Natural Resources Canada
Ressources naturelles Canada

CANADIAN GEOSCIENCE MAP 106

SURFICIAL GEOLOGY

TSIMEH CREEK

British Columbia

Map Information Document

Preliminary

Canadian Geoscience Maps

2013

Canada

PUBLICATION

Map Number

Natural Resouces Canada, Geological Survey of Canada
Canadian Geoscience Map 106 (Preliminary)

Title

Surficial geology, Tsimeh Creek, British Columbia

Scale

1:50 000

Catalogue Information

Catalogue No. M183-1/106-2012E-PDF
ISBN 978-1-100-21442-9
doi:10.4095/291998

Copyright

Recommended Citation

Huntley, D.H., Hickin, A.S., Chow, W., and Mirmohammadi, M., 2013. Surficial geology, Tsimeh Creek, British Columbia; Geological Survey of Canada, Canadian Geoscience Map 106 (preliminary), scale 1:50 000. doi:10.4095/291998

Cover Illustration

Loess covered glacial lake sediments incised by Tsimeh Creek, near confluence with the Fort Nelson River in northeast British Columbia, view north. Photograph by D.H. Huntley. 2013-078

ABSTRACT

Canadian Geoscience Map 106 depicts the surficial geology over some 790 km^2 covered by the Tsimeh Creek map sheet (NTS 94-O/02) in northeastern British Columbia. The map area lies within the Fort Nelson Lowland and is incised by west-flowing Fort Nelson River and north-draining Tsimeh Creek. Bedrock is mantled by unconsolidated earth materials dating to the Late Pleistocene (Late Wisconsinan Glaciation, >25 to 10 ka) and non-glacial Holocene (10 ka to present). Deposits of till, green on the map, are generally suitable for placement of infrastructure. Glaciofluvial and eolian deposits with mineral, aggregate and groundwater potential are coloured orange and buff. Slopes disturbed by landslides and debris flows appear brown. Glaciolacustrine and organic deposits with sporadically discontinuous permafrost are coloured purple and grey. Alluvial deposits prone to flooding, erosion, and sedimentation appear yellow on the map.

RÉSUME

La Carte géoscientifique du Canada 106 illustre la géologie des matériaux superficiels d'un territoire d'environ 790 km^2 couvert par le feuillet cartographique de Tsimeh Creek (SNRC 94-O/02), dans le nord-est de la Colombie-Britannique. La région cartographique se situe dans les basses terres de Fort Nelson et est entaillée par la rivière de Fort Nelson à écoulement ouest ainsi que par le ruisseau Tsimeh qui coule vers le nord. Le socle rocheux est couvert de matériaux terrestres non consolidés remontant au Pléistocène supérieur (Glaciation du Wisconsinien supérieur, de > 25 ka à env. 10 ka) ainsi que de matériaux non glaciaires de l'Holocène (d'env. 10 ka jusqu'à nos jours). Les dépôts de till, de couleur verte sur la carte, sont généralement propices à l'établissement de l'infrastructure. Les dépôts fluvioglaciaires et éoliens, qui recèlent un potentiel en minéraux, en agrégats et en eau souterraine, sont figurés par les couleurs orange et chamois. Les versants dérangés par des glissements de terrain et des coulés de débris sont représentés en brun. Les dépôts glaciolacustres et organiques, qui renferment sporadiquement du pergélisol discontinu, sont représentés en violet et en gris. Les dépôts alluviaux sujets aux inondations, à l'érosion et à la sédimentation apparaissent en jaune sur la carte.

ABOUT THE MAP

General Information

Authors: D.H. Huntley, A.S. Hickin, W. Chow, and M. Mirmohammadi

Geology by D.H. Huntley and A.S. Hickin (2009–2010)

Geological compilation by D.H. Huntley (2009–2011)

Geomatics by D.H. Huntley, W. Chow, and M. Mirmohammadi

Cartography by W. Chow

Initiative of the Geological Survey of Canada, conducted under the auspices of the Yukon Basin Project as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) program

Map projection Universal Transverse Mercator, zone 10. North American Datum 1983

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications. Elevations in feet above mean sea level

Magnetic declination 2013, 20º15'E, decreasing 21' annually

The Geological Survey of Canada welcomes corrections or additional information from users.

