards

Another major omission, for a reactor facility, is that no position in GFP's organization is identified as the *Design Authority*. To quote from Section 6.1 of RD-367 [10]:

> *"**The licensee shall be ultimately responsible for the design of the reactor facility**.*
>
> *During the design phase a **formal design authority shall be established**. The tasks and functions of the design authority shall be formally documented.*" [emphasis added]

An explanation for these major omissions can be found in GPF's licence application, Section 1, "Introduction". To quote:

> *GFP is a company incorporated in Canada, specializing in small nuclear project development and project financing. GFP has been developing capabilities to function as a smart buyer of nuclear technology and specifically for the use of the MMR technology.* [7]

While a company that specializes "*in … project development and … financing*" has little need for in-house nuclear technological expertise in the areas listed above, it does not absolve it from the acquiring those capabilities such that it can evaluate the suppliers' expertise in those areas. In other words, it has to operate as a "smart buyer" (see also Section 2.3.1 below).

However, as the above quote acknowledges, GFP currently does not have the "smart buyer" capability and is only now developing those required competences.

2.3.1 The "Smart Buyer" and the Problem Definition

Consider the relationship between a supplier and a buyer. Typically, the buyer has a problem (i.e. a need) that requires a solution (or solutions). If the buyer cannot provide the solution in-house, then obtaining a supplier is necessary.

Developing the capabilities at some future date (as GFP is currently doing) is too late in this process. The buyer must be smart in order to clearly define the problem such that the supplier knows what is required. In other words, to define the problem unambiguously, the buyer must be "smart".

Without a clear definition, there is a significant risk that supplier will provide a product that is not a solution to the problem. Further, the buyer then has no basis on which to reject the proposed solution.

Thus, to assess whether the buyer is "smart" at this stage, we need to assess the problem definition. Is it clear and unambiguous?

Consider the problem as defined in GFP's PD:

> *"The Project will demonstrate the commercial viability of the MMR technology to prospective customers (e.g., remote communities and mining industry) with no access to grid power for their heating and electricity needs."* [2]

Note the phrase "… *will demonstrate the commercial viability of the MMR technology* …" However, GFP provides no explanation as to what is meant by demonstrating "*the commercial viability".*

Further, consider GFP's assertion that the plant will operate for approximately "20 years". To quote:

> *"The MMR reactor is designed for a 20-year operating life …"* [2]

In addition, consider this quote from CMD 20-H102 [3]:

> *The Nuclear Plant will be designed to support immediate dismantling and decommissioning, beginning as soon as possible after the permanent shutdown of the plant. The decommissioning phase will take approximately two to three years, with all radioactive material above a specified level identified and removed to ensure the project site or facility can be cleared or used without any regulatory restrictions.*

At what point will "*… commercial viability …*" be demonstrated? After one, five, ten or twenty years of operation? Does demonstrating *"… viability …"* include consideration of the decommissioning and abandonment phases? These latter two phases are identified in the CMD 20-H102 [3].

Without a clear definition of what "*… commercial viability …*" means, and when that viability has been demonstrated, there is no way to evaluate whether the "MMR technology" achieved this goal. There has to be closure.

If the GFP cannot provide an unambiguous statement of what it requires before its licence application is submitted, then by definition, it is not a "smart buyer". Thus, developing the required "*… capabilities to function as a smart buyer…"* at sometime in the future is too late.

Since its problem definition is inadequate, we conclude that GFP has failed this "smart buyer" test.

2.3.2 Problem Definition and Compliance with CEAA (2012)

The inadequacy of defining the purpose of a project is critical to ensuring compliance with Section 9(1) of CEAA (2012). Under that section, two factors need to be considered:

(f) "the purpose of the designated project" and

(g) "alternative means of carrying out the designated project that are technically and economically feasible and the environmental effects of any such alternative means"

Note: This provision of the Act assumes the "designated project" is both "*… technically and economically feasible …*" However, what if the project itself is not technically feasible? Apparently, to undertake an EA, it is assumed that the project itself is both technically and economically feasible. See also Section 3.2 below.

If the purpose of the project is to "*...demonstrate the commercial viability of the MMR technology …*" and "*… commercial viability …*" is defined as "cost per megawatt electrical", then on that basis alone proceeding with this project is questionable.

Assessing whether a proposal is economically feasible is the sole responsibility of the proponent and outside the mandate of the CNSC. Since the regulator has responsibilities for "… *the protection of the environment, the health and safety of persons …",* therefore, technical feasibility is within the mandate of the CNSC.

2.4 Summary

As noted in Section 2.1 above, GFP's proposal to build and operate a demonstration (i.e. FOAK) reactor appears to bypass two critical stages in the reactor lifecycle development (see Figure 2 above). Without any knowledge and operational experience gained from these two stages (lab testing programs and prototype operation), raises significant questions of whether GFP's design for its FOAK reactor is technically adequate, and presents an acceptable risk to the health and safety of persons and the environment.

As discussed in Section 2.3 above, there are also significant doubts that GFP is qualified under Section 24(4) subsections (a) and (b) of NSCA to take on those risks. This raises more uncertainties with proceeding to licence this undertaking at this time.

