UNIVERSITY OF ALBERTA

RECEIVED
By Manager of Licensing at 4:55 pm, Apr 08, 2011

Marianne Douglas <msdougla@ualberta.ca>

3rd year renewal of : Licence # 0202909N-M

2009 - 2011

smolj@queensu.ca <smolj@queensu.ca> **Wed, Mar 16, 2011 at 12:06 PM**
To: "Thomas, Mary Ellen" <MaryEllen.Thomas@arcticcollege.ca>
Cc: "Cote, Mosha" <Mosha.Cote@arcticcollege.ca>, msdougla@ualberta.ca

Mosha Cote
Nunavut Research Institute
Iqaluit, NU
X0A 0HA

March 16, 2011

Re: *Licence # 0202909N-M*

Dear Mosha (copy Mary-Ellen and Marianne Douglas, University of Alberta and co-PI)):

Further to Mary-Ellen's email (below footer) we are sending you the report and tranlation on our last field season (2009; we were not in the region in 2010), and a request for our renewal for the 3rd year of this work.

The work in 2011 will be of the same type done in 2009, as we are primarily returning to our sites at Cape Herschel (Ellesmere Island), where we have been working since 1983, as well as near-by sites for comparison, and also re-monitoring our Resolute Bay sites (right near the PCSP base).

As of today, we have still not received confirmation from PCSP, but assume all is well.

Our plan is to do the fieldwork this July (we are just awaiting final details from PCSP).

The proposed field crew for 2011 has overlap with 2009, but some new students etc. The crew this year should be: John Smol, Marianne Douglas, Chris Grooms, Wes Blake, Kathryn Griffiths, and Emily Stewart, and possibly a TBA.

Please let us know if you need anything else right now. We are in the process of applying for the water permit.

Thank you very much.

John P. Smol

Professor
Canada Research Chair in Environmental Change
Editor, *Environmental Reviews*

Paleoecological Environmental Assessment and Research Lab (PEARL)
Dept. Biology, 116 Barrie St.
Queen's University
Kingston, Ontario K7L 3N6 Canada
Phone: (613) 533-6147; Fax: (613) 533-6617; E-mail: SMOLJ@QueensU.Ca

Nunavut Water Board
APR 14 2011
Public Registry

PS Attached is the report in English, Inuktitut and a copy of this cover letter.

----- Original Message -----
From: "Thomas, Mary Ellen" <MaryEllen.Thomas@arcticcollege.ca>
Date: Thursday, January 6, 2011 8:22 am
Subject: RE: quick question on permits
To: 'John Smol' <smolj@queensu.ca>

Cc: "Cote, Mosha" <Mosha.Cote@arcticcollege.ca>

> All you need is the translated annual report (1 page) and
> we re-issue the license.
> I have copied Mosha Cote on this as he is our licensing manager.
>
> Happy New Year.
>
> Mary Ellen
>
> -----Original Message-----
> From: John Smol [mailto:smolj@queensu.ca]
> Sent: Wednesday, January 05, 2011 3:39 PM
> To: Thomas, Mary Ellen
> Cc: Marianne Douglas
> Subject: quick question on permits
>
>
> Hi Mary-Ellen:
>
> Happy new year.
>
> I hope you are well.
>
> I had a quick question that maybe you can answer or forward to
> whomever in your office that can. Thanks.
>
> We (Marianne and I) are currently under a multi-year licence
> that should cover this summer's work at Cape Herschel etc. It is
> number 020290N-M
>
> I am new to multi-year licences. I am pretty sure I need to do
> still something for this summer with your offices, even though
> the licence covers that period.
> The last time we were Nunavut was 2009 (we were not there last
> summer). So would all you need is a report for 2009 field work -
> and translated to Inukitut be needed - or do we re-do a full
> licence thing (but then it is just speeded up at your end as we
> are doing the same types of things this year as we did in 2009).
>
> Many thanks! John
>
>
> ____
> John P. Smol, FRSC
> Professor
> Canada Research Chair in Environmental Change Editor,
> Environmental Reviews
>
> Paleoecological Environmental Assessment and Research Lab
> (PEARL) Dept. Biology, 116 Barrie St.
> Queen's University
> Kingston, Ontario K7L 3N6, Canada
> Phone: 1-613-533-6147; FAX: 1-613-533-6617
> E-mail: SmolJ@QueensU.Ca
>
> PEARL http://post.queensu.ca/~pearl/
> New Textbook: http://post.queensu.ca/~pearl/textbook.htm
> Environmental Reviews: http://pubs.nrc-cnrc.gc.ca/cgi-
> bin/rp/rp2_desc_e?erDPER Book Series:
> http://post.queensu.ca/~smolj/dper/index.html