This publication is available for free download through GEOSCAN (http://geoscan.ess.nrcan.gc.ca/).

Preliminary publications in this series have not been scientifically edited.

Map Viewing Files

The published map is distributed as a Portable Document File (PDF), and may contain a subset of the overall geological data for legibility reasons at the publication scale.

ABOUT THE GEOLOGY

Descriptive Notes

INTRODUCTION

This Surficial Geology Map of NTS 94-O/2 (Canadian Geoscience Map 106) is the product of collaboration between the Geological Survey of Canada and the British Columbia Ministry of Energy, Mines and Natural Gas as part of the Geo-mapping for Energy and Minerals Program (GEM-Energy Yukon Basins Project. The accompanying geodatabase includes field observation points and field photos, landform features as lines, and surficial geology unit polygons. The map and geodatabase are essential baseline geoscience information for a range of potential end-users including resource explorationists, geotechnical engineers, land-use managers, terrestrial ecologists, archaeologists, geoscientists and communities in northern British Columbia. By providing new insight into the distribution and origins of surficial earth materials, CGM 106 will help to reduce the economic costs and risks associated with the sustainable development of energy and mineral resources in NTS 94-O/2. Environmental impact assessments for new access roads, work camps, well pads, pipeline and power transmission line corridors, water storage and waste management systems and other infrastructure will benefit from the geoscience information presented here. By identifying areas prone to geological hazards (e.g., landslides, permafrost, flooding), CGM 106 will also help to protect natural resources, infrastructure and communities vulnerable to climate change in Canada's north.

APPROACH TO SURFICIAL GEOLOGY MAPPING

Remote predictive mapping and field-based benchmarking studies have led to a better understanding of the regional distribution of surficial deposits, permafrost, landslides and other geomorphic processes in the NTS 94-O/2 map area (Huntley and Hickin, 2010; Huntley et al., 2011a-b). Surficial earth materials and landforms were classified using a combination of stereo-pair aerial photographs (BCB97010, 15BCB97015, 15BCB97029, 15BCB97075 and 15BCB97088 series), LANDSAT 7 satellite imagery (http://glovis.usgs.gov/ [URL 2011]) and Shuttle Radar Topography Mission digital elevation models (http://dds.cr.usgs.gov/srtm/ [URL 2011]). The base map was generated from CANVEC shape files (http://geogratis.cgdi.gc.ca/geogratis/ [URL 2011]). Surficial geology polygons and landform line symbols were digitized using commercially available computer software packages (Global Mapper, ArcMap and ArcGIS) and compared to published maps, reports and archived digital data from adjacent map areas (e.g., Stott and Taylor, 1968; Bednarski, 2003a-d; Clement et al., 2004; Bednarski, 2005a-b; Trommelen and Levson, 2008; Demchuk, 2010). The geodatabase accompanying this map conforms to the Science Language for the Data Management component of the GEM Geological Map Flow process (cf. Huntley and Sidwell, 2010; Huntley et al., 2011a; Deblonde et al., 2012).

Fieldwork was undertaken in 2009 and 2010 to ground truth surficial geology polygons interpreted from air photos and satellite imagery, and to gather characteristics that could not be determined through remote predictive mapping. Earth materials were defined on the basis of facies and landform associations, texture, sorting, colour, sedimentary structures, degree of consolidation, and stratigraphic contact relationships at field stations and remote observations from helicopters. The distribution of glacial and non-glacial landforms is depicted on the surficial geology map. Map units in the Legend include organic deposits, alluvial, colluvial, eolian, glaciolacustrine and glaciofluvial sediments, tills and areas of bedrock.

