

# PUBLICATIONS

**MANITOBA GEOLOGICAL SURVEY PUBLICATIONS**  
**RELEASED DECEMBER 2012 TO NOVEMBER 2013**

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## **Data Repository Items**

DRI2013001

Geochronological data for sample 107-09-207a, Southern Indian Lake, Manitoba (part of NTS 64G8)

by N. Rayner

*Microsoft® Excel® file accompanies:*

*Kremer, P.D., Rayner, N. And Corkery, M.T. 2009: New results from geological mapping in the west-central and northeastern portions of Southern Indian Lake, Manitoba (parts of NTS 64G1, 2, 8, 64H4, 5); in Report of Activities, Manitoba Innovation, Energy and Mines, Manitoba Geological Survey, p. 94–107.*

DRI2013002

Lithogeochemical database, Sm-Nd isotopic data and U-Pb geochronological data for the eastern Rice Lake greenstone belt, southeastern Manitoba (parts of NTS 52L11, 14)

by S.D. Anderson

*Microsoft® Excel® file accompanies:*

*Anderson, S.D. 2013: Geology of the Garner–Gem lakes area, Rice Lake greenstone belt, southeastern Manitoba (parts of NTS 52L11, 14); Manitoba Mineral Resources, Manitoba Geological Survey, Geoscientific Report GR2013-1, 135 p.*

DRI2013003

Field-based ice-flow indicator data, Gauer Lake–Wishart Lake area, north-central Manitoba (NTS 64H4, 5, 12, 13)

by M.S. Trommelen

*Microsoft® Excel® file accompanies:*

*Trommelen, M.S. 2013: Quaternary geology between Gauer Lake and Wishart Lake, north-central Manitoba (NTS 64H4, 5, 12 13, parts of 64G1, 8); in Report of Activities 2013, Manitoba Mineral Resources, Manitoba Geological Survey, p. 156–168.*

DRI2013004

Radiocarbon data, Gillam and Knee Lake areas, north-central Manitoba (NTS 54C, D, 53M1)

by M.S. Trommelen

*Microsoft® Excel® file accompanies:*

*Trommelen, M.S. 2013: Preliminary Quaternary geology in the Gillam area, northeastern Manitoba (parts of NTS 54D5–9, 11 and 54C12); in Report of Activities 2013, Manitoba Mineral Resources, Manitoba Geological Survey, p. 169–182.*

DRI2013005

Field-based ice-flow indicator data, Gillam to Split Lake, north-central Manitoba (NTS 54D, 64A)

by M.S. Trommelen

*Microsoft® Excel® file accompanies:*

*Trommelen, M.S. 2013: Preliminary Quaternary geology in the Gillam area, northeastern Manitoba (parts of NTS 54D5–9, 11 and 54C12); in Report of Activities 2013, Manitoba Mineral Resources, Manitoba Geological Survey, p. 169–182.*

## **Geoscience Educational Series**

ES2013-1

Cold Manitoba – the Quaternary: Glaciers – Manitoba’s landscape artists – 25 000 to 11 000 years ago

*(Geological History of Manitoba poster)*

ES2013-2

Cold Manitoba – the Quaternary: Glaciers retreat – the last to leave – 11 000 to 7 000 years ago  
(*Geological History of Manitoba poster*)

ES2013-3

Cold Manitoba – the Quaternary: Glacial leftovers – post-glacial period – the last 7 000 years  
(*Geological History of Manitoba poster*)

## **Geoscientific Papers**

GP2013-1

Till composition and ice-flow indicator data, Snyder Lake area, northwestern Manitoba (parts of NTS 64N5)  
by M.S. Trommelen, J.E. Campbell, P.D. Kremer and C.O. Böhm  
(*Report on DVD*)

## **Geoscientific Reports**

GR2011-1

Geology and geochemistry of arc and ocean-floor volcanic rocks in the northern Flin Flon Belt, Embury–Wabishkok–Naosap lakes area, Manitoba (parts of NTS 63K13, 14)  
by H.P. Gilbert  
(*Report with accompanying map and interactive GIS map on DVD*)