>

>
>

John P. Smol, FRSC
Professor
Canada Research Chair in Environmental Change
Editor, Environmental Reviews

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E-mail: SmolJ@QueensU.Ca

PEARL http://post.queensu.ca/~pearl/
New Textbook: http://post.queensu.ca/~pearl/textbook.htm
Environmental Reviews: http://pubs.nrc-cnrc.gc.ca/cgi-bin/rp/rp2_desc_e?er
DPER Book Series: http://post.queensu.ca/~smolj/dper/index.html

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3 attachments

Smol Douglas NRI Report 20111-Inuktitut[1].pdf
34K

Smol_Douglas NRI_report_2011.doc
28K

Smol renewal cover letter March 16 2011.doc
3187K

Queen's
UNIVERSITY

DEPARTMENT OF BIOLOGY

Queen's University
Kingston, Ontario, Canada K7L 3N6

Mosha Cote
Nunavut Research Institute
Iqaluit, NU
X0A 0HA

March 16, 2011

Re: *Licence # 0202909N-M*

Dear Mosha (copy Mary-Ellen and Marianne Douglas, University of Alberta and co-PI)):

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(License # 0202909N-M)
Report of the 2009 Field Season

Water Quality and Environmental Change at Cape Herschel and Related Regions

Field Party: John P. Smol, Chris Grooms and Alexandra Rouillard (Queen's University, Biology); Marianne Douglas, Conrad Murphy, Megan Goudie (University of Alberta, Earth and Atmospheric Sciences), Weston Blake Jr. (Geological Survey of Canada)

Dates of Field Work: July 5th – July 26th, 2009

Our main research goals for the 2009 field season (we did not do work in Nunavut in 2010) was to continue our work assessing the present-day and long-term changes in water quality of lakes and ponds across the Arctic in order to determine if they are being influenced by environmental factors such as climate or pollutants. Our work has continued for almost three decades and we have expanded our datasets to include a large number of sites in the High Arctic.

The objectives of the 2009 field season was to return to our main sampling sites on Cape Herschel (Ellesmere Island), where we have been monitoring ponds and lakes for environmental change since 1983. Our overall goals are to help determine the major influences on water quality and other ecological and environmental changes, with a special focus on climate change. Beginning in the last decade, many of the ponds at Cape Hershel have begun to dry out over the short Arctic summer – a change that we have linked to recent climatic warming.

As in previous years, we sampled over 40 ponds and lakes for the following parameters: 1) water samples for chemical analyses including pH, conductivity, major ions, nutrients, trace metals; 2) algal and zooplankton samples for analysis of biological community composition; and 3) surface sediment samples to quantitatively correlate dominant diatom (algae) species to measured water quality variables. The sampled sites are part of our long-term monitoring program and we now have data from these sites spanning over 2 decades. A suite of almost 50 water variables are measured, two of the most important of which are the key nutrients nitrogen and phosphorus.

In 2006 we had noted that several of the ponds had dried up. This was again the case in 2007, and in 2009 some ponds had dried, whilst others were drying up during our stay. As in the previous two field seasons, several of the deeper sites showed signs of lowered water levels along the shore. We believe that this drying is due to warming and increased evaporation. We were able to monitor the changes in water chemistry and biology as the ponds continued to evaporate. Our data are showing that many variables, such as conductivity and nutrient concentrations, are changing under this new warming scenario. Our data are also showing that the number of ice-free days is increasing and that the growing season is essentially longer.

If ponds continue to dry up, then it will represent a major loss of habitat. An additional project undertaken in 2009 was to try and develop new approaches to study long-term changes in the ecological significance of changes in ultra-violet radiation on lake and pond ecosystems.

In addition to our work on Cape Herschel, we also took new water samples and lake sediment cores from near-by Pim Island, to compare the ecological changes we are seeing at Cape Herschel to this region. The Pim Island sites, due to differences in local geology, have different ecological characteristics. Our work on the present-day and long-term changes in these lakes and ponds also point to the severity of recent climate warming.