INFERRED GEOLOGICAL HISTORY

The distinctive landscape of NTS 94-O/2 is largely a product of underlying bedrock and geological structures, with ornamentation by the Late Wisconsinan Laurentide Ice Sheet. Fine-grained sandstone and shale (Lower Cretaceous Sikanni Formation) subcrop drift deposits in the southwest. Exposures in creek and river sections indicate that undifferentiated clastic bedrock (Lower Cretaceous Fort St. John Group) underlies the map area (Stott and Taylor, 1968).

Topography and drainage patterns were greatly modified during the phase of maximum ice cover (>18 ^{14}C ka BP or >21.4 calendar ka BP). Unconsolidated sediment thicknesses in excess of 2-5 m are observed in major valley exposures and it is suspected that similar drift thicknesses blanket bedrock (unit R) across the map area. Silt- and clay-rich Laurentide tills have low indurated clast contents (<20%) of proximally derived Cretaceous siliciclastic sedimentary rocks and distal igneous and metamorphic clasts from the Canadian Shield, hundreds of kilometres to the northeast. Drumlin ridges up to several hundred metres in length suggest clay-rich tills (unit Ts) were deposited beneath active, rapidly flowing warm-based glacial ice moving southwest across the map area (Huntley and Hickin, 2010; Huntley et al., 2011b). Multiple generations of ice flow are preserved in streamlined landforms. Northwest to westerly oriented drumlin ridges on the Fort Nelson Lowland are interpreted as a relict of glacial maximum ice flow patterns.

Deglaciation began sometime after 18 ^{14}C ka BP (or >21.4 calendar ka BP) and ended before 10 ^{14}C ka BP (ca. 12 calendar ka BP), with retreat of the Laurentide Ice Sheet, stagnant ice masses, glaciofluvial outwash and landslide debris blocked and reordered regional drainage. The mapped distribution of major moraine ridges (unit Tm) implies that ice margins receded eastward across the Fort Nelson Lowland (Huntley and Hickin, 2010). South of the Fort Nelson River, streamlined till between major moraines indicate that as lowland ice receded, glaciers remained active with flow directions changing to the west-northwest. Minor moraine ridges drape drumlins in cross-cutting patterns and are interpreted as crevasse fillings and squeeze moraines deposited shortly after drumlinization ended, or as ice retreated from the map area (Huntley et al., 2011b).

Hummocky till (unit Th) occurring in association with short segments of subareal-subglacial meltwater channels and eskers suggest that local bodies of stagnant glacier ice remained in lowland areas (Huntley et al., 2011a; Huntley et al., 2011b). As ice retreated from the map area, a proglacial lake system formed in the Fort Nelson Lowland. Proglacial lakes were linked by spillways that drained meltwater northward into the Liard River basin. In the map area, glaciolacustrine deposits (unit GLb), glaciofluvial terraces (unit GFt), and meltwater channels incised into till and bedrock indicate that glacial lake levels fell stepwise through deglaciation, with stable elevations at approximately 420 m, 380 m and <300 m. Most fine-grained glacial earth materials were re-worked by eolian activity and discontinuous loess (unit El) covers glacial lake and till deposits in some areas.

Post-glaciation (10 ^{14}C ka BP, or ca. 12 calendar ka BP to present), changes in regional base-level led to episodes of channel incision and aggradation, and resulted in the formation of erosional alluvial terraces along most stream and river valleys. In the early Holocene, pulses of fluvial terrace formation followed initial valley incision by the Liard and other major rivers. Most streams and rivers have alluvial fans (unit Af) and terraces (unit At) <5 m above active floodplains (unit Ap) consisting of gravel overlain by silt and sand. Poorly drained clay-rich till on the plateaux and glaciolacustrine sediments in lowland areas are covered by extensive postglacial peat deposits (unit Owb), fens (unit Owf) and undifferentiated wetlands (unit O). Discontinuous permafrost is sporadically encountered in glaciolacustrine and some peat deposits. Charcoal, observed in dug pits on alluvial terraces, suggest forest fires may have contributed to periods of landslide activity on slopes and local fluvial aggradation. Landslides and colluviated deposits (units Cv, Cb) are common where bedrock outcrops form escarpments, and where shale or fine-grained glacial deposits are exposed along steep cutbanks. Stream networks and wetlands draining plateau watersheds are disrupted by beaver activity and, to a lesser extent, by roads and infrastructure where they cross streams, rivers and organic deposits (Huntley and Hickin, 2010; Huntley and Hickin, 2011a-b).