Without a formal design authority identified in its Organization Chart GFP's Organization Chart, it is unlikely that GFP:

- is "… *qualified to carry on the activity that the licence will authorize the licencee to carry on …*" as required by Paragraph 24(4)(a) of NSCA, and
- can *"…make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed*" as required by Paragraph 24(4)(b) of NSCA.

Note: The responsibility for compliance, and/or conformance to applicable legislation, standards, and international obligations remains with the licencee, and cannot be delegated to a "supplier".

To initiate the licencing process by issuing a licence to prepare site [7] to an organization that has provided little technical information and indicates limited expertise, and is bypassing two critical stages in the development

lifecycle (see Figure 2), is problematic at best. Certainly, it fails to conform to Canada's precautionary framework [6].

We submit GFP's application points to several weaknesses in the CNSC's current licencing process. We suggest that it should be incumbent on the regulator to modify the licencing process to ensure that, before proceeding with licencing, the applicant has provided sufficient proof that it can meet the provisions of Sections 24(4)(a) and 24(4)(b) of the NSCA. In addition, when licencing a new technology in Canada, the applicant should provide proof that its data and information collection conforms to the two earliest steps in Figure 2: Development Lifecycle of a New Technology.

The regulator should only proceed based on the existing evidence that the applicant is qualified, not whether the applicant can develop those competencies some time in the future.

3 Is GFP's Licence Application Premature?

3.1 Land Ownership

Locating the prototype reactor on the Chalk River site is problematic. Figure 4 is taken from GFP's "Licence to Prepare Site Initial Application: MMR Nuclear Plant at Chalk River", Appendix B [7]:

> AECL's acceptance of CNL's recommendation under the Invitation means that AECL is willing to enter into initial, non-exclusive, non-binding discussions with GFP regarding a potential SMR Project at an SMR Site, including potential land arrangements and other contracts. It is important to understand that AECL is not, by issuing this letter or otherwise, in any way committing to GFP to proceed with an SMR Project and AECL may, at any time and for any reason, cease discussions with GFP.

Figure 4: Excerpt from GFP Licence Application (emphasis added)

In response to Comment LO1, Land Ownership, in the CNSC's comment disposition table, the following is the response provided:

> *"CNSC staff have noted these comments and have shared them with the proponent. It is CNSC staff's expectation that the proponent clarify AECL's role in the draft EIS."* [12]

We respectfully disagree with this disposition. There is no need for *"… the proponent to clarify AECL's role…"* We already know that AECL is the landowner and it has yet to grant permission for GFP to use their land (see Figure 4). Yet in its disposition (quoted above) the CNSC staff appears to be proceeding on the assumption that AECL will allow the reactor to be located on its land.

The fact that GFP does not yet have permission to use the land appears to be out of compliance with Section 3 of the *Class1 Nuclear Facilities Regulations* which states:

> *"An application for a licence in respect of a Class I nuclear facility, other than a licence to abandon, shall contain the following information …*
>
> *(c) evidence that the applicant is the owner of the site or has authority from the owner of the site to carry on the activity to be licensed…"* [13]

In its own licence application [7], GFP admits it does not have permission to use AECL's land, and yet it is proceeding with a licence application at this time. This suggests the regulator is not enforcing their own regulations. One wonders why the CNSC staff expects "… *that the proponent clarify AECL's role in the draft EIS …*" Surely this is too late in the licence application process.

We strongly recommend the Commission direct the staff to enforce all applicable regulations to this application.

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[12] CNSC, *Disposition Table of Public and Indigenous Groups' and Organizations' Comments on the Project Description– Micro Modular Reactor Project*, e-Doc: 5995782

[13] Government of Canada, *Class I Nuclear Facilities Regulations*, SOR/2000-204

3.2 The Feasibility of Building and Operating an MMR™

Based up on the limited design information provided in GFP's PD [2] and USNC's web site, two proposed novel concepts for Canada raise the question of whether the basic design is actually feasible.

3.2.1 Sealed Reactor Vessel

As shown in Figure 5 (copied from GFP's PD [2]), the fuel is contained within the reactor vessel.

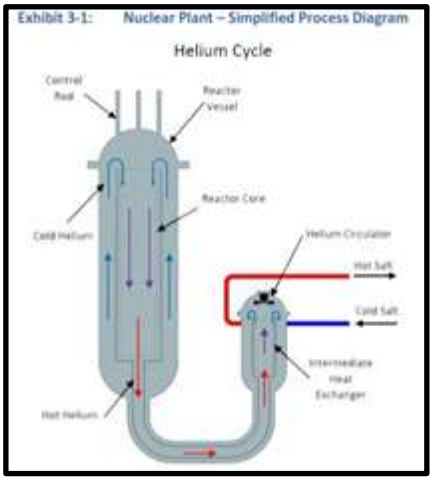

Figure 5: GFP's Nuclear Plant - Simplified Process Diagram

However, from their website [14], USNC states the following:

> ***Sealed Core***
>
> *The MMR™ reactor is sealed for life – the fuel cannot be accessed.*

As Figure 5 shows, the helium gas circulator inside the reactor vessel is located above the intermediate heat exchanger. If the reactor vessel is sealed for life this implies that the circulator (which is an active component requiring a source of power) is neither repairable nor replaceable for the 20-year lifetime of the reactor. Consequently, the circulator requires a 100% operational reliability for 20 years. This raises the question of whether this reliability is feasibility for a lifetime-sealed reactor vessel.