As in previous years, additional sampling was undertaken near the PCSP base at Resolute as part of our long-term monitoring of these sites. A total of 6 ponds and lakes were sampled, including Char and Meretta lakes. These long-term, seasonal data are critical in helping us understand the rate of change in arctic lakes that have been influenced by human activities. Meretta Lake was the site that used to receive sewage from the North Base from the mid 1940s through to the early 1990s. The Meretta Lake data demonstrate that lakes can recover from sewage (nutrient) addition. It has now almost completely returned to its pre-impact nutrient levels.

The baseline information collected during the 2009 field season continues to add to our growing database of water quality data in the Arctic. Arctic environments are amongst the most susceptible regions in the world to environmental changes, such as climatic warming and the transport of airborne pollutants and therefore continued collection of data in this region is essential in assessing the rate, magnitude and direction of environmental change.

(ᓚᐃᓴᓐᓯ ᓈᓴᐅᑎᖓ 0202909N-M)
ᐅᓂᒃᑳᖅ 2009-ᒥ ᖃᐅᔨᓴᕆᐊᖅᑐᖅᓯᒪᑎᓪᓗᒋᑦ

ᖃᐅᔨᓴᕆᐊᖅᑐᖅᓯᒪᔪᒥᓃᑦ: ᔫᓐ ᐱ. ᔅᒨᑦ, ᑯᓇᔅ ᒍᕉᒻᔅ ᐊᒻᒪᓗ ᐋᓕᒃᓴᓐᑐᕋ ᕈᐃᓚᑦ (ᑯᐃᐸᒃ ᓯᓚᑦᑐᓴᕐᕕᔪᐊᖓᓂ, ᐆᒪᔪᓕᕆᓂᖅ); ᒥᐊᕆᐋᓐ ᑕᒃᓚᔅ, ᑲᓐᑫᑦ ᒨᐱ, ᒪᐃᑌᓐ ᒨᑎ (ᐊᓪᐴᑕ ᓯᓚᑦᑐᓴᕐᕕᔪᐊᖓ, ᓄᓇᓕᕆᓂᕐᒧᑦ ᐊᓂᕐᓂᓕᕆᓂᕐᒧᑦᓗ ᖃᐅᔨᓴᕐᓂᖅ), ᕕᐊᓐᑕ ᕗᓚᐃᒃ ᓄᑲᖅᑎᖅ (ᓄᓇᓕᕆᔩᒃᑯᑦ ᖃᐅᔨᓴᖅᑎᖏᑦ ᑲᓇᑕᒥ)

ᖃᐅᔨᓴᕆᐊᖅᑐᖅᓯᒪᔭᒥᓂᖏᑕ ᐅᓪᓗᖏᑦ: ᔪᓚᐃ 5 – ᔪᓚᐃ 26, 2009

ᓇᐃᓈᖅᓯᒪᓂᖏᑦ:

ᖃᐅᔨᓴᓪᓗᐊᕐᓂᐊᓚᐅᖅᑕᕗᑦ 2009-ᒥ ᖃᐅᔨᓴᕐᓇᐅᑎᓪᓗᒍ (ᓄᓇᕗᒥ ᐃᖅᑲᓇᐃᔭᓚᐅᖕᒋᓐᓇᑉᑕ 2010-ᖑᑎᓪᓗᒍ) ᑲᔪᓯᑎᓪᓗᒍ ᐃᖅᑲᓇᐃᔮᕆᓚᐅᖅᓯᒪᔭᕗᑦ ᖃᐅᔨᓴᖅᑐᒋᑦ ᐅᓪᓗᒥᐅᔪᖅ ᐊᒻᒪᓗ ᐊᑯᓂᐅᔪᒧᑦ ᐊᓯᔾᔨᕐᓂᐊᖅᑐᑦ ᐃᒪᖏᑦ ᑕᓯᕐᓂ ᑕᓯᐅᔭᕐᓂᓗ ᐅᑭᐅᖅᑕᖅᑐᒥ ᓇᓗᓇᐃᖅᓯᕐᑯᓪᓗᑕ ᐊᓯᔾᔨᓕᕐᒪᖔᑕ ᐊᕙᑎ ᐱᔾᔪᑎᒋᓪᓗᒍ ᓲᕐᓗ ᓯᓚᑉ ᐊᓯᔾᔨᕐᓂᖓᓄᑦ ᐅᖅᑰᓐᓃᑦ ᓱᑭᕐᓇᖅᑐᓄᑦ. ᐃᖅᑲᓇᐃᔮᕆᓂᑯᕆᓕᖅᑕᕗᑦ ᑕᒪᓐᓇ ᐊᕙᑏᑦ ᖁᓖᓪᓗᑲᓴᒃ ᐊᒻᒪᓗ ᐊᒥᓱᒃᑲᓐᓂᕐᓂᒃ ᖃᐅᔨᓴᖃᑦᑕᓕᖅᑯᑕ ᖁᑦᑎᒃᑐᖅ ᐱᖅᓯᐅᑎᓕᖅᑐᒍ.