Acknowledgments

Canadian Geoscience Map 106 is an output of the Geo-Mapping for Energy and Minerals Yukon Basins Project managed by Carl Ozyer and Larry Lane (GSC-Calgary). The assistance of Robert Cocking, Sean Eagles, Vic Dohar, Mike Sigouin, Scott Tweedy and Martin Legault (NRCAN Scientific Publishing Services) was greatly appreciated throughout the map-making process. A critical review of CGM 106 was provided by Roger Paulen (GSC-Ottawa).

References

Bednarski, J.M., 2003a. Betalamea Lake, Northwest Territories – Yukon Territory – British Columbia (NTS 95B/4); Geological Survey of Canada, Open File 4502, scale 1:50 000.

Bednarski, J.M., 2003b. Surficial geology of Fort Liard, Northwest Territories - British Columbia. Geological Survey of Canada, Open File 1760, scale 1:50 000.

Bednarski, J.M., 2003c. Surficial geology of Lake Bovie, Northwest Territories - British Columbia. Geological Survey of Canada, Open File 1761, scale 1:50 000.

Bednarski, J.M., 2003d. Surficial geology of Celibeta Lake, Northwest Territories - British Columbia. Geological Survey of Canada, Open File 1754, scale 1:50 000.

Bednarski, J.M., 2005a. Surficial Geology of Etsine Creek, British Columbia, Geological Survey of Canada, Open File 4825, scale 1:50 000.

Bednarski, J.M., 2005b. Surficial Geology of Gote Creek, British Columbia, Geological Survey of Canada, Open File 4846, scale 1:50 000.

Clement, C., Kowall, R. Huntley, D. and Dalziel, R., 2004. Ecosystem units of the Sahtaneh area; Slocan Forest Products (Fort Nelson) Report, 39 pages and appendices.

Deblonde, C., Plouffe, A., Boisvert, E., Buller, G., Davenport, P., Everett, D., Huntley, D., Inglis, E., Kerr, D., Moore, A., Paradis, S.J., Parent, M., Smith, R., St-Onge, D., and Weatherston, A., 2012. Science Language for an Integrated Geological Survey of Canada Data Model for Surficial Maps Version 1.1 Results of Geological Survey of Canada Surficial Legend Review Committee; Geological Survey of Canada, Open File 7003; 237 pages.

Demchuk, T., 2010. Surficial geology of the Komie Creek area (NTS 094P/05). British Columbia Ministry of Energy, Mines and Petroleum Resources, Open File 2010-08; Geological Survey of Canada Open File 6568, scale 1:50 000.

Huntley, D.H. and Hickin, A.S., 2010. Surficial deposits, landforms, glacial history and potential for granular aggregate and frac sand: Maxhamish Lake Map Area (NTS 94-O), British Columbia. Geological Survey of Canada, Open File 6430, 17 pages.

Huntley, D., Hickin, A. and Chow, W., 2011a. Surficial geology, geomorphology, granular resource evaluation and geohazard assessment for the Maxhamish Lake map area (NTS 94-O), northeastern British Columbia; Geological Survey of Canada, Open File 6883, 20 pages.

Huntley, D.H., Hickin, A.S. and Ferri, F., 2011b. Provisional surficial geology, glacial history and paleogeographic reconstructions of the Toad River (NTS 94-N) and Maxhamish Lake map areas (NTS 94-O), British Columbia. Geoscience Reports 2011, BC Ministry of Energy, pages 37-55.

