South Meager Geothermal Project:

New Perspectives from Recently Unearthed Data

Report 2019-07

January 2019

Photo: Flow test of well MC-6 at the South Meager geothermal project (Source: ThinkGeoEnergy website: www.thinkgeoenergy.com)

This brief was prepared for Geoscience BC by Dr. Jeff Witter of Innovate Geothermal Ltd.

Situated on the south flank of Mt. Meager, ~60 km northwest of Pemberton in British Columbia, is Canada's most advanced, volcano-hosted, high temperature geothermal energy project. Exploration and development of the project has been on pause since soon after the 2008 global financial crisis when investors mostly fled from high risk, early-stage natural resource projects. In an effort to spur renewed interest in the South Meager geothermal project, Geoscience BC facilitated the public release of hitherto proprietary drilling and geothermal well test data (Geoscience BC, 2017). These data provide new and revealing evidence that a substantial geothermal resource is present at South Meager. Of particular importance is the revelation that zones of permeability have been discovered near the bottoms of two deep, high-temperature (> 230 °C) geothermal wells (named MC-6 and MC-8; Figure 1). Previous public domain information on South Meager indicated that deep geothermal wells drilled at the project were indeed quite hot, but did not have commercial permeability. Consultant reports in the Geoscience BC (2017) data release show that flow testing of wells MC-6 and MC-8 in the mid-2000's demonstrated a hydraulic connection between the wells. This provides strong evidence for enhanced permeability in the subsurface at South Meager across a large zone at least 730 m long (Figure 2). Thus, significant permeability at South Meager has been proven. In addition, the newly-released data provide an explanation for why these existing, deep, high-temperature geothermal wells at the South Meager project have not successfully produced commercially-viable volumes of geothermal fluids. In short, geothermal wells MC-6 and MC-8, which penetrated the high-temperature and permeable geothermal resource, are located high on the southern flank of Mt. Meager, > 500 m above the water table (Figure 2). Well tests at South Meager have confirmed that production of the high-temperature geothermal fluids from a wellhead which is located so far "uphill" is not commercially-viable (GeothermEx, 2009). However, well bore simulations described in GeothermEx (2008) show that a new, hypothetical geothermal well, drilled from a wellpad that is located at a lower elevation on the valley floor and which targets the known high-temperature, permeable zone in well MC-8 should be commercially successful (Figure 2). These calculations by GeothermEx further indicate that such a well would likely have an electrical generating capacity of > 6 MW. Thus, recently released data on the South Meager geothermal project reveal two important points. First, the exact location of the high-temperature and permeable portion of the South Meager geothermal resource is known (i.e. a drillable target). Second, a viable strategy has been proposed (i.e. drill deep production wells from the valley floor) to overcome the development challenges which have prevented the South Meager geothermal project from achieving success in the past. Geoscience BC (2016) estimated the recoverable geothermal energy resource for the South Meager geothermal project to be ~100 MW based upon evidence from deep drilling combined with estimates about geothermal reservoir volume. The recently released data on the South Meager project, which proves substantial permeability in the subsurface, provide strong supporting evidence that the ~100 MW estimate may be achievable.