GR2012-1

Geology of the Elbow Lake area, central Flin Flon Belt, Manitoba (part of NTS 63K15W)  
by E.C. Syme and J.B. Whalen  
(*Report with accompanying map and interactive GIS map on DVD*)

GR2012-2

Geology of the Flin Flon area, Manitoba and Saskatchewan (part of NTS 63K12, 13)  
by R-L. Simard, K. MacLachlan, H.L. Gibson, Y.M. DeWolfe, C.A. Devine, P.D. Kremer, B. Lafrance, D. Ames, E.C. Syme, A.H. Bailes, K. Bailey, D. Price, S. Pehrsson, E.M. Lewis, D. Lewis and A.G. Galley  
(*Report with accompanying map MAP2010-1*)

GR2012-3

Stratigraphy and regional geology of the Late Devonian-Early Mississippian Three Forks Group, southwestern Manitoba (NTS 62F, parts of 62G, K)  
by M.P.B. Nicolas  
(*Report*)

GR2013-1

Geology of the Garner–Gem lakes area, Rice Lake greenstone belt, southeastern Manitoba (parts of NTS 52L11, 14)  
by S.D. Anderson  
(*Report with accompanying map and DRI2013002*)

## Open Files

OF2011-1

GIS compilation of relogged sub-Phanerozoic Precambrian exploration drillcore from the Thompson Nickel Belt, eastern Flin Flon Belt and Winnipegosis Komatiite Belt (parts of NTS 63B, 63C, 63F, 63G, 63J)

by C.R. McGregor

*(Report and interactive GIS map on DVD)*

OF2012-1

GIS compilation of exploration drillcore from all Manitoba Geological Survey drillcore libraries

by C.R. McGregor

*(Report and interactive GIS map on DVD)*

OF2012-2

Digital compilation of sub-Phanerozoic Precambrian geology in Manitoba

by C.R. McGregor

*(Report and interactive GIS map on DVD)*

OF2013-1 / GAC–MAC Field Trip Guidebook FT-C5

Ordovician–Silurian boundary interval in the Williston Basin outcrop belt of Manitoba: a record of global and regional environmental and biotic change

by R.J. Elias, G.A. Young, L.A. Stewart, M.W. Demski, M.J. Porter, T.D. Lukie, G.S. Nowlan and E.P. Dobrzanski

*(Report for download)*

OF2013-2

Regional lake sediment geochemical data, Kasmere Lake–Nueltin Lake area, Manitoba (NTS 64-K, 64-N, 64-O)

by M.W. McCurdy, J.E. Campbell, C.O. Böhm, M.S. Trommelen, and E.C. Syme

*(Report for download; also released as: Geological Survey of Canada, Open File 7309)*

OF2013-3 / GAC–MAC Field Trip Guidebook FT-A2

Volcanological and Structural Setting of Paleoproterozoic VMS and Gold deposits at Snow Lake, Manitoba

by A. Bailes, K. Rubingh, S. Gagné, C. Taylor, A. Galley, S. Bernauer and D. Simms

*(Report for download)*

OF2013-4 / GAC–MAC Field Trip Guidebook FT-A1

The Rice Lake mine trend, Manitoba: regional setting, host rock stratigraphy and structural evolution of a classical Archean orogenic gold system

by S.D. Anderson

*(Report for download)*

OF2013-5 / GAC–MAC Field Trip Guidebook FT-B1

Geology of the Manitoba Legislative Building

by J. Young, G. Young and W.C. Brisbin

*(Report for download)*

OF2013-6 / GAC–MAC Field Trip Guidebook FT-C3

The volcanological and structural evolution of the Paleoproterozoic Flin Flon Mining District, Manitoba: the anatomy of a giant VMS system

by H. Gibson, B. Lafrance, S. Pehrsson, M. DeWolfe, K. Gilmore, R.-L. Simard and B. Pearson

*(Report for download)*

OF2013-7 / GAC–MAC Field Trip Guidebook FT-C2

Mafic and ultramafic intrusive rocks and associated Ni-Cu-(PGE) and Cr-(PGE) mineralization in the Bird River greenstone belt, southeast Manitoba

by H.P. Gilbert, M.G. Houlié, X.M. Yang, J.S. Scoates, R.F.J. Scoates, C.A. Mealin, V. Bécu, V.J. McNicoll and C.R. Galeschuk