Huntley, D.H. and Sidwell, C.F., 2010. Application of the GEM surficial geology data model to resource evaluation and geohazard assessment for the Maxhamish Lake map area (NTS 94-O), British Columbia. Geological Survey of Canada, Open File 6553, 22 pages.

Stott, D.F. and Taylor, G.C., 1968. Geology of Maxhamish Lake. Geological Survey of Canada, Map 2-1968, scale 1:250 000.

Trommelen, M. and Levson, V.M., 2008. Quaternary stratigraphy of the Prophet River, northeastern British Columbia; Canadian Journal of Earth Sciences, Vol. 45, pages 565-575.

Author Contact

Questions, suggestions, and comments regarding the geological information contained in the data sets should be addressed to:

David Huntley
Geological Survey of Canada
1500 – 605 Robson Street
Vancouver BC
V6B 5J3
David.Huntley@nrcan.gc.ca

Coordinate System

Projection: Universal Transverse Mercator
Units: metres
Zone: 10N
Horizontal Datum: NAD83
Vertical Datum: mean sea level

Bounding Coordinates

Western longitude: 123°00’00” W
Eastern longitude: 122°30’00” W
Northern latitude: 59°15’00” N
Southern latitude: 59°00’00” N

Data Model Information

The Geological Survey of Canada (GSC) through the Geomapping for Energy and Minerals Program (GEM) has undertaken the Geological Map Flow to develop protocols for the collection, management (compilation, interpretation), and dissemination of surficial and bedrock geology data and map information. To this end, a data model has been created.

The Surficial Data Model (SDM) was designed using ESRI geodatabase architecture. The XML workspace document provided can be imported into a geodatabase, and the geodatabase will then be populated with the feature datasets, feature classes, tables, relationship classes, subtypes and domains.

Shapefile and table (.dbf) versions of the data are included within the data. Column names have been simplified and the text values have been maintained within the shapefile attributes. The direction columns are numerical, to display rotation for points, and the symbol fields will hold the correct values to be matched to the appropriate style file.

For a more in depth description of the data model please refer to the official publication:

Science language for an integrated Geological Survey of Canada data model for surficial geology maps, version 1.2; Deblonde, C; Plouffe, A; Boisvert, É; Buller, G; Davenport, P; Everett, D; Huntley, E; Inglis, E; Kerr, D; Moore, A; Paradis, S J; Parent, M; Smith, I R; St. Onge, D; Weatherston, A. Geological Survey of Canada, Open File 7003, (ed. 1.2), 2012, ; 238 pages (1 sheet), doi:10.4095/290144

LICENSE AGREEMENT

GEOGRATIS LICENCE AGREEMENT FOR UNRESTRICTED USE OF DIGITAL DATA

This is a legal agreement between you ("Licensee") and Her Majesty the Queen in Right of Canada ("Canada"), as represented by the Minister of Natural Resources Canada. **BY ACCESSING, DOWNLOADING, PRINTING OR USING THE DATA, INFORMATION AND MATERIALS BEING PROVIDED WITH, OR ACCESSIBLE PURSUANT TO THIS AGREEMENT, YOU ARE AGREEING TO BE BOUND BY THE TERMS OF THIS AGREEMENT. IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, YOU MUST IMMEDIATELY DISPOSE OF ANY SUCH DATA, INFORMATION, MATERIALS AND ANY DERIVED PRODUCTS.**

I. **WHEREAS** Canada is the owner of the data (the "Data") accessible pursuant to the terms and conditions of this Agreement;

II. **AND WHEREAS** the Licensee wishes to obtain certain rights to the Data, on terms and conditions herein contained;

III. **AND WHEREAS** Canada represents that it has full authority to grant the rights desired by the Licensee on the terms and conditions herein contained;

IV. **AND WHEREAS** the parties hereto are desirous of entering into a licence agreement on the basis herein set forth.

NOW, THEREFORE, in consideration of the covenants contained in this Agreement, the parties agree as follows:

1.0 DEFINITIONS

1. Canada's Data means any and all Data, the Intellectual Property Rights of which vest with Canada.

2. Data means any digital data, meta-data, or documentation subject to the terms and conditions of this Agreement.

3. Derivative Products means any product, system, sub-system, device, component, material or software that incorporates or uses any part of the Data.

