

**PERMIT TO CONSTRUCT A NON-DOMESTIC WELL**

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Pursuant to the *Water Resources Act*, SNL 2002 cW-4.01, specifically Section(s) 58

Date: **MAY 10, 2019**

File No: **NDOM19-006**  
Permit No: **GW10292-2019**

Permit Holder: **TECK Resources Limited  
Duck Pond Operations  
PO Box 9  
Millertown NL A0H 1V0**

Attention: **Mr. Darren Hennessey**

Re: **Teck Resources Ltd. - Well for pumping test, Duck Pond mine site**

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Permission is hereby given for : **Well for pumping test to determine flow for groundwater contamination recovery**

- This Permit does not release the Permit Holder from the obligation to obtain appropriate approvals from other concerned municipal, provincial and federal agencies.
- The Permit Holder must obtain the approval of the Crown Lands Administration Division if the project is being carried out on Crown Land.
- This Permit is subject to the terms and conditions indicated in Appendices A and B (attached).
- It should be noted that prior to any significant changes in the design or installation of the proposed works, or in event of changes in ownership or management of the project, an amendment to this Permit must be obtained from the Department of Municipal Affairs and Environment under Section 49 of the *Water Resources Act*.



MINISTER

**APPENDIX A**  
**Terms and Conditions for Permit**

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**Non-Domestic (General)**

1. The well must be drilled and completed by a water well driller licenced by the Government of Newfoundland and Labrador, and constructed according to the Water Resources Act and the Well Drilling Regulations under that Act.
2. A Completion Report must be provided to this department within 30 days after well construction is complete.
3. Water well construction data including Drilled Water Well Record(s) and pumping test results for the well must be attached to the Completion Report.
4. This permit is valid for one (1) year from the date of issuance.
5. The well owner is responsible for compliance with this permit.

**Non-Domestic (Location)**

6. The well must be located outside the right-of-way, or a minimum of 30 metres from the centre line, whichever is greater, of any road, street or highway.
7. The well must not be located within 30 metres of another well water supply or nearby furnace oil storage tanks.
8. The well must not be located within a minimum of 16 metres and/or down gradient of sewage disposal field or septic tank.
9. The well must not be drilled within 15 metres of any water body as defined under the Water Resources Act.

**Non-Domestic (Construction)**

10. Water disinfected by a National Sanitation Foundation (NSF) certified chlorine product must be used for the drilling and clean up operations.
11. Construction of each well must include carbon steel casing to a minimum depth that extends 6 meters into the bedrock and impedes flow of potentially contaminated surface water and/or shallow groundwater to the well. A drive shoe must be used to set the casing into the bedrock.
12. Casing joints must be of continuous weld.
13. The well annulus must be a minimum of 50 millimetres (2 inches) from the outside of the casing to the wall of the borehole and sealed with appropriate grout and/or cement from the bottom of the well casing/drive shoe to the ground surface. If a 150 millimetre (6 inch) casing is used, then a minimum of a 250 millimetre (10 inch) borehole is required.
14. In the course of drilling the well and during the development stage, if salty, sulphurous, or other water that might impair the quality of potable water is encountered, the well driller must seal off that water by a method approved by the Minister.

15. The well driller must take all other reasonable measures necessary to ensure that contaminated surface water, shallow groundwater, and/or other water that might impair the quality of potable water will not enter the well.
16. Water well construction data must include the precise location of the newly completed well taken in latitude/longitude format.

#### **Non-Domestic-Finished Wellhead**

17. The area immediately surrounding the well must be sloped away from the well and grass covered to a minimum distance of 5 metres in all directions.
18. The wellhead must be completed to a minimum height of 0.6 metres above finished grade.
19. The wellhead must be completed with a double vented (screened) metal vermin-proof well cap with electrical access through the well cap.
20. Water supply from the well must utilize a pitless adaptor installed below the frost line.
21. There must be no holes, slots, or other openings made in the well casing except for the installation of a properly sealed pitless adapter.
22. If an electrical ground wire or other such attachment to the well casing is necessary, it must be attached to a steel anchor that has been welded to the outside of the well casing.
23. If a well pump is to be suspended, it must be done utilizing a stainless steel cable attached to an industry approved well hanger inside the wellhead.
24. The well casing and finished wellhead must be sealed (water tight) except for the screened vent.
25. If finished outside, the wellhead must not be enclosed in a protective enclosure, finished below ground level, in a concrete pit, or any other such enclosure unless the method of enclosure is approved by this department.
26. The well must not be located inside, under, or too close to a building unless provision is made in the construction of the building to allow access to the well for cleaning, treatment, repair, testing and inspection of the well.
27. A wellhead located inside a building must be finished in the same manner as an outside well, i.e., to a minimum height of 0.6 metres above floor level, utilizing a pitless adaptor (installed above floor level), and utilizing a double vented screened vermin proof well cap.

#### **Non-Domestic (Industrial)**

28. Because the mine site is a relatively high risk area for groundwater contamination, it is recommended that each completed well not be used as a drinking water supply.

#### **Non-Domestic (Pumping Test)**

29. An aquifer pumping test is recommended for the well but not required. If completed, the pump test should be carried out as per the Water Resources Management Division document Guidelines for Aquifer Pumping Tests. A final report written by a hydrogeologist or qualified person, providing the information required in the guidelines, must be forwarded to this department.
30. Any existing wells in the vicinity of the new wellhead must be monitored during the pumping test. Any changes in water level must be recorded, analyzed, and reported with the completion report.