ᐱᓇᓱᐊᒐᕆᓚᐅᖅᑕᕗᑦ 2009-ᒥ ᖃᐅᔨᓴᕐᓇᐅᑎᓪᓗᒍ ᐅᑎᕐᓗᑕ ᓄᐊᑦᑎᕕᒋᕙᑦᑕᑎᓐᓄᑦ ᖃᐅᓱᐃᑦᑐᑉ ᕿᑭᖅᑕᖓᑕ ᑲᓇᓐᓇᖓᓂ ᐃᒪᖓᓂ (ᖃᐅᓱᐃᑦᑑᑉ ᕿᑭᖅᑕᖓᓄᑦ), ᐅᐊᑦᑎᖃᑦᑕᕐᓂᑯᓇᓪᓗᑎᒍ ᑕᓯᐅᔭᑦ ᑕᓰᓪᓗ ᐊᓯᔾᔨᖅᐸᓪᓕᐊᓕᕐᒪᖔᑦ ᖃᐅᔨᓴᖅᑐᑕ 1983-ᒥᓂᑦ. ᑎᑭᓐᓇᓯᐊᓗᐊᙳᐊᖅᑕᕗᑦᓕ ᐃᑲᔪᕐᑐᑕ ᓇᓗᓇᐃᖅᑕᐅᒐᔭᕐᒪᑦ ᐊᑦᑐᐃᓂᖃᕈᑎᒋᑦᑐᐊᖅᑕᖏᑦ ᐃᒪᑉ ᐱᐅᔫᓂᖓᑕ ᐊᒻᒪᓗ ᐊᓯᖏᑦ ᐊᕙᑎᑉ ᐃᒪᖓᓗ ᐊᓯᔾᔨᕐᒪᖔᑦ, ᐅᐊᑦᑎᓗᐊᙳᐊᖅᑐᒍ ᐱᔾᔭᑎᒋᓂᐊᕐᓯᒋᑦᑐᒍ ᓯᓚᑉ ᐊᓯᔾᔨᕐᓂᖓᑦ ᐱᑦᑐᒍ. ᖁᓖᑦ ᐊᖀᒧᓂ ᐱᒋᐊᓚᐅᖅᓯᒪᓪᓗᑕ, ᐊᒥᓱᑦ ᑕᓯᐅᔭᑦ ᖃᐅᓱᐃᖅᑐᑉ ᕿᑭᖅᑕᖓᑕ ᑲᓇᓐᓇᖓᓂ ᐃᒪᖓᓂ ᐸᓂᖃᑦᑕᓕᕐᒪᑕ ᓇᐃᑦᑑᒐᓗᐊᖅᑎᑦᑐᒍ ᐅᑭᐅᖅᑕᖅᑐᒥ ᐊᐅᔭᖓ – ᐊᓯᔾᔨᕈᑕᐅᓯᒪᔪᖅ ᑕᒪᓐᓇ ᓯᓚᑉ ᐅᖅᑰᓇᖅᓯᕙᓪᓕᐊᓂᖓᓄᑦ.

