November 12th, 2020

Marija Tresoglavic, Acting Commission Secretary
British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, BC V6Z 2N3

Subject: British Columbia Utilities Commission ("BCUC") – Inquiry into the Regulation of Safety
Written Submission in Response to Exhibit A-1

Dear Ms. Tresoglavic,

In response to Order G-241-20, Borealis GeoPower Inc. writes in response to the questions set out by the Commission in Appendix B.

Warm Regards,

Tim Thompson
Chair
Borealis GeoPower Inc.

About Borealis

Founded in 2007, Borealis GeoPower Inc. is a small clean technology enterprise focused on developing geothermal energy projects throughout Western and Northern Canada. Our portfolio includes projects with exploration permits as well as a diverse collection of consulting assignments. We work closely with our host communities and First Nations partners to enable energy projects that support local jobs, a diversified economy, zero-emission power and heat production, and participation in the international natural resources sector via rare earth elements in geothermal brines.

Framing the Discussion

Borealis GeoPower Inc. (Borealis) is an intervener in this proceeding with the overarching goal of encouraging the development of safe and reliable geothermal energy systems, including those that may be classified as Indigenous Utilities. It is Borealis' view that the prevention of over-regulation, be it in scope or complexity, is crucial to the encouragement of geothermal energy system development. In this proceeding, Borealis is also representing the Canadian Geothermal Energy Association (CanGEA) and Kitselas Geothermal Inc. (KGI).

To be clear, in this Inquiry, Borealis is not referring to geoexchange systems or ground-source heat pumps. The geothermal energy systems that Borealis is concerned with refer to energy systems that derive their energy from deep purpose-built wells that produce waters in a wide potential temperature range.

Geothermal energy systems are currently associated with a responsibility to regulate that is shared between multiple government bodies. Depending on the circumstances of a specific geothermal energy system, the BCUC, Technical Safety BC (TSBC), the BC Oil and Gas Commission (BC OGC), and the Ministry of Forests, Lands, and Natural Resource Operations & Rural Development (FLNRORD) all may have a responsibility to regulate. Further, the Canadian Standards Association (CSA) develops standards that may be applied to the development and operation of a geothermal energy system. The temperature of the water, the location of the energy system, the ownership/control of the energy system, and the 'customer' served by the energy system will all serve to dictate the regulatory framework that applies.

There are no deep geothermal energy systems in operation in British Columbia as of yet, although a number of them are in various stages of planning/development. The regulatory frameworks for safety and service reliability for deep geothermal energy systems are relatively uncertain, given that no such system has been fully contemplated by the government and no such system has been developed. At present, when determining how to regulate the safe development and operation of a geothermal energy system, government bodies and geothermal developers are faced with uncertainty. The lack of a certain regulatory framework leads to a process that, at best, is inefficient. At worst, the government body declines to grant permits for fear of the energy system not being effectively regulated for safety. This worst-case scenario is an unfortunate and unnecessary result, given the inherently benign characteristics of many geothermal energy systems and their proliferation around the world over the last 125 years.

Given the Government of British Columbia's commitment to reducing pollution while growing the economy, as well as British Columbia's abundance of geothermal energy and viable potential projects to harness that energy, the development of geothermal energy systems will soon become commonplace in the Province. However, this can only happen if a clear regulatory framework exists to allow for their efficient and safe development.

To that effect, in this Inquiry Borealis seeks clarification on the role of the BCUC as related to its shared responsibility to regulate safety and reliability with other government bodies and as related to geothermal water temperature, Indigenous control, and the re-use (i.e. cascading) of heat energy.

Responses to the Inquiry's Questions

1. What is the BCUC's jurisdiction with respect to the regulation of safety and what aspects of a public utilities' activities does it apply to?

(a) Does the BCUC have the authority under the UCA to set standards, rules or regulations with respect to safety?

Borealis agrees that sections 23, 24, 37, and 38 of the *Utilities Commission Act* (UCA) are the sections that pertain to the BCUC's jurisdiction with respect to the regulation of safety. However, in this inquiry, Borealis would like to confirm the extent of application of the UCA to geothermal energy systems.