Consider this conflict between the USNC design claim, copied from their website [14], and the helium circulator shown in Figure 5. To quote the design claim:

> ***"No External Power or Water Required***
>
> *The heat generated by the core is removed passively through the natural convection of the the* [sic] *helium"*

If this claim is true, then one wonders why a helium circulator is required as shown in Figure 5.

3.2.2 FCM™ fuel

The design claim in Section 3.1.1 of the PD [2] states:

> *"One such feature is the use of the Fully Ceramic Micro encapsulated (FCM) fuel that ensures containment of radioactivity during operations and accident conditions, which means that almost no fission products are released out of the fuel".*

This implies that, effectively, there is complete containment of fission products by virtue of the fuel design itself. This feature of the fuel leads to the claim that the reactor can be sealed for life and that the fuel has no need to be accessed.

[14] Link https://usnc.com/MMR.html, accessed May 30, 2020.

Thus, any risk of fuel manufacturing defects or fuel failures releasing fission products due to irradiation-induced changes in material properties of the fuel would have to be entirely discounted over a 20-year lifetime. Since there is no proposal for a helium purification system, to remove fission products or any helium impurities that may become activated and / or cause undesirable interactions with the fuel or very hot graphite, this absence is consistent with the claim of that "… *almost no fission products are released …"*.

This key design feature of effectively 100% fuel reliability for fission product containment over 20 years then is based on the PD Section 3.3.2.1.1 justification. To quote:

> *TRISO technology has demonstrated irradiation performance. This reliable and historically proven TRISO fuel is suitable for use in the MMR reactor*. [2]

However, GFP provides no references to, or evidence from, fuel irradiation testing and post irradiation inspection programs to support this claim. In our view, this represents a substantial risk to the project's feasibility.

In addition to discounting fuel-specific failure mechanisms GFP also does not acknowledge any other potential generic accident scenarios, relevant to high temperature helium-cooled reactors [15, 16, 17] . The latter could include helium system leaks due to corrosion or other mechanisms and potential ingress of either molten salt, air and / or moisture, into the primary coolant system, leading to potential interactions with very hot graphite.

The vital importance of fuel integrity is recognized by selected CNSC design requirements from RD-367, Section 8.1.2 Fuel Elements and Assemblies. To quote:

> *The fuel shall be qualified for operation, either through experience with the same type of fuel in other reactors or through a program of experimental testing and analysis, to ensure that fuel assembly requirements are met. Fuel design and design limits shall use a verified and auditable knowledge base using data from experiments and from experience with irradiation…*
>
> *Fuel assemblies and the associated components shall be designed to withstand the anticipated irradiation and environmental conditions in the reactor core, and all processes of deterioration that can occur in normal operation and AOOs* [Anticipated Operational Occurrences].
>
> *The design shall account for all known degradation mechanisms, with allowance being made for uncertainties in data, calculations and fuel fabrication…*
>
> *Fuel assemblies shall be designed to permit adequate inspection of their structures and component parts prior to and following irradiation.*

The first three of these CNSC requirements point to the absence of the first laboratory testing stage of lifecycle development identified in Section 2.2 above, demonstrating the premature nature of the current licencing submission. The last requirement in the above quote appears to point to the conclusion that the very basic reactor design feature of a sealed vessel cannot satisfy the CNSC design requirement for fuel assembly inspection on site, prior to irradiation as well as following irradiation. Along with the feasibility of the helium gas circulator design noted above, fuel inspection also seems to raise a question of basic design feasibility.

3.2.3 USNC's Assertion

In its press release of April 2, 2019 [18], USNC's Chief Executive Officer, Francesco Venneri, stated the following:

> *"…..being the very first company to submit a site-licence application is testament to the utility and inherent safety of the USNC MMR® design for delivering on-demand power …"*

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[15] M. V. Ramana (2016) *The Checkered Operational History of High Temperature Gas-Cooled Reactors*, Bulletin of the Atomic Scientists, 72:3, 171-179, DOI:10.1080/00963402.2016.1170395 http://dx.doi.org/10.1080/00963402.2016.1170395

[16] 18th International Conference on Structural Mechanics in Reactor Technology (SMiRT 18) Beijing, China, August 7-12, 2005, *The Primary Circuit of the Dragon High Temperature Reactor Experiment*. Rainer Simon

[17] IAEA-TECDOC-1645, High Temperature Gas Cooled Reactor Fuels and Materials, Section 8, Fuel Failure Mechanisms, IAEA, Vienna, 2010

[18] USNC, *First Regulatory Application Submitted For Small Modular Reactor In Canada*, Press Release, April 2, 2019, Available from https://usnc.com/docs/JOINT site application release FINAL 4.2.19.pdf

From our own experiences with the Canadian nuclear licensing process, we express some surprise that a proponent could claim that just the act of submitting a licence application *"… is testament to the utility and the inherent safety of …*" their proposed undertaking.

3.3 Summary

As noted in Section 3.1 above, GFP does not have permission to use the Chalk River site to locate its FOAK reactor. Without that explicit permission, GFP's licence application appears to be out of compliance with Section 3(c) of the *Class I Nuclear Facilities Regulations* [13]. Therefore, the decision as to whether to proceed with the licencing process is problematic.

