Notice of the Final Oral Examination
for the Degree of Master of Science

of

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BSc (Vancouver Island University, 2017)

“Conceptualizing the hydro-geothermal system at Sloquet Hot Springs on unceded St'at'imc territory in Southwestern British Columbia”

School of Earth and Ocean Sciences

Monday, March 8, 2021
2:30 P.M.
Conducted Virtually

Supervisory Committee:
Dr. Tom Gleeson, School of Earth and Ocean Sciences, University of Victoria (Supervisor)
Dr. Kathryn Gillis, School of Earth and Ocean Sciences, UVic (Member)
Dr. Dante Canil, School of Earth and Ocean Sciences, UVic (Member)
Dr. Catherine Hickson, Tuya Terra Geo Corp. (Outside Member)

External Examiner:
Dr. Dan Gibson, Department of Earth Sciences, Simon Fraser University

Chair of Oral Examination:
Dr. Francis Lau, School of Health Information Science, UVic

Dr. Stephen Evans, Acting Dean, Faculty of Graduate Studies
Abstract

Geothermal resources across the southern Canadian Cordillera are of increasing interest for provincial, national, and Indigenous governments, researchers, and local communities. To date, research in the southern Canadian Cordillera has been focused on investigating the distribution of thermal spring systems and their relation to major geological features that often control thermal fluid flow. Sloquet Hot Springs, on unceded St'at'imc territory, is one of the many thermal systems in southwestern British Columbia. The area is characterized by steep terrain, with undulating slopes that are covered by dense vegetation and unconsolidated materials and has dozens of cold, warm, and hot springs with temperatures ranging from 22 °C to 68.8 °C. Research focused on working collaboratively with Xa’xtsa First Nations’ TTQ Economic Development Corporation and Trails and Recreation Sites British Columbia to develop local and regional conceptual models of the hydro-geothermal system at Sloquet Hot Springs. Research examines the state of resources, regulation, research, and reconciliation in British Columbia to provide a case study on how to develop inclusive and equitable environments when operating within the field of geoscience. Research at Sloquet Hot Springs is one example of how geoscience researchers can conduct works on traditional territories of British Columbia.

An elevated geothermal gradient and high transmissivity suggest that there is enhanced permeability in the subsurface allowing thermal fluids to discharge from depth via fault conduits and mix with the cooler local groundwater system. Although there was no obvious fault identified in the field, it is probable that a buried fault(s) are/is present in the upper 10-meters of the subsurface near HS100 and HS138 as these springs have high temperature and flow rates when compared to other springs at the study site. Further, joint structures at Sloquet tend to be oriented in the NNW-SSE and N-S direction which is representative of regional fault structures in the area. Based on these findings it is possible that Sloquet Hot Springs is in the deformation zone of the regional fault system and that permeability is enhanced at greater distances from these structures allowing thermal fluid flow at the site.