The following flow chart on the following page has been produced by Borealis with respect to the interplay between geothermal water temperature, the re-use of heat energy, and the shared responsibility to regulate safety and reliability between regulators, including the BCUC.

First, Borealis is seeking comment from Inquiry participants and the Inquiry panel as to the validity of this flow chart. For clarity, a "cascaded heat facility" is a secondary heat facility that uses the remaining heat contained in the outflow waters of the primary energy conversion facility. The outflow waters can be 'cascaded' from facility to facility until the point that the heat contained in the water is no longer economic to use.

Next, where multiple regulators have jurisdiction in the regulation of safety of geothermal energy systems, as identified in the flow chart, Borealis is seeking clarity on the distinct and/or shared roles of those safety regulators.

Of note, Borealis is seeking clarification on the jurisdiction of the BCUC to regulate "a person not otherwise a public utility who is engaged in the production of a geothermal resource, as defined in the *Geothermal Resources Act*".[1]

[1] Utilities Commission Act, RSBC 1996, c 473, s 1(1)

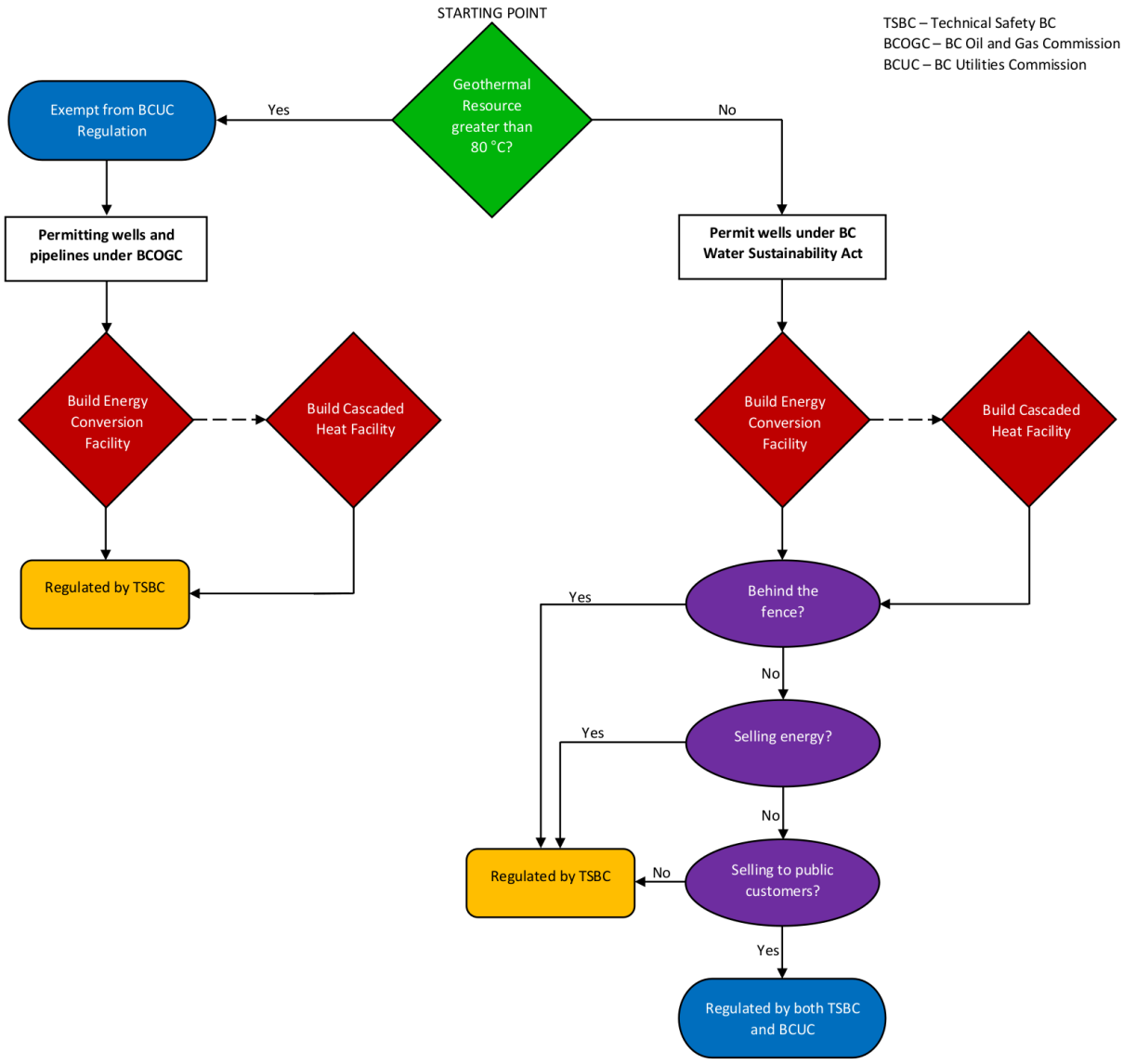

Figure 1. Regulatory Flowchart: Geothermal Energy System Development

The next item that Borealis is seeking clarity on is the role of the BCUC, and the role of other regulators, in the regulation of safety regarding Indigenous Utilities. This issue was brought forward to the panel in the Indigenous Utilities Regulation Inquiry by FortisBC. Borealis looks forward to how this Safety Inquiry will clarify this matter.

For reference, the Final Report of the Indigenous Utilities Regulation Inquiry stated:

> "Therefore, to the extent that a First Nation wishes the BCUC to continue to regulate safety, those provisions of the UCA dealing with safety will continue to apply. In any event, subject to any changes to their jurisdiction, other regulators

such as Technical Safety BC and the BC Oil and Gas Commission will continue to have jurisdiction over various aspects of safety of an Indigenous utility, regardless whether the BCUC or the First Nation is the regulator."[2]

2. **Are there currently any legislative gaps in the oversight of public utilities with respect to safety?**
3. **Are there any areas of legislative overlap or duplication in the oversight of public utilities with respect to safety?**

These two questions will be addressed in unison.