4. Intellectual Property Rights means any intellectual property right recognised by law, including any intellectual property right protected through legislation, such as that governing, but not limited to, copyright and patents.

2.0 LICENCE GRANT

1. Subject to this Agreement, Canada hereby grants to the Licensee a non-exclusive, fully paid, royalty-free right and licence to exercise all Intellectual Property Rights in the Data. This includes the right to use, incorporate, sublicense (with further right of sublicensing), modify, improve, further develop, and distribute the Data; and to manufacture and / or distribute Derivative Products.

2. The Intellectual Property Rights arising from any modification, improvement, development or translation of the Data, or from the manufacture of Derivative Products, effected by or for the Licensee, shall vest in the Licensee or in such person as the Licensee shall decide.

3.0 PROTECTION AND ACKNOWLEDGEMENT OF SOURCE

1. Use of the Data shall not be construed as an endorsement by Canada of any Derivative Products. The Licensee shall identify the source of the Data, in the following manner, where any of the Data are redistributed, or contained within Derivative Products:
   "© Department of Natural Resources Canada. All rights reserved."

4.0 WARRANTY, LIABILITY, INDEMNITY

1. Canada makes no representation or warranty of any kind with respect to the accuracy, usefulness, novelty, validity, scope, completeness or currency of the Data and expressly disclaims any implied warranty of merchantability or fitness for a particular purpose of the Data. Canada does not ensure or warrant compatibility with past, current or future versions of any browser to access the site's Data.

2. The Licensee shall have no recourse against Canada, whether by way of any suit or action, for any loss, liability, damage or cost that the Licensee may suffer or incur at any time, by reason of the Licensee's possession or use of the Data.

3. The Licensee shall indemnify Canada and its officers, employees, agents and contractors from all claims alleging loss, costs, expenses, damages or injuries (including injuries resulting in death) arising out of the Licensee's possession or use of the Data.

4. The Licensee shall license all persons or parties who obtain Data or Derivative Products from the Licensee the right to use the Data or Derivative Products by way of a license agreement, and that agreement shall impose upon these persons or parties the same terms and conditions as those contained in section 4.0 of this Agreement.

5. The Licensee's liability to indemnify Canada under this Agreement shall not affect or prejudice Canada from exercising any other rights under law.

5.0 TERM

1. This Agreement is effective as of the date and time of acceptance (Eastern Time) and shall remain in effect for a period of one (1) year, subject to subsection 5.2 and section 6.0 below.

2. At the end of the first term, this Agreement shall automatically be extended for successive one (1) year terms, subject to section 6.0 below.

6.0 TERMINATION

1. Notwithstanding section 5.0, this Agreement shall terminate:

   i automatically and without notice, if the Licensee commits or permits a breach of any of its covenants or obligations under this Agreement;

ii upon written notice of termination by the Licensee at any time, and such termination shall take effect thirty (30) days after the receipt by Canada of such notice; or

iii upon mutual agreement of the parties.

2. Upon the termination for whatever reason of this Agreement, the Licensee's obligations under section 4.0 shall survive; and the Licensee's rights under section 2.0 shall immediately cease.

3. Upon the termination for whatever reason of this Agreement, the Licensee shall delete or destroy all Data acquired under this Agreement immediately or within a reasonable timeframe where the Data is required to complete orders of Derivative Products made before the termination date of this Agreement.

7.0 GENERAL

1. **Applicable Law**
   This Agreement shall be construed and enforced in accordance with, and the rights of the parties shall be governed by, the laws of Ontario and Canada as applicable. The parties hereto attorn to the jurisdiction of the Superior Court of the Province of Ontario.

2. **Entire Agreement**
   This Agreement constitutes the entire agreement between the parties with respect to its subject matter. This Agreement may only be amended in writing, signed by both parties, which expressly states the intention to amend this Agreement.

