OTH-1003

PRESENTATION MADE BY

ALLAN CIEKIEWICZ

BEFORE THE

CLEAN ENVIRONMENT COMMISSION

REGARDING THE

WUSKWATIM GENERATION AND

TRANSMISSION PROJECTS

in the month of MARCH 2004 at WINNIPEG MB

A.

Good..... . Mr. Chairman, members of the Commission, Manitoba Hydro employees, Councillor Thomas of the Nisichawayasihk Cree Nation , and all members of the public.

B.

My name is Allan Ciekiewicz I live approximately 35 km north east of Winnipeg and I make this presentation independent of any group, organization, company etc. My presentation as a private citizen is based on my research and first hand knowledge and experience with Manitoba Hydro for the past three and one-half years. My presentation will not attempt to tell the Nisichawayasihk Cree Nation how to look after their people. My presentation is informational food for thought and hopefully consideration by the Nisichawayasihk Cree Nation and the Clean Environment Commission (and hopefully Manitoba Hydro). Originally I had only intended to read the 36 page executive summary of the Generation and Transmission Projects and leave it at that. However, for me the summary contained many ambiguous terms such as: may be expected or not expected, not aniticipated, may result, could result, estimated, potential, could, agreement in principle, likelihood, adverse effects and I was convinced to read more material related to the Projects. Hence my presentation.

C.

Councillor Thomas, on March 1 before the swearing in ceremony I appreciated your interpretation (r. 1) of the Eagle Feather and my presentation is one that is given in the spirit of the Eagle Feather.

D. A point of clarification for those who are following this presentation with copies. In several places throughout the presentation you will see reference indicators such as (r. 5). Brief explanations for these references are included at the end of this presentation...that would be pages 12 A,B,C, and D. The second part of this presentation contains the references and in some instances the references may contain a copy of the actual document referenced or a copy of excerpts from the document or a summary of the document or a simple calculation. All pages are numbered in the lower right corner.

E.

My presentation will focus briefly on a variety of topics that have been mentioned during these Hearings. Such topics as:

(a) Manitoba Hydro's Sustainable Development Policy/Principles
(b) Manitoba Hydro's Environmental Management Policy
(c) the Selkirk Thermal Generating Station before and after the conversion to natural gas
(d) the National Energy Board
(e)the Mid Continent Power Pool..MAPP
(f) the augmented flow program
(g) modelling
(h) mitigative measures

I use some of these topics to illustrate actions of Manitoba Hydro that display an attitude that contradicts its own principles and policies. For some of my presentation I will use by way of example the Selkirk Thermal Generating Station to justify my comments.

F.

Both Manitoba Hydro's Sustainable Development Policy, for example parts 1, 3, 6, 9, 12, 13, (r. 2) and their Environmental Management Policy for example parts 1, 2, 4, (r. 2) are contradicted by Manitoba Hydro's application or lack thereof / attitude / interpretation of mitigative measures.

G.

I have read much of the material in the binders related to the Generation and Transmission Projects and in some instances found very specific examples of mitigative measures that have been addressed. However, I find it unacceptable that in many places throughout the material there is mention of an Environmental Protection Plan that will contain specific mitigative measures to be completed following receipt of the required environmental licence and approvals. Such a statement in so comprehensive a set of documents is unacceptable and places the validity of the application in jeopardy. By example consider the following 1998 general mitigative statement that existed in the operating licence for the Selkirk Station in 1998..... the Licencee shall at all times carry out an efficient program of general housekeeping, equipment maintenance and mitigative measures so as: (a) to minimize the emission of particulate matter through the stack from the boiler operations; and ..... (r. 3) The role (r. 4) of the Selkirk Station was to be used as a stand-by emergency station to secure power supply for Manitobans during threats to Manitoba's power supply. Therefore, why would Manitoba Hydro ignore such an obvious mitigative condition of an

operating licence and use the coal-fired Selkirk Station as a source of electricity for the export (r. 5) market ? The answer is money. However, a quote from the book *As Long as the Rivers Run* by James B. Waldram (r. 6) sums up such an envrionmentally negative attitude of Manitoba Hydro. Rosie Dumas of South Indian Lake in 1974 stated..... The Hydro has no thought of the people of South Indian Lake, only the power he can get out of it.... . Unfortunately, thirty years later, my experience with Manitoba Hydro verifies that such an attitude still exists. Such attitude displayed by Manitoba Hydro does not conform to its Environmental Management Policy and Sustainable Development Policy. In my opinion it is important that specific mitigative measusres and compenstaton agreements be spelled out in the Environmental Approvals and Licences related to the Wuskwatim Projects.