*(Report for download)*

OF2013-8 / GAC–MAC Field Trip Guidebook FT-C1

The Tanco mine: geological setting, internal zonation and mineralogy of a world-class rare element pegmatite deposit

by T. Martins, P. Kremer and P. Vanstone

*(Report for download)*

OF2013-9 / GAC–MAC Field Trip Guidebook FT-A4

Upper Cretaceous-Paleocene stratigraphy and mineral resources of southwestern Manitoba (parts of NTS 62F, G)

by J.D. Bamburak and M.P.B. Nicolas

*(Report for download)*

## **Preliminary Maps**

PMAP2013-1

Geology and structure of northeastern Oxford Lake, Manitoba (parts of NTS 53L13, 14): sheet 1

by S.D. Anderson, P.D. Kremer and T. Martins

scale 1:20 000

PMAP2013-2

Geology and structure of northeastern Oxford Lake, Manitoba (parts of NTS 53L13, 14): sheet 2

by S.D. Anderson, P.D. Kremer and T. Martins

scale 1:20 000

PMAP2013-3

Geology and structure of northeastern Oxford Lake, Manitoba (parts of NTS 53L13, 14): sheet 3

by S.D. Anderson, P.D. Kremer and T. Martins

scale 1:20 000

PMAP2013-4

Bedrock geology of northeastern Cauchon Lake, Manitoba (parts of NTS 63P9, 10)

by C.G. Couëslan

scale 1:20 000

PMAP2013-5

Bedrock geology of northern and western Partridge Crop Lake, Manitoba (parts of NTS 63P11, 12)

by C.G. Couëslan

scale 1:20 000

PMAP2013-6

Geology and structure of the eastern extension of the Rice Lake mine trend, Rice Lake greenstone belt, southeastern Manitoba (part of NTS 52M3, 4)

by S.D. Anderson

scale 1:10 000

PMAP2013-7

Bedrock geology of the Cat Lake–Euclid Lake area, Bird River greenstone belt, southeastern Manitoba (parts of NTS 52L11, 12)

by X.M. Yang

scale 1:10 000

PMAP2013-8

Geology of the Rail Lake–Sewell Lake area, Flin Flon–Snow Lake greenstone belt, west-central Manitoba (parts of NTS 63K10, 15)