ᑕᐃᒫᒃᓴᐃᓐᓇᕐᓗ ᐊᖀᒧᖅᑖᖑᓚᐅᖅᑐᓂᒃ, ᓄᐊᑦᑎᓯᒪᕗᒍᑦ 40-ᐅᓗᐊᖅᑐᓂᒃ ᑕᓯᕐᓂᒃ ᐃᒪᕐᒥᒃ ᐱᑦᑐᑕ ᖃᐅᔨᓴᕐᓂᐊᖅᑐᑎᒍ ᐅᑯᐊ ᖃᐅᔨᓴᕈᑎᒋᑦᑐᒋᑦ: 1) ᐃᒪᑉ ᐱᔭᒥᓂᖅᐳᑦ ᐃᓚᐅᕈᑎᒃᓴᓂ ᕿᓂᖅᑐᑕ ᐱᖅᓯᐅᑎᓪᓗᒍ ᖃᐅᔨᓴᖅᑐᒍ ᐃᓚᐅᕈᑎᒃᓴᓕᒫᑦ ᓈᒻᒪᓐᓂᖃᓇᐊᖃᕐᓂᖏᑦ, ᐆᒻᒪᖅᑯᑎ ᐃᖕᒋᕐᕕᒋᔭᓐᓇᖅᑕᖏᑦ, ᐃᔭᕈᕙᐅᕙᖏᑦ, ᐆᒪᔪᑎᖏᑦ ᐊᑐᓇᐊᓕᖏᑦ, ᓴᕕᖅᔭᓂ ᑭᓂᖅᑐᒥᓂᐅᔭᑦ; 2) ᐊᖅᑲᔮᑦ ᐊᒻᒪᓗ ᐃᒪᕐᒥᐅᑕᑦ ᐱᕈᖅᑐᑦ ᓄᐊᑕᒥᓂᑦ ᖃᐅᔨᓴᖅᑕᐅᒐᔭᕐᒪᑕ ᖃᓄᐃᑦᑐᓂᒃ ᐆᒪᔭᖅᑐᕐᒪᖔᑦ; ᐊᒻᒪᓗ 3) ᐳᑦᑕᔪᑦ ᑭᓂᖅᑕᑦ ᓄᐊᑕᒥᓂᑦ ᐊᔾᔩᓐᓂᕐᓂ ᖃᐅᔨᓴᖅᑕᐅᕐᑯᑦᑐᒋᑦ ᐊᖅᑲᔮᑦ ᐱᕈᓯᑦ ᐃᒪᑉ ᐱᐅᔫᓂᖏᑦ ᓱᑯᑦᑎᐊᓃᑦᑐᑦ ᖃᐅᔨᓴᖅᑕᐅᕐᑯᑦᑐᒋᑦ. ᓄᐊᕝᕕᒥᓃᑦ ᐊᑯᓂᐅᔪᖅ ᓄᐊᑦᑎᕕᒋᖃᑦᑕᕐᓂᐊᖅᑕᕗᑦ ᐅᐊᑦᑎᖃᑦᑕᕐᓂᐊᖅᑐᑎᒍᑦ ᐊᒻᒪᓗ ᒫᓐᓇᐅᔭᖅ ᑐᑭᓯᒋᐊᑭᑎᖃᑦᑕᖅᑐᒍᑦ ᑖᒃᑯᓇᙵᑦ ᐊᕙᑎᑦ ᐊᖀᒧᓕᖅᑐᓂᑦ. 50-ᐸᔫᔪᑦ ᐃᒥᕐᒥ ᓄᐊᑦᑎᔪᒥᓂᐅᓯᒪᕗᒍᑦ ᖃᐅᔨᓴᖅᑕᓲᖑᑦᑐᑎᑦ, ᒪᕐᕉᓐᓂᒃ ᐃᓚᐅᕈᑎᖃᕐᓂᐅᓴᐅᕙᑉᐳᑦ ᐱᒻᒪᓇᐅᑦᑎᒃ ᐳᓪᓚ ᑕᑯᒃᓴᐅᙱᑦᑐᖅ ᑎᐱᖅᕿᓂᓗ ᐊᒻᒪᓗ ᓴᐅᓂᕐᒧᑦ ᓴᙱᓰᑦᑎᑦᒍᑎ.