There is currently no standard for geothermal-specific pipeline facilities. In effect, this is a legislative vacuum which invites legislative overlap. While Borealis is not aware of any instances of true legislative duplication, the lack of an official standard may result in multiple government bodies seeking to apply their own safety standards.

It is Borealis's understanding that the pipeline facilities of a geothermal energy system that uses a geothermal resource of less than 80 °C are regulated by the BCUC and TSBC. In this scenario, there is no standard prescribed for the regulation of these facilities. As such, Borealis is concerned that the standards applied, out of an abundance of caution, may be those designed for oil and gas activities.

It is Borealis's understanding that the pipeline facilities of a geothermal energy system that uses a geothermal resource of 80 °C or greater are regulated by the BC OGC and TSBC. In this scenario, the standards for safety are presumed to default to oil and gas standards.

In British Columbia, geothermal energy systems that derive water from a Hot Sedimentary Aquifer (HSA) may warrant the application of oil and gas regulations. For example, the Clarke Lake project in NE British Columbia, while planning to produce geothermal resources, will be operating in an area where natural gas is known to exist, and natural gas has been historically produced. It must be noted that HSAs can produce waters that are less than 80 °C.

Other potential geothermal energy systems, such as those hosted outside of sedimentary basins, do not bear any relation to oil and gas, no matter their temperature. These systems operate at low pressure, are not flammable, and the fluids are less corrosive. These systems do not pose the same safety risks as an oil and gas related system and the application of oil and gas standards to these systems will overregulate and discourage development.

Borealis is seeking the development of a set of safety standards tailored for non-sedimentary basin geothermal pipeline facilities to fill the legislative vacuum, providing safety and certainty to the development and operation standards of geothermal energy systems.

[2] Indigenous Utilities Regulation Inquiry - Final Report, p. 61-62.

Given that Borealis and KGI will likely be coming before relevant government bodies seeking a permit for geothermal pipelines in the near-future, Borealis, KGI, and CanGEA would welcome an opportunity to provide pre-emptive advice and global case studies to such relevant government bodies for the creation of this new set of standards.

4. Would a workshop in support of the Inquiry be beneficial?

(a) If so, what would an appropriate scope for a workshop include?

Borealis supports a workshop.