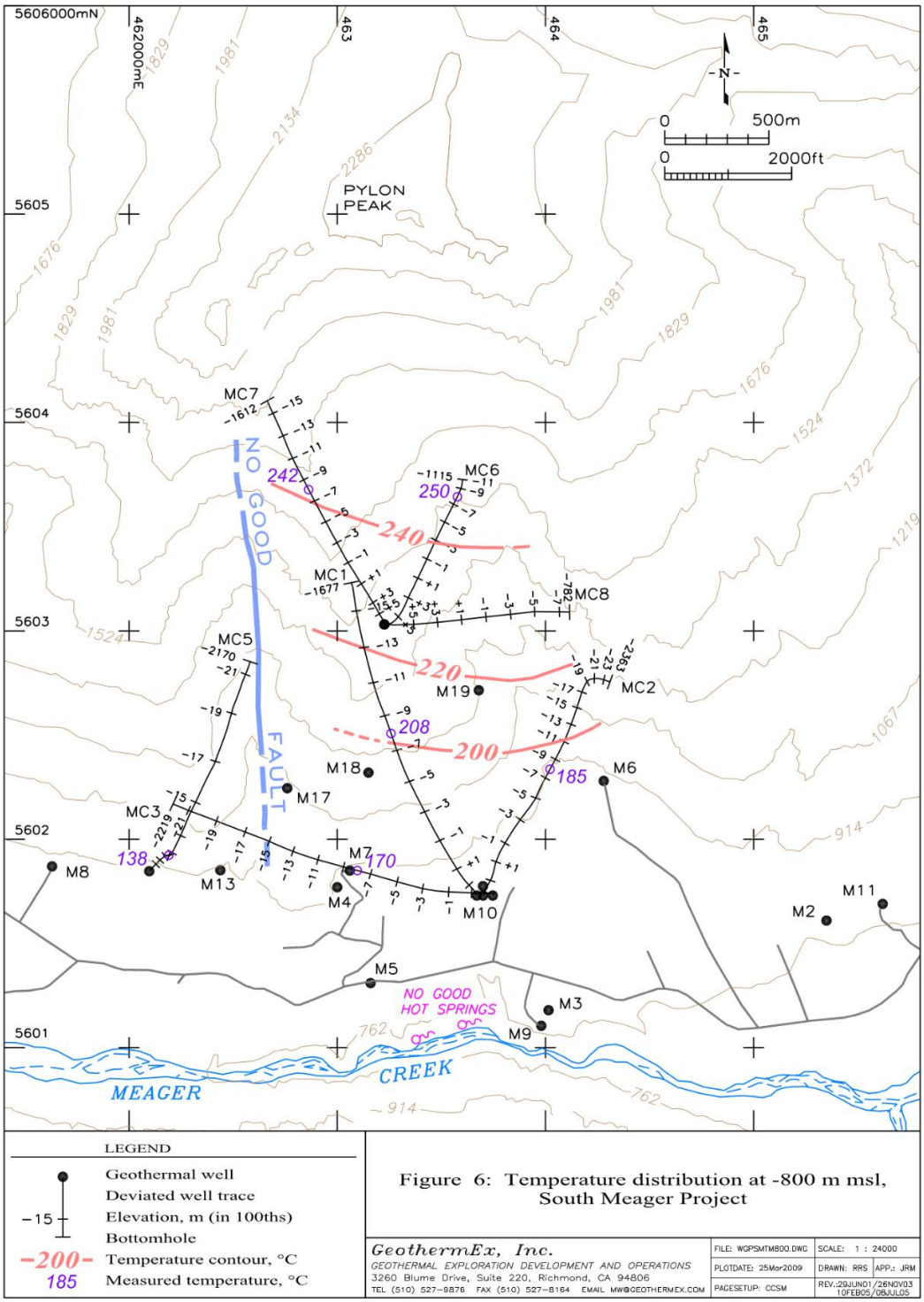

Figure 1. Map of the South Meager geothermal project from GeothermEx (2009) showing the wellhead locations of exploration wells (black dots with M# labels), in addition to the subsurface wellpaths of directionally drilled wells (black lines with hatchures).