Given the inconsistency between GFP and USNC design claim information (see Section 3.2 above), and the doubt that USNC's design can meet the requirements of RD-367 [10], we conclude GFP's licence application is premature, and suggest that all licencing activities cease until GFP can demonstrate:

- it has permission to use the Chalk River site, and
- that the design for its demonstration reactor meets the requirements of RD-367.

4 Comments on CMD 20-H102

Our comments below focus on two aspects of CMD 20-H102 [3], the comment disposition table [12] (included as a reference in the document).

4.1 The Comment Disposition Table

One of the references contained in CMD 20-H102 is CNSC's *Disposition Table of Public and Indigenous Groups' and Organizations' Comments on the Project Description– Micro Modular Reactor Project*. This table consolidates many of the comments on GFP's PD [2] submitted to the CNSC.

We do not expect that Commission members will review all comments received. Therefore providing a summary of the comments received through the CMD would be helpful if it was complete and accurate.

However, this is not true. In fact, in Sections 3.1 above and 4.1.1 below we provide specific evidence that the table is incomplete and contains several inaccuracies. What's more, several of these inaccuracies were communicated to CNSC staff by one of us (W. Turner) through an email [19]. In their email response, it was suggested that the issues raised be submitted to the Commission through an intervention [20].

The discussion that follows is not intended to be complete. The idea that specific evidence can be found suggests that through a thorough review of the table many more issues would be identified. In other words, the information in the table is unreliable.

4.1.1 Issues with the Comment Disposition Table

As stated above, the table is incomplete and contains several inaccuracies.

4.1.1.1 Omissions

With respect to its completeness, the table does not contain all comments received. To quote the note at the top of the table:

> *Note: Comments submitted of general support or opposition to the project have been noted, but are not reflected below.*

This statement raises concerns as to whether the Commission members are aware how many of these "general" comments were in support and how many were in opposition. Further, by not including them, their nature remains unknown unless the Commission members wish review them in detail.

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[19] W. Turner, email to A. Rupert, *MMR Project Description Disposition Table*, 2020 May 06

[20] A. Rupert, email to W. Turner, RE: MMR Project Description Disposition Table, 2020 May 13.

We also note, that many reviewers spent considerable time writing and submitting their comments in the hope that the issues they raised would be (as a minimum) acknowledged and addressed.

As commenters ourselves, we recognize that not all comments submitted were within the scope of the review of GFP's PD. For example, the purpose of the PD is to determine whether an EA is required and the information contained therein was prescribed by regulation [21]. Since some details of the project details were not required by this regulation, several commenters raised issues about that missing information.

While the CNSC staff would be correct in pointing that out, we suggest it is not correct to ignore them in this table. Further, what does the CNSC staff mean by "*… have been noted …*"?

4.1.1.2 Accuracy

As to accuracy in the table, we present several examples from the comments submitted by one of us, W. Turner. These examples should raise questions as to whether the information contained under the column "Comment Summary" in the table [12] is an accurate reflection of all comments received.

The following is a summary of the errors identified in an email sent to the CNSC staff [19] a few days after it was made available on the CNSC website.

In that email, concerns with the accuracy of the contents of the "Comment Summary" were identified. In the following, the comment numbers refer to those given in the table [12].

These concerns are listed below. The contentious wording is highlighted.

1. With respect to Comment PP2:

*"William Turner **states that there is no evidence** of the proponent conducting public engagement activities"*

The wording highlighted above is an assertion made by CNSC staff. However, what it should refer to is a conclusion. The actual comment included in [22] provides extensive evidence and many quotations to support this as a conclusion. All of this supporting information was not included in the PP2 Comment Summary.

2. With respect to another issue in Comment PP2:

*"William Turner **states further that the proponent's lack of a pubic information program does not comply with the CNSC's REGDOC-3.2.1**..."*

Again, this assertion by CNSC staff actually refers to a conclusion. In fact, the specific passage of REGDOC 3.2.1 is quoted on page 14 of [22].

If the CNSC staff did not agree with these two conclusions, then they should have indicated their disagreement in their response. However, their response contains no such disagreement.

3. With respect to Comment PD2:

*Similarly, Sunil Nijhawan and William Turner **believe that "the proponent fails to meet the very basic norms of a nuclear reactor** licensing application at any stage of the application process" **because of the absence of CEAA or CNSC requirements on the content of the project description**."*

No such statement can be found in a search of [22]. However, what can be found is this (copied from Section 3):

While the CNSC has determined that the contents of GFP's Project Description meet the requirements of the Prescribed Information for the Description of a Designated Project Regulations (CEAA 2012) ... that cannot be the only criterion for accepting and proceeding with GFP's licence application. [22]

This quotation explicitly states that GFP's project description meets the requirements of both CEAA and the CNSC. By including the assertion above in their Comment Summary raises a question as to whether the CNSC staff really understood this and other comments discussed in [22].

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[21] Government of Canada, *Prescribed Information for the Description of a Designated Project Regulations*, SOR/2012-148

[22] William Turner, submission to the CNSC, *Comments on the Project Description for the Micro Modular Reactor Project at Chalk River*, link - https://registrydocumentsprd.blob.core.windows.net/commentsblob/project-80182/comment-27228/132224E.pdf

If a clear statement such as that quoted above can be misinterpreted, one wonders what other statements by other commenters could have been misconstrued.