by S. Gagné

scale 1:10 000

## EXTERNAL PUBLICATIONS

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- Bamburak, J.D., Nicolas, M.P.B. and Hatcher, J. 2013: A visual system of correlating bentonite seams in the Pembina Member of the Upper Cretaceous Pierre Shale in the Pembina Hills area of Manitoba and North Dakota (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=10&abs\\_no=79](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=10&abs_no=79)> [October 11, 2013]
- Bécu, V., Houlié, M.G., McNicoll, V.J., Yang, X.M. and Gilbert, H.P. 2013: New insights from textural, petrographic and geochemical investigation of the gabbroic rocks of the Bird River Intrusive Event within the Bird River greenstone belt, southeastern Manitoba; Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, Program with Abstracts, p. 68, URL <<http://www.gac.ca/wp/wp-content/uploads/2013/05/2013WinnipegGACMACAbstracts-merged.pdf>> [October 30, 2013]
- Caté, A.V., Mercier-Langevin, P., Ross, P-S., Duff, S., Hannington, M., Dubé, B. and Gagné, S. 2013: The Paleoproterozoic Lalor VMS deposit, Snow Lake, Manitoba: observations on the nature and architecture of the gold and base metal-rich ore zones and associated alterations (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=10&abs\\_no=99](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=10&abs_no=99)> [November 2, 2013]
- Chow, N., Bates, K., Eggie, L., McDonald, D. and Nicolas, M.P.B. 2013: Resource potential of the Devonian Winnipegosis and Duperow formations in southwestern Manitoba; 21<sup>st</sup> Williston Basin Petroleum Conference, Regina, Saskatchewan, April 30–May 2, 2013, (oral presentation) URL <[http://wbpc.ca/+pub/document/2013\\_presentations/Chow%20WBPC%202013\\_N%20Chow\\_for%20posting.pdf](http://wbpc.ca/+pub/document/2013_presentations/Chow%20WBPC%202013_N%20Chow_for%20posting.pdf)>, 28 p. [October 11, 2013]
- Couëslan, C.G., Pattison, D.R.M. and Dufrane, S.A. 2013: Paleoproterozoic metamorphic and deformation history of the Thompson Nickel Belt, Superior Boundary Zone, Canada, from in situ U–Pb analysis of monazite; Precambrian Research, v. 237, p. 13-35.
- Duff, S., Hannington, M., Caté, A., Mercier-Langevin, P., Kjarsgaard, I., Dubé, B. and Gagné, S. 2013: Major ore types of the Lalor gold-rich massive sulfide deposit, Snow Lake, Manitoba (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=11&abs\\_no=342](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=11&abs_no=342)> [November 2, 2013]
- Hosseinejad, S., Pedersen, P.K., Spencer, R. and Nicolas, M.P.B. in press: Application of XRF to Cretaceous organic-rich, siliciclastic/carbonate mudrocks, eastern Saskatchewan and southwestern Manitoba (abstract); Canadian Society of Petroleum Geologists–Canadian Society of Exploration Geophysicists–Canadian Well Logging Society Conference, Calgary, Alberta, May 6-10, 2013.
- Hosseinejad, S., Pedersen, P.K., Spencer, R. and Nicolas, M.P.B. 2013: Integrated Sedimentary Geochemistry of a Cretaceous Potential Shallow Shale Gas Reservoir, western Manitoba, Canada (abstract); American Association of Petroleum Geologists, Annual Convention and Exhibition, Pittsburgh, Pennsylvania, May 19–22, 2013, URL <<http://www.searchanddiscovery.com/abstracts/html/2013/90163ace/abstracts/hos.htm?q=%2BtextStrip%3Apedersen>> [October 11, 2013]
- Houlié, M.G., Leshner, C.M., Metsaranta, R.T., Goutier, J., McNicoll, V. and Gilbert, H.P. 2013: Temporal and spatial distribution of magmatic Ni-Cu-PGE/Cr-PGE/Fe-Ti-V deposits in the Bird River/Uchi/Oxford-Stull/La Grande-Eastmain superdomain: a new metalotect within the Superior Province (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=10&abs\\_no=488](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=10&abs_no=488)> [November 2, 2013]
- Houlié, M.G., McNicoll, V.J., Bécu, V., Yang, X.M. and Gilbert, H.P. 2013: New age for the Mayville Intrusion: Implication for a Large Mafic-Ultramafic Event in the Bird River Greenstone Belt, Southeastern Manitoba; Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, Program with Abstracts, p. 115, URL <<http://www.gac.ca/wp/wp-content/uploads/2013/05/2013WinnipegGACMACAbstracts-merged.pdf>> [October 30, 2013]