2006-ᖑᑎᓪᓗᒍ ᖃᐅᔾᔨᐊᓚᔪᕗᒍᑦ ᐊᒥᓱᑦ ᑕᓯᐅᔭᑦ ᐸᓂᖅᑐᒥᓂᐅᒻᒪᑕ ᐃᒪᖅᑭᓐᓃᖅᑐᑎᑦ. 2007-ᖑᑎᓪᓗᒍᓗ ᑕᐃᒪᐃᔪᒋᕗᖅ, ᐊᒻᒪᓗ 2009-ᒥ ᐃᓚᖏᑦ ᑕᓯᐅᔭᑦ ᐸᓂᖅᑐᒥᓂᐅᑦᑐᑎᑦ, ᐊᓯᖏᑦᑕ ᐃᒪᖅᑭᓐᓃᔪᓪᓗᑎᑦ ᖃᐅᔨᓴᕆᐊᖅᓯᒪᑎᓪᓗᑕ ᓯᓚ. ᒪᕐᕉᒃ ᖃᐅᔨᓴᕐᓇᐅᓚᐅᖅᑐᓐᓂᒃ ᑭᖑᓪᓕᕐ, ᐊᒥᓱᑦ ᐃᑎᓂᖅᓴᑦ ᐃᑦᑲᓐᓂᖅᓴᐅᔪᑦᑐᑦ ᓯᔾᔭᖅᒧᑦ. ᐅᖅᑰᓇᖅᓯᕙᓪᓕᐊᓂᖓᓄᑦ ᐊᒻᒪᓗ ᐊᓂᕐᓂᒨᖅᑲᕐᓂᖅᓴᐅᓕᕐᓂᖓᓄᑦ. ᐅᐊᑦᑎᒍᓐᓇᖃᑦᑕᖅᓯᒪᔭᕗᑦ ᑕᒪᒃᑯᐊ ᐊᓯᔾᔨᕐᓂᐅᔪᑦ ᐃᒪᖓᓂ ᐃᓚᐅᕈᑎᕈᓐᔭᖓᓂ ᐊᒻᒪᓗ ᐆᒪᔪᕐᑎᑦᒍᑦ ᑕᓯᐅᔭᑦ ᐃᒪᐃᑉᐸᓪᓕᐊᑎᓪᓗᒋᑦ. ᑐᑭᓯᒋᐊᑭᑎᕗᑦ ᑕᑯᒃᓴᐅᑎᑦᑎᕗᑦ ᐊᒥᓱᓂᒃ ᐱᔾᔪᑎᖃᕈᓐᓇᕐᒪᑦ ᑕᒪᓐᓇ, ᓲᕐᓗ ᐊᐅᓚᔪᓐᓇᐅᑎ ᐃᖕᒋᕐᕋᒍᓐᓇᕐᓂᖓ ᐊᒻᒪᓗ ᐱᑉᐸᓪᓕᐊᒍᓐᓇᓂᕐᒧᑦ ᐊᒥᓰᓂᖏᑦ ᐊᔾᔨᑉᐸᓪᓕᐊᒻᒪᑕ ᑕᒫᓂ ᐅᖅᑰᓇᖅᓯᕙᓪᓕᐊᑎᓪᓗᒍ. ᑐᑭᓯᒋᐊᑭᑎᒍᓐᓇᖅᑐᒍ ᓯᖅᑯᐃᖅᓇᑭᑎᑉᓴᒃᐳᑦ ᓯᑯᖅᒪᖏᑦᑎᕗᑦ ᐅᓪᓗᖏᑦ ᐊᒥᓯᖅᐸᓪᓕᐊᑐᐃᓐᓇᕐᓯᑕ ᐊᒻᒪᓗ ᐱᖅᑐᖅᑲᐅᓇᐅᓂᐊᕐᓂᖏᑦ ᐱᖅᑐᓂᒃ ᐊᑯᓂᐅᓂᖅᓴᖅ ᐅᓪᓗᖏᑦ ᐊᒥᓯᖅᐸᓪᓕᐊᔪᑦ ᐱᖅᑐᑦ ᐱᖅᐸᓪᓕᐊᕝᕕᒋᓚᖏᑦ.

ᑕᓯᐅᔭᑦ ᐸᓂᖅᐸᓪᓕᐊᑐᐃᓐᓇᖅᑎᑦ, ᐆᒪᔪᑦ ᓇᔪᖏᑦ ᓄᖑᓪᓚᓐᓇᓂᐊᕐᒪᑕ. ᐱᓚᓇᐊᓇᔭᐅᓚᐅᖅᓯᒪᓪᒥᔪᖅᑕᐅᖅ 2009-ᖑᑎᓪᓗᒍ ᐋᖅᑭᓇᓯᐊᓚᐅᖅᓯᒪᔪᑦ