This quote from [22] raises the question as to whether meeting the prescribed information requirements is "*… the only criterion for accepting and proceeding with GFP's licence application …*"

Somewhat disturbing is that nowhere in the "CNSC Response" column is this conclusion addressed.

In Section 2 above, we also make a similar argument.

4. With respect to Comment PL1:

"As such, the commenter [W. Turner] ***claims these studies can not be undertaken until a licence is approved."***

However, this is not a claim, but an interpretation of the fact that these supplementary studies were not completed before GFP made its licence application. The supporting evidence was provided in [22].

We suggest that the use of the word "claims" in this instance is misleading.

Further arguments are provided in Section 4.2.2.1 below.

5. With respect to Comment RSD2:

"William Turner ***claims the proponent's licence application is premature*** *due the lack of technical information and in light of CNL's Canadian Nuclear Research Initiative (CNRI),"*

This quotation seems to contain a contradiction. As we understand the term "claim", it represents an assertion without evidence. Yet the quotation includes some evidence that the *"...application is premature…*"

A search in [12] on the term "claim" results in 15 hits. All (except these two) are related to claims made by GFP in their project description [2]. When used by the commenters, these "claims" specifically point to GFP's lack of evidence.

Again, based on the evidence provided in [22], the conclusion was that the "*...licence application is premature...*"

In Section 3 above we provide further evidence that GFP's licence application is premature.

We note that under the column "CNSC Response" none of these five issues are addressed.

4.1.2 Summary

The evidence presented above suggests that the information in the Comment Disposition Table [12] is unreliable.

4.2 The Scope of the EA

In the following we identify several aspects of what should be included in the Scope of the EA. First, the endpoint of the assessment needs to be defined. Second, all physical activities that can interact with the environment need to be identified.

4.2.1 Defining the assessment endpoint

Critical for determining the scope of any assessment is the definition of the evaluation criteria. In environmental assessments, these are the endpoints. Table 1 provides a list of generic endpoints typical for EA's conducted under CEAA (2012) and address the factors identified in CEAA (2012), subsection 19(1) (a). Since each project is different, this list should not be considered definitive.

Table 1: Environmental Components and Assessment Endpoints

Environmental Component	*Assessment Endpoint*
Atmosphere	Air quality (Greenhouse gases, particulates, etc.)
	Noise
Surface Water	Surface hydrology/drainage
	Water quality

Environmental Component	*Assessment Endpoint*
Aquatic	Sediment quality
	Aquatic habitat
	Aquatic species at risk
	Benthic invertebrate & fish population/distribution
	Aquatic health
Geological & Hydrogeological	Groundwater quality & quantity
	Flow or water table elevation
Terrestrial	Soil quality & quantity
	Vegetation communities/species and listed plants
	Terrestrial species at risk
	Wildlife habitat
	Wildlife population/distribution
	Wildlife health
Radioactivity	Worker safety
	Public safety
Hazardous Substances	Worker safety
	Public safety
Indigenous land & resource use	Social or economic, archaeological, cultural or spiritual value for traditional use
	Asserted Indigenous Rights or Title
Socio-economic	Land use
	Services & Infrastructure
	Quality of life
	Waste management (domestic, hazardous, and radioactive)
	Historical/culturally valued components

4.2.2 Defining the activities subject to assessment

The list of activities to be licenced are given in Section 2 of the CNSC document, REGDOC-1.1.1 [23]. To quote from Section 2:

"The following activities may be licensed:

- *site preparation for the purpose of constructing or operating a reactor facility*
- *construction of a reactor facility*
- *operation of a reactor facility*
- *decommissioning of a reactor facility*
- *abandonment of a reactor facility*"

For determining the scope of an EA, this list is inadequate since it does not identify those physical actions required to implement the licenced activity.

4.2.2.1 Site Evaluation Studies

As depicted in Figure 6 (copied from REGDOC-1.1.1 [23]), there are two columns to the CNSC regulatory process, the "Proponent" pre-application (information gathering) and "Applicant" (regulatory activities).

Under the "Proponent" column is a list of activities associated with gathering information required to evaluate and select a site. Since the "Proponent" is not a Responsible Authority under CEAA (2012) none of these activities are subject to an EA.

[23] CNSC, *Site Evaluation and Site Preparation for New Reactor Facilities*, REGDOC-1.1.1, Canadian Nuclear Safety Commission, Ottawa, 2018 July

Under the "Applicant" column is a list of "Regulatory activities", all related to the conduct of an EA.

With the submission of the licence, all those unfinished activities under the "Proponent" column are transferred to the "Applicant" column, thus become subject to that EA.

Are there any activities that were incomplete when GFP submitted its licence and would fit into this category? To determine this answer, one needs to compare the date of the Licence Application [3] to that of their PD [2].