31. Prior to commencing a long-term aquifer test, a step drawdown test must be conducted to estimate the rate that can be maintained by the well for extended periods of time. The step drawdown test should consist of at least 4 steps and each step should be of at least 30 minutes duration. The pumping rates that are used for this test are determined from the driller's estimate of the well yield. If four steps are used, the first should be conducted at a rate of about one-quarter of the well yield estimate provided by the driller. This rate is maintained for 30 to 60 minutes and then the next step is begun without stopping for recovery. Each successive step should be run at a rate that is approximately double the rate of the step prior. The step drawdown test must be evaluated by a qualified professional prior to the constant rate pumping test to evaluate a sustainable pumping rate.

#### **Non-Domestic (Abandonment)**

32. If the completed well can not meet its intended purpose as stated in the application, or if it has no further use at any time after it has been drilled or in service, for any reason including poor water quality or insufficient yield, the well must be sealed as per the Water Resources Management Division document Guidelines for Sealing Groundwater Wells, available on our web site at [http://www.mae.gov.nl.ca/waterres/cycle/groundwater/well/guidelines\\_for\\_sealing\\_groundwater\\_wells.pdf](http://www.mae.gov.nl.ca/waterres/cycle/groundwater/well/guidelines_for_sealing_groundwater_wells.pdf).

#### **Non-Domestic (Completion)**

33. The signed completion report must include: all completed Drilled Water Well Records for each water well or borehole constructed; aquifer pumping test results (including calculations); water quality results; and any other reports related to the construction or abandonment of water wells or boreholes.
34. All non-domestic wells and boreholes are subject to inspections to ensure compliance with the terms and conditions of this permit. Upon completion of the inspection, a wellhead inspection report will be sent to the well owner.

#### **Non-domestic (GPS Coordinates)**

35. The well and/or borehole must be constructed at or near the given coordinate as provided in the non-domestic well application: 48.656333 N, -56.442219 W. Any additional information on well or borehole locations can be acquired by contacting the groundwater environmental scientist at (709) 729-1671 or [GroundwaterSection@gov.nl.ca](mailto:GroundwaterSection@gov.nl.ca).

**APPENDIX B**

**Special Terms and Conditions for Permit**

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1. The Permit Holder and its agent(s), subcontractor(s), and consultant(s) shall keep all systems and works in good condition and repair and in accordance with all laws, by-laws, directions, rules and regulations of any governmental authority. The Permit Holder or its agent(s), subcontractor(s), or consultant(s) shall immediately notify the Minister if any problem arises which may threaten the structural stability of the systems and works, endanger public safety and/or the environment or adversely affect others and/or any body of water either in or outside the said Project areas. The Permit Holder and its agent(s), subcontractor(s), and consultant(s) shall be responsible for all damages suffered by the Minister and Government resulting from any defect in the systems and works, operational deficiencies/inadequacies, or structural failure.
2. The Permit Holder and its agent(s), subcontractor(s), and consultant(s) shall operate the said Project and its systems and works in a manner which does not cause any water related and/or environmental problems, including but not limited to problems of erosion, deposition, flooding, and deterioration of water quality and groundwater depletion, in or outside the said Project areas. The Permit Holder and its agent(s), subcontractor(s), and consultant(s) shall be responsible for any and all damages associated with these problems caused as a result of changes, deficiencies, and inadequacies in the operational procedures by the Permit Holder or its agent(s), subcontractor(s), or consultant(s).
3. If the Permit Holder or its agent(s), subcontractor(s), or consultant(s) fails to perform, fulfil, or observe any of the terms and conditions, or provisions of this Permit, as determined by this Department, the Minister may, without notice, amend, modify, suspend or cancel this Permit in accordance with the *Water Resources Act*.
4. The Permit Holder and its agent(s), subcontractor(s), and consultant(s) indemnify and hold the Minister and Government harmless against any and all liabilities, losses, claims, demands, damages or expenses including legal expenses of any nature whatsoever whether arising in tort, contract, statute, trust or otherwise resulting directly or indirectly from granting this Permit, systems and works in or outside the said Project areas, or any act or omission of the Permit Holder or its agent(s), subcontractor(s), or consultant(s) in or outside the said Project areas, or arising out of a breach or non-performance of any of the terms and conditions, or provisions of this Permit by the Permit Holder or its agent(s), subcontractor(s), or consultant(s).
5. This Permit is subject to all provisions of the *Water Resources Act* and any regulations in effect either at the date of this Permit or hereafter made pursuant thereto or any other relevant legislation enacted by the Province of Newfoundland and Labrador in the future.
6. This Permit shall be construed and interpreted in accordance with the laws of the Province of Newfoundland and Labrador.

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cc: Groundwater Section File Copy

**Appendix C - Completion Report**

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Attention: **Mr. Darren Hennessey**

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Permission was given for : **Well for pumping test to determine flow for groundwater contamination recovery**

*I (the Permit Holder named above or agent authorized to represent the Permit Holder) do hereby certify that the project described above was completed in accordance with the plans and specifications submitted to the Department of Municipal Affairs and Environment and that the work was carried out in strict compliance with the terms and conditions of the Permit issued for this project.*

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

This completion report must be completed and forwarded to the following address upon completion of the approved work.

Department of Municipal Affairs and Environment  
Water Resources Management Division  
PO Box 8700  
St. John's NL A1B 4J6

## General Water Quality Parameter List for Groundwater

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Alkalinity  
Aluminum  
Ammonia  
Antimony  
Arsenic  
Barium  
Boron  
Bromide  
Cadmium  
Calcium  
Chloride  
Chromium  
Colour (true)  
Conductivity  
Copper  
Dissolved Organic Carbon  
Fluoride  
Hardness  
Iron  
Kjeldahl Nitrogen  
Lead  
Magnesium  
Manganese  
Mercury  
Nickel  
Nitrate/Nitrite  
pH  
Potassium  
Selenium  
Sodium  
Sulphate  
Total Dissolved Solids  
Total Phosphorus  
Turbidity  
Uranium  
Zinc