3. **Dispute Resolution**
   If a dispute arises concerning this Agreement, the parties shall attempt to resolve the matter by negotiation.

ACCORD DE LICENCE

ACCORD DE LICENCE D'UTILISATION SANS RESTRICTION DE DONNÉES NUMÉRIQUES DE GÉOGRATIS

CE DOCUMENT constitue une entente légale entre vous (ci-après le " Détenteur de licence ") et SA MAJESTÉ LA REINE DU CHEF DU CANADA (ci-après le " Canada "), représentée par le Ministre des Ressources naturelles du Canada. **EN ATTEIGNANT, TÉLÉCHARGEANT, IMPRIMANT OU UTILISANT LES DONNÉES, L'INFORMATION OU LE MATÉRIEL FOURNIS OU ACCESSIBLES SELON CETTE ENTENTE, VOUS VOUS ENGAGEZ À RESPECTER LES MODALITÉS DE CET ACCORD.** SI VOUS ÊTES EN DÉSACCORD AVEC CES MODALITÉS, VOUS DEVEZ IMMÉDIATEMENT ÉLIMINER TOUTE COPIE DE CES DONNÉES, INFORMATION, MATÉRIEL ET PRODUITS DÉRIVÉS.

I. **ATTENDU QUE** le Canada détient les droits de propriété sur les données (les " Données ") accessibles aux termes des modalités de cet Accord;

II. **ATTENDU QUE** le Détenteur de licence désire obtenir certains droits sur les Données, sous réserve des modalités énoncées ci-après;

III. **ATTENDU QUE** le Canada déclare avoir la pleine autorité pour accorder les droits demandés par le Détenteur de licence, sous réserve des modalités énoncées ci-après;

IV. **ET ATTENDU QUE** les parties veulent en venir à une entente d'utilisation à partir de ce qui suit.

V. **À CES CAUSES**, en considérant les conventions contenues dans cet Accord, les parties conviennent de ce qui suit :

1.0 DÉFINITIONS

1. Données du Canada signifie toute Donnée dont le Canada détient le droit de propriété.

2. Données signifie toute donnée numérique, métadonnée ou documentation visée par les modalités de cet Accord.

3. Produits dérivés signifie tout produit, système, sous-système, appareil, composant, matériel ou logiciel qui comprend ou utilise toute partie des Données.

4. Droits de propriété intellectuelle signifie tout droit de propriété intellectuelle reconnu par la loi, y compris tout droit de propriété intellectuelle protégé par une législation telle que celle qui régit, sans être limitée à, les droits d'auteur et les brevets.

2.0 CESSION D'UNE LICENCE

1. 2.1 Sous réserve des modalités du présent Accord, le Canada octroie au Détenteur de licence une licence non exclusive, sans frais ni redevances exigibles, et le droit d'exercer tous les Droits de propriété intellectuelle sur les Données. Ceci comprend le droit d'utiliser, incorporer, accorder des licences d'utilisation (avec droit subséquent d'accorder des licences d'utilisation), modifier, améliorer, développer et distribuer les Données; et de fabriquer ou distribuer des Produits dérivés.

2. Les Droits de propriété intellectuelle découlant de toute modification, amélioration, développement ou traduction des Données, ou de la fabrication de Produits dérivés, effectués par ou pour le Détenteur de licence seront détenus par le Détenteur de licence ou tout substitut identifié par le Détenteur de licence.

3.0 PROTECTION ET IDENTIFICATION DE LA SOURCE

1. L'utilisation des Données ne constitue en aucune façon une reconnaissance par le Canada d'un Produit dérivé. Le Détenteur doit identifier la source de données, de la façon suivante, lorsque toute partie des Données est redistribuée ou comprise dans un Produit dérivé :
   © Le ministère des Ressources naturelles Canada. Tous droits réservés.