When did GFP submit the licence? According to Section 2.1 of CMD 20-H102 it was March 2019. To quote:

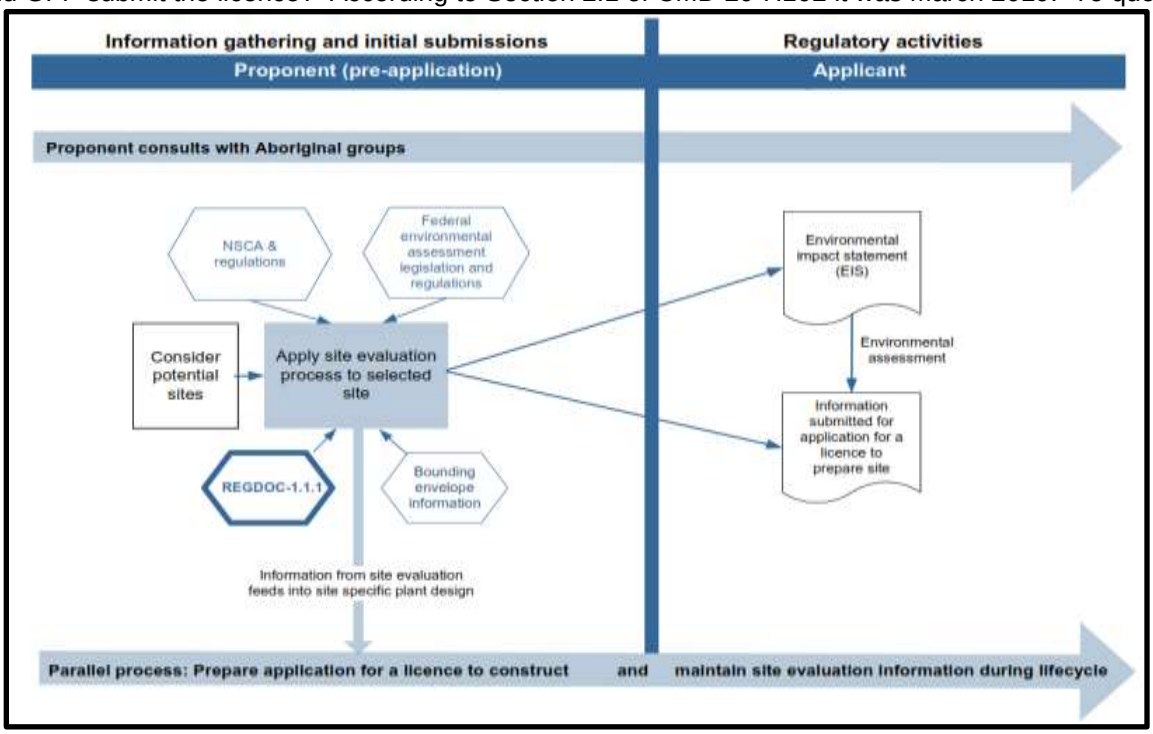

Figure 6: The role of site evaluation in the CNSC regulatory process

> *In March 2019, GFP submitted a license to prepare site application … and a project description addressing requirements under CEAA 2012 for the MMR Project …"* [3]

What does GFP say about the activities in support of the site selection in their PD? To quote:

> *"The final site selection decision of the preferred site will be made following results of additional supporting studies"* [2]

Note that the date of the PD is July 2019, several months after the licence application. As argued above, on the date of the licence submission, any incomplete activities were transferred to the regulatory side of Figure 6. Therefore, along with all other activities on this side, they are subject to an EA.

We recommend that the scope of the EA as described in CMD 20-H102 [3], be revised to include these activities that remain incomplete (see also Table 2).

4.2.3 The Reactor Site Activity List

A list of physical actions associated with each of the licenced activities is given in CMD-20-H102 [3]. This list is taken from GPFs licence application [7]. Since their application lacks sufficient detail about their project, GFP's action list cannot be considered complete.

Table 2 provides a list of physical activities that should be included with each phase of the licence but were not included in the actions listed in CMD 20-H102. Included in this table are the actions that were left incomplete when GFP submitted its licence application (see Section 4.2.2.1 above).

Table 2: Project Phase & Additional Activities

Project Phase	*Additional Activities*
Site Evaluation Process (See Section 4.2.2.1)	Hydro-geological Studies
	Vegetation Studies
	Habitat Studies
	Archaeological Studies
Site Preparation	Installation of security fencing
	Construction / paving of site access roads, parking areas
	Clearing and landscaping for the 'district heating/electrical grid' corridors to CRL site and power house switchyard
	Demolition and removal of existing structures along 'district heating / electrical grid' corridors (if required)
	Forest fire mitigation measures
	Services and utilities partial installation up to proposed building locations
Construction	Construction of all auxiliary building structures
	Construction of waste management facilities for the segregation and temporary storage of stockpiles of construction waste on site
	Transportation of fuel / reactor module to site
	Assembly of the modules
	Transportation of the molten salt system, steam cycle and electrical generator equipment to the site
	Connection / installation of all buildings' service systems provided during site preparation phase (domestic water, fire water, electrical, natural gas, HVAC, communications)
	Construction of the helium storage system
	Transportation of helium and molten salt supply
	Temporary storage and security for receipt of pre-fabricated reactor module and fuel, molten salt, steam and turbine-generator system components
	Construction of the district heating system (if required)
Operation	Monitoring and measuring all building emissions (gaseous and liquid)
	Maintenance, testing, monitoring and inspections of all buildings, systems and equipment associated with the overall project
	Helium purification system, chemical and active material removal and storage.
Decommissioning	Construction of temporary storage for helium and molten salt
	Recovery of and purification of helium and molten salt and transfer to temporary storage
	Transportation of purified helium and molten salt to final disposition (recycle/disposal/active waste)
	Construction of a temporary lay-down area for dismantled equipment, building debris..
	Transportation of the dismantled equipment, buildings, etc. to final disposal facility.
	Dismantling the temporary storage and lay-down areas
Abandonment	Remove all items in temporary storage
	Remove all above ground structures, security fencing
	Isolate CRL district heating system, electrical output, and inlet connections
	Remove all below ground structures, and return the area to its previous surface
	Clean up all debris
	Returning the site to "green fields"

We recommend that the scope of the EA as described in CMD 20-H102 [3], be revised to include these additional activities (see also Table 2).