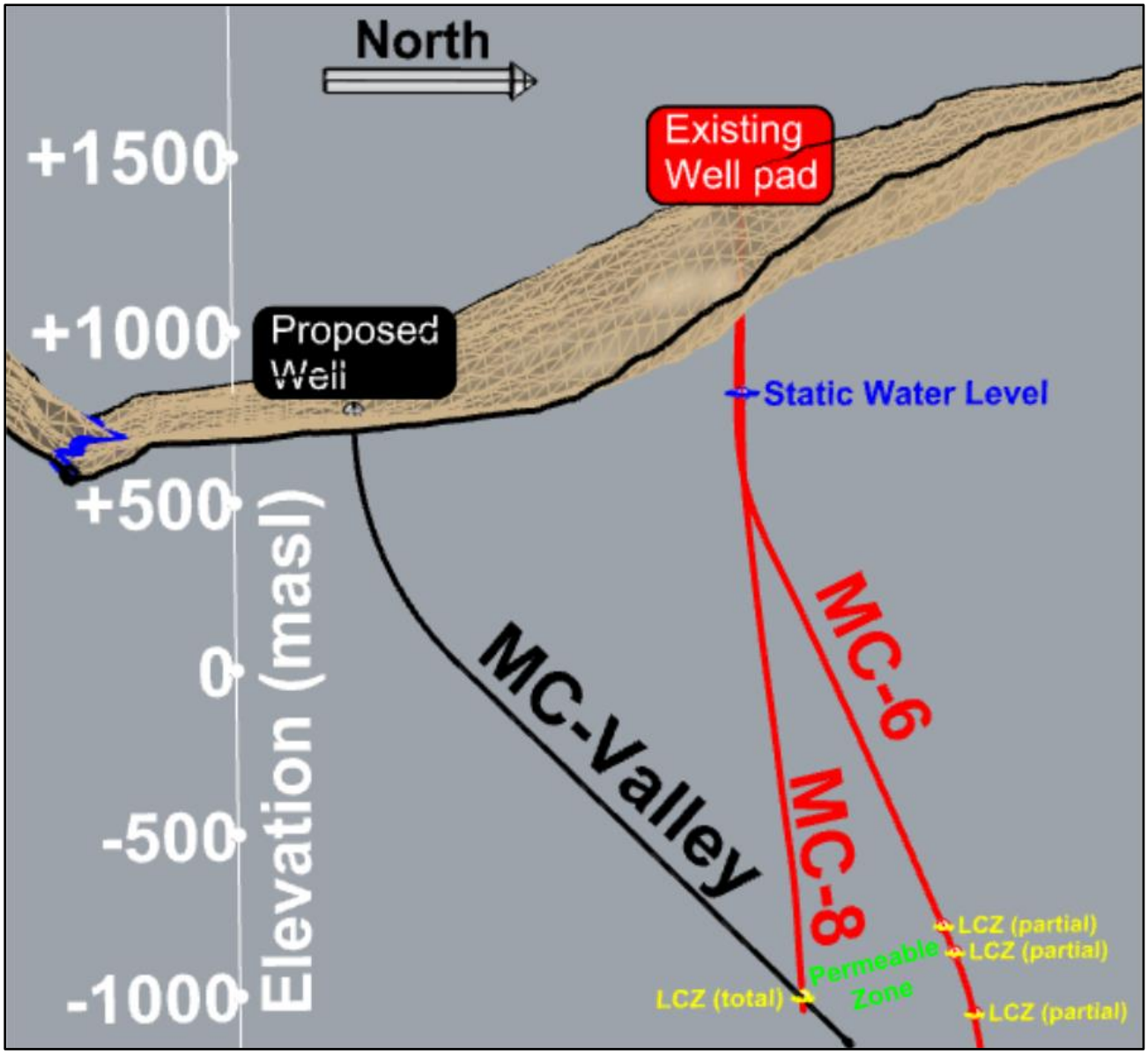

Figure 2. 3D perspective view, looking to the west, of the South Meager geothermal project. Surface topography is shown in tan; Meager Creek lies in the valley bottom (dark blue stream). Two deep wells, MC-6 and MC-8 (red), were drilled in the mid-2000's from a well pad high up the mountain slope. Actual wellpaths are shown. These wells encountered substantial subsurface permeability (LCZ = Lost Circulation Zone; yellow). Well tests demonstrate that the LCZ's in wells MC-6 and MC-8 are connected by a permeable zone (green), at least 730 m long, that lies between the wells. Well bore simulations show that a new, hypothetical well (MC-Valley; black) drilled from the valley floor, and which intersects the LCZ in well MC-8 should be a commercially-viable geothermal well with a capacity of > 6 MW.

References

Geoscience BC (2016) Economic Viability of Geothermal Resources in British Columbia. Project code: 2014-037, http://www.geosciencebc.com/s/2014-037.asp, Accessed online: December 22, 2018.

Geoscience BC (2017) Mount Meager geothermal data compilation project. Project code: 2017-006, http://www.geosciencebc.com/s/2017-006.asp, Accessed online: December 22, 2018.

GeothermEx, Inc. (2008) South Meager Project – MC-8 Evaluation. Consultant memorandum prepared for Western Geopower Corporation, Dated: 9 January 2008, 7 pages.

GeothermEx, Inc. (2009) Summary of the Status of the South Meager Geothermal Project, British Columbia, Canada. Consultant report for Western Geopower Corporation, Dated: 25 March 2009, 20 pages.