4.0 GARANTIE, EXCLUSION ET INDEMNISATION

1. Le Canada ne fait aucune représentation ou garantie, expresse ou tacite, découlant de la loi ou d'autres sources, en ce qui concerne entre autres l'exactitude, l'utilité, la nouveauté, la validité, l'étendue, l'intégralité ou l'actualité des Données et rejette expressément toute garantie implicite de qualité loyale et marchande ou l'à propos à une fin particulière des Données. Le Canada n'assure ni ne garantit la compatibilité du site qui contient les Données avec les versions antérieures, actuelles et futures de n'importe quel fureteur.

2. Le Canada ne peut être tenu responsable par le Détenteur de licence en ce qui a trait à toute réclamation, revendication ou action en justice, quelle qu'en soit la cause, concernant toute perte ou tout préjudice ou dommage ou frais, direct ou indirect, qui pourrait résulter de la possession ou de l'utilisation des Données par le Détenteur de licence.

3. Le Détenteur de licence tiendra le Canada et ses représentants, employés, agents et exécutants, indemnes et à couvert à l'égard de toute réclamation, revendication ou action en justice, quelle qu'en soit la cause, alléguant toute perte, tout frais, toute dépense, tout dommage ou toute blessure (y compris toute blessure mortelle) qui pourrait résulter de la possession ou de l'utilisation des Données par le Détenteur de licence.

4. Le Détenteur de licence devra accorder des licences d'utilisation à toute personne ou partie qui obtient les Données ou des Produits dérivés au moyen d'un accord de licence, et cet accord devra imposer à ces personnes ou parties les mêmes modalités que celles qui sont énoncées dans la section 4.0 de cet Accord.

5. L'obligation du Détenteur de licence d'indemniser le Canada selon cet Accord ne peut affecter ni empêcher le Canada d'exercer tout autre droit selon la loi.

5.0 DURÉE

1. Cet Accord entre en vigueur à partir de la date et de l'heure d'acceptation des modalités de l'Accord (Heure de l'Est) et restera en vigueur pour une période d'un (1) an, en vertu de la sous-section 5.2 et de la section 6.0 qui suivent.

2. À la fin du premier terme, cet Accord sera automatiquement renouvelé pour des termes successifs d'un (1) an, en vertu de la section 6.0 qui suit.

6.0 RÉSILIATION

1. 6.1 Nonobstant la section 5.0, cet Accord peut être résilié :

   i. automatiquement et sans préavis, si le Détenteur de licence manque à ses engagements ou obligations selon cet Accord;

   ii. par un préavis écrit de résiliation émis par le Détenteur de licence, en tout temps, et cette résiliation prendra effet trente (30) jours suivant la réception d'un tel préavis par le Canada; ou

   iii. par consentement mutuel des parties.

2. Lors de la résiliation de cet Accord, pour quelque raison que ce soit, les obligations qui incombent au Détenteur de licence en vertu de la section 4.0 continueront de s'appliquer et les droits du Détenteur de licence en vertu de la section 2.0 cesseront immédiatement.

3. Lors de la résiliation de cet Accord, pour quelque raison que ce soit, le Détenteur de licence devra immédiatement effacer ou détruire toutes les Données obtenues en vertu de cet Accord, ou à l'intérieur d'un délai raisonnable lorsque les Données sont nécessaires pour terminer la livraison de Produits dérivés commandés avant la résiliation de cet Accord.

7.0 GÉNÉRAL

1. **Lois d'application**
   Le présent Accord est régi et interprété en vertu des lois en vigueur dans la province de l'Ontario. Les parties acceptent de tomber sous la juridiction de la Cour supérieure de la Province de l'Ontario.

2. **Totalité de l'Accord**
   Le présent Accord constitue l'intégralité de l'entente conclue entre les parties relativement à l'objet du présent Accord. Toute modification à cet Accord ne peut être que par écrit, doit porter la signature de chaque partie et exprimer clairement l'intention de modifier cet Accord.

3. **Solution des litiges**
   Si un litige survient à propos de cet Accord, les parties tenteront de le résoudre par des négociations de bonne foi.