4.2.3.1 Activities Required to Meet RD-367

The following are examples of specific reactor design requirements to enable operational activities such as surveillance, verification and testing as defined in RD-367 [10].

To quote from Section 8.1,

> *The core design shall include provisions for monitoring, surveillance, inspections, tests, analyses and commissioning programs, as well as periodic verification and testing programs to assure that the reactor facility performs as designed and meets the acceptance criteria.*

To quote from 8.1.2:

> *Fuel assemblies shall be designed to permit adequate inspection of their structures and component parts prior to and following irradiation.*

To quote from 8.2.1:

> *The components of the reactor coolant pressure boundary shall be designed, manufactured and arranged in a manner that permits adequate inspections and tests of the boundary throughout the lifetime of the reactor facility.*

In order to comply with these requirements, someone has to monitor, survey, inspect, test, analyze, conduct periodic verification and testing programs. However, RD-367 does not provide any guidance as to how these activities should be done. Defining the "how" is the responsibility of the proponent.

Nevertheless, workers who perform these actions, will be at risk of radiation exposure. Therefore, with respect to the scope of the EA, all these activities fall within the environmental component, "Radioactivity" (see Table 1).

We recommend that GFP describe the actions required to address these requirements. Once described, we recommend that the scope of the EA given in CMD 20-H102 [3], be revised to include these activities.

4.2.4 Off-Site Facilities

In all its documentation, GFP has provided no information as to its source of enriched uranium. That source cannot be Canada since Canada has no facility to enrich uranium, and no intention of building such a facility.

As to the other activities associated with fuel manufacturing, GFP states:

> *The MMR fuel would be fabricated in a separate fuel fabrication facility, independent of the Project and not located within the Project's site.*

However, this assertion is problematic. Since the project cannot proceed without fuel, the fuel fabrication facility cannot be "*… independent of the Project …*" even if it is "*… not located within the Project's site*." (See also Section 3.2 above.)

Since the project cannot proceed without all other the facilities in which reactor components are manufactured, or assembled, GFP has a problem if it excludes these from the project's scope.

If the project cannot proceed without a prepared site, and preparing that site is within the project's scope, then any off-site facility crucial to ensuring the project can proceed must also be within that scope.

Suppose none of the facilities are located in Canada, clearly none would be subject to a CNSC licence. However, that exemption does not extend to shipping their products within Canada. Their transportation within Canada is subject to regulatory approval [24].

As noted previously, without transporting these products to the building site, the project cannot proceed. Therefore, transporting these goods within Canada falls within the scope of the EA.

The typical activities associated with these off-site facilities are listed in Table 3. Since GFP provides no details as to the location of these facilities (except for the uranium enrichment facility), we must assume they will all be located somewhere in Canada. Further, GFP's PD provides no information as to the facility operations. Thus, to a great extent, the list is an approximation and cannot be considered complete.

[24] Government of Canada, *Packaging and Transport of Nuclear Substances Regulations, 2015*, SOR/2015-145

Table 3: Typical Physical Activities Associated with Off-site Facilities

Off-site Facility	*Additional Activities*
Fuel fabrication, reactor grade graphite production, and reactor module manufacturing facilities	Selecting the manufacturing facility site
	Clearing site for manufacturing facility
	Constructing access roads (if required)
	Installing security fence
	Constructing the facility
	Operating the facility
	Reactor module inspection
	Monitoring and measuring emissions
	Quality assurance testing
	Waste management
	Transportation of the manufactured goods from the fuel enrichment facility (outside Canada) through to the module manufacturing facility and the GFP site
	Decommissioning the facility

While the list is not complete, it does indicate that the scope of the EA as defined in CDM 20-H102 [3] is inadequate to assess all project activities (including those related to off-site operations and goods transport) that interact with the environment.

We recommend that, in order to be open and transparent with respect to all its project activities, GFP be requested to revise their Project Description to include these off-site facilities, including their location, and other appropriate details. We also recommend that their revised PD be subject to another public review period.

Whether or not this request is forwarded to GFP, we recommend that the scope of the EA as described in CMD 20-H102 [3], be revised to include all off-site facilities (see also Table 3).

4.2.5 Additions to the EA Scope

As noted in Sections 4.2.2 through to 4.2.4 above the scope of the EA proposed in CMD 20-H102 [3], is inadequate.

In Section 4.2.2, we point out that several activities associated with site selection were not completed before GFP submitted their licence application. As such these incomplete actions become part of the "Regulatory activities" and are subject to an EA.