- Kremer, P.D., Davis, D.W., Lin, S. and Linnen, R.L. 2013: Syn-deformational emplacement of the Bernic Lake pegmatite group, Bird River greenstone belt, southeastern Manitoba (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=10&abs\\_no=497](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=10&abs_no=497)> [November 2, 2013]
- Lavoie, D., Pinet N., Dietrich, J., Hu, K., Zhang, S., Chen, Z., Decker, V., Armstrong, D., Nicolas, M.P.B. and Duchesne, M.J. 2013: The final North America conventional oil frontier: The intracratonic Hudson Bay Basin in northern Canada (abstract); Geological Society of America, Annual Meeting and Expo, Denver, Colorado, October 27-30, 2013, URL <<https://gsa.confex.com/gsa/2013AM/webprogram/Paper223755.html>> [October 11, 2013]
- Lavoie, D., Pinet N., Dietrich, J., Kohn, B.P., Zhang, S., Hu, K., Armstrong, D., Nicolas, M.P.B., Asselin, E., Bertrand, R., Duchesne, M.J., Decker, V., Galloway, J., Reyes, J. and Brake, V. 2013: The final North American conventional oil frontier: The intracratonic Hudson Bay Basin in the Canadian arctic (abstract); American Association of Petroleum Geologists, Annual Convention and Exhibition, Pittsburgh, Pennsylvania, May 19–22, 2013, URL <<http://www.searchanddiscovery.com/abstracts/html/2013/90163ace/abstracts/lavo.htm?q=%2BtextStrip%3Alavoie>> [October 11, 2013]
- Lavoie, D., Pinet, N., Zhang, S., Dietrich, J., Armstrong, D., Nicolas, M.P.B., Keating, P., Decker, V. and Kohn, B. in press: The synthesis of hydrocarbon systems and conceptual plays for the intracratonic Hudson Bay Basin, arctic Canada (abstract); Canadian Society of Petroleum Geologists–Canadian Society of Exploration Geophysicists–Canadian Well Logging Society Conference, Calgary, Alberta, May 6–10, 2013.
- Lee, S.K.Y., Lenton, M. And Keller, G. 2013: GeoCapture – Geological and geochemical database management system for drill hole and surface data (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=10&abs\\_no=223](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=10&abs_no=223)> [November 2, 2013]
- McWhirter, B.R., Lobb, D.A., Bamburak, J.D., Nicolas, M.P.B., Li, S. and Ali, G. 2013: Determination of the bedrock stratigraphy of the south Tobacco Creek area in the Pembina Hills portion of the Manitoba escarpment using field investigation, LIDAR and photo imagery (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=11&abs\\_no=257](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=11&abs_no=257)> [October 11, 2013]
- Murphy, L.A. 2013: Grandmother teaching Earth Science (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=10&abs\\_no=459](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=10&abs_no=459)> [November 2, 2013]
- Nicolas, M.P.B., Bamburak, J.D., Hosseininejad, S. and Pedersen, P.K. 2013: Mineralogy, geochemistry and facies variations of a potential shallow shale gas play within the Cretaceous Carlile and Favel formations, southwestern Manitoba (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=11&abs\\_no=195](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=11&abs_no=195)> [October 11, 2013]
- Nicolas, M.P.B., Lavoie, D. and Armstrong, D.K. 2013: Oil shale and reservoir rocks of the Hudson Bay Lowland, north-eastern Manitoba (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=10&abs\\_no=40](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=10&abs_no=40)> [October 11, 2013].
- Pietrus, E.C., Chow, N. and Nicolas, M.P.B. 2013: Sedimentological analysis and reservoir potential of the Lower Silurian Ekwon River Formation, Hudson Bay Basin, northeast Manitoba (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=10&abs\\_no=416](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=10&abs_no=416)> [October 11, 2013]

- Trommelen, M.S., Ross, M. And Campbell, J.E. 2013: A spatial mosaic of overprinting and inheritance within the till sheet of northeastern Manitoba (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=10&abs\\_no=496](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=10&abs_no=496)> [November 2, 2013]
- Trommelen, M.S., Ross, M. and Campbell, J. E. 2013: Inherited clast dispersal patterns: implications for paleoglaciology of the southeast Keewatin Sector of the Laurentide Ice Sheet; *Boreas*, v. 42, no. 3, p. 693-713.
- Yang, X.M., Gilbert, H.P., Houlé, M.G., Bécu, V., McNicoll, V.J. and Corkery, M.T. 2013: The Neoproterozoic Mayville mafic-ultramafic intrusion in the Bird River greenstone belt, southeastern Manitoba: geological setting, geochemical variation and the implications for Cu-Ni-PGE-Cr mineral exploration; Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, Program with Abstracts, p. 200, URL <<http://www.gac.ca/wp/wp-content/uploads/2013/05/2013WinnipegGACMACAbstracts-merged.pdf>> [October 30, 2013]
- Zhou, X., Lin, S. and Anderson, S.D. 2013: Lithology, alteration and structure of the Ogama-Rockland gold deposit in the southeast margin of the Ross River pluton, Rice Lake greenstone belt, Superior Province, Manitoba (abstract); Geological Association of Canada–Mineralogical Association of Canada, Joint Annual Meeting, Winnipeg, Manitoba, May 22–24, 2013, URL <[http://gac.esd.mun.ca/gac\\_2013/search\\_abs/sub\\_program.asp?sess=98&form=10&abs\\_no=251](http://gac.esd.mun.ca/gac_2013/search_abs/sub_program.asp?sess=98&form=10&abs_no=251)> [October 15, 2013]