In Section 4.2.3, we point out that the activities currently listed in CMD 20-H102 are incomplete. In Table 2, we provide a list of additional activities that require assessment under CEAA (2012). That said, GFP's compliance to several design requirements listed in RD-367 [10], will result in a radioactive exposure risk to a worker. Under CEAA (2012) the significance of the risk must be assessed.

In Section 4.2.4, we discuss several issues associated with off-site facilities. Since all these facilities are required to ensure the project proceeds, we suggest all associated activities are within the scope of the EA. GFP has provided no descriptions of these facilities. Further we do not know if any of these facilities currently exist in Canada or elsewhere. If they do not exist we do not know where they will be built, in Canada or elsewhere.

In our evaluation above (Section 4.2.4), we assume that all the relevant facilities do not exist, and will be built in Canada. Since all are required to ensure the Project can proceed, we maintain that the generic activities listed in Table 3 associated with these new facilities, including those yet to be defined, fall within the scope of the EA.

Suppose GFP provides the evidence that these facilities exist and all are located outside Canada. If true, then the transportation within Canada of the goods produced at these facilities is an activity that falls within the scope of this EA. This is especially true for transporting those goods that require regulatory approval [24].

In summary, we recommend that the scope of this EA be expanded to include the activities discussed in Sections 4.2.2 through to 4.2.4 above.

4.3 Summary

As noted in Section 4.1 above, we conclude that the current disposition table [12] does not accurately document both the public and the Indigenous group comments on GFP's project description [2]. We suggest that these inaccuracies may lead to a decision for which critical public input is missing.

Therefore, we recommend that the CNSC staff be directed to review their "Comment Summary" and their responses to ensure all omissions and inaccuracies are addressed. Since any Commission decision must be based on accurate information, we suggest that this be done before the decision on the scope of the EA is rendered.

As discussed in 4.2 above, there are additional areas that should be within the scope of the EA. These include:

- the additional site evaluation studies (see Section 4.2.2.1),
- several activities associated with the reactor site itself, including those required to meet the provisions of RD-367 [10] (see Section 4.2.3), and
- several activities associated with the off-site facilities (see Section 4.2.4 above).

Since GFP provides no information regarding these off-site facilities, this last issue is at best speculative. However, as a minimum, the activities associated with transporting all the required reactor components to the GFP's chosen reactor location within Canada are within the scope of the EA.

5 Conclusions

Our first concern is with the current licencing process, since GFP's licence application is for a *"First-of-a-Kind"* reactor and therefore sets a precedent. As pointed out in Section 2 above, since this is the first application to follow this process, several weaknesses have become evident.

As discussed in Section 2.3 above, the evidence we found suggests that the Applicant is not qualified to meet the provisions of Section 24(4), both (a) and (b). This raises the question as to why CNSC staff would proceed with a licence if there is any doubt that the Applicant is unqualified. Certainly, GFP's organization chart (Figure 3) included in their licence application [7] should have given pause to the CNSC staff.

While GFP is currently developing its "smart buyer" capabilities, we suggest that these competencies are critical to the definition of the project's purpose. Thus, it is far too late to acquire this expertise after the licence application.

We strongly recommend that the regulator only proceed based on the applicant's current qualifications, not on whether the applicant can develop the required competencies at some time in the future.

In Section 3 above, from the two issues below, we ask the question as to whether GFP's licence application is premature.

- GFP does not have permission to use the Chalk River Laboratories site to locate their reactor. This appears to be in contravention of Section 3(c) of the *Class I Nuclear Facilities Regulations* [13].
- Basic questions about the design, the fuel in particular, strongly suggest that their proposed facility cannot meet several CNSC regulatory documents (for example, RD-367 [10]). Further, there is inconsistency between GFP's documentation and that of the reactor designer, USNC.

Without the prerequisites of a site or a robust design (which GFP has yet to provide), the EA process cannot proceed. Therefore, we conclude that this application is premature.

What is most surprising is USNC's statement to the effect that an application for a licence *"… is testament to the utility and the inherent safety of …*" of their design.

Our second concern is the CMD 20-H102 document [3] itself, and the scope of the EA, the subject of this hearing. In Section 4 above, we identify two issues:

- Based on an evaluation of the contents of the Comment Disposition Table [12] (included as a reference in CMD 20-H102), we raise questions as to whether the omissions and inaccuracies included render this reference unreliable (see Section 4.1 above).

- The list of activities provided in CMD 20-H102 is incomplete and focuses only on those activities GFP identified in their licence application.

These additional activities should include those associated with:

- the additional site evaluation studies (see Section 4.2.2.1),
- several activities associated with the reactor site itself, including those required to meet the provisions of RD-367 [10] (see Section 4.2.3), and
- several activities associated with the off-site facilities (see Section 4.2.4 above).

With respect to this last category, GFP provides no information regarding these off-site facilities making the addition of these activities speculative. However, as a minimum, the activities associated with transporting all the required reactor components to GFP's chosen reactor location within Canada are within the scope of the EA.

Therefore, we respectfully request that the Commission delay its decision on the Scope of the Environmental Assessment until:

- GFP provides appropriate evidence that it is qualified to carry on the licenced activities,
- GFP provides appropriate evidence that their proposed undertaking meets all regulatory requirements (including permission from AECL to use their land) and is feasible, and
- the CNSC staff has updated the CMD 20-H102 to ensure it is complete and reliable.