H.

As was mentioned (r. 7) during the Hearings by Mr. Wojczynski the pollution control devices of the Selkirk Station were not as efficient as the pollution control devices of the Brandon coal station. That factor was considered when it was decided to convert the Selkirk Station to natural gas. It is important to indicate to what degree the coal-fired Selkirk Station's pollution control devices were inadequate. By comparison; for the year 2003, the Brandon Station's coal unit generated 639 611 MWh (r. 8) of electricity and emitted 8.4 tonnes of particulate matter; for the year 1998 the Selkirk Station's coal units generated 482 267 MWh (r. 9) of electricity and emitted 2850 tonnes of particulate matter. To put this into perspective; the Selkirk Station produced only three-quarters of the power generated by the Brandon Station but emitted 339 times more particulate

matter than the Brandon Station(r. 10). That fact should have been enough to convince anyone that the polluting Selkirk Station should have been used infrequently and only as the stand-by emergency station for which it was intended. This does not comply with their own Environmental Management Policy and Sustainable Development Policy. A note of importance: in both years 1998 and 2000 the generation of electricity by the Selkirk Station surpassed the expected / predicted worse case scenario generation of 450 000 MWh and there wasn't even anything close to a worst case scenario to consider (r. 11)

I.

Returning to my comments regarding the missing Environmental Protection Plan for the Wuskwatim Generation and Transmission Project. It is imperative that the Environmental Protection Plan be complete before any decisions / recommendations are made by the Commission. When Manitoba Hydro held public open house meetings to promote the conversion of the Selkirk Station to natural gas I attended the open house meetings to learn of the specifics of the project. The problem with the public open house meetings was that the report titled Selkirk Generating Station Fuel Switching Project Environmental Report had not been completed until after the public open house meetings. Manitoba Hydro's notification to alter (r. 12) the Selkirk Station stated that four physical alterations would take place. After reading the report it was obvious that a fifth alteration was added and that was to alter the role and mode of operation of the Selkirk Station. In fact that was the only defintive /complete section of the Report. The four alterations mentioned in the notification had not been finalized by the time the Report was completed. (In my opinion the Report was not complete.) It is difficult to address an issue at an public

open house if the public is not made aware of the facts. In fact Manitoba Hydro is now allowed to operate the gas-fired Selkirk Station under its new role approximately twice as much as was allowed when the station used coal thereby eliminated any reduction in greenhouse gas emissions. But the current licence contradicts itself (r. 13) by stating in one section that theSelkirk Station will operate in its role as a backup supply to the primary hydraulic system by being available at all times to supplement the hydraulic system and just about in the same breath stating that if Manitoba Hydro needs to seek replacement power then Manitoba Hydro can import cheaper power than that which could be produced by the Selkirk Station. That is exactly what Manitoba Hydro has done the past year. Manitoba Hydro has imported cheap coal for the purposes of generating electricity for the export market (r. 14) By example in December 2003 Manitoba Hydro exported a total of 94 224 MWh of electricity; at least 2697 MWh of that total was coal generated while the Selkirk Station remained idle (r. 15). Also for December 2003 Manitoba Hydro imported 521 868 MWh of electricity from North Dakota and Minnesota while the Selkirk Station remained idle. If we are truly experiencing a drought condition why had the Selkirk Station only run at approximately a 10% capacity factor for the year 2003? That action does not comply with Manitoba Hydro's own Environmental Management Policy and Sustainable Development Policy. Had Manitoba Hydro used the Selkirk Station to contribute to export and import situations there would have been a reduction in greenhouse gases by approximately one-half when compared to coal generated electricity. Manitoba Hydro must be aware of the fact that if they want to be known as an evironmentally friendly "green" corporation that there is a cost to having that distinction. Once again....a completed Environmental Protection Plan for the Wuskwatim Projects

is necessary. If not, the decisions / recommendations of this Clean Environment Commission in my opinion may be invalid.

J.

There was mention of the Canadian National Energy Board during the Hearings. In December 2001 I became an intervenor (r. 16) regarding an application(r. 17) to the National Energy Board by Manitoba Hydro to export 100 MW of electricity to Wisconsin Public Service Corporation. Manitoba Hydro stated that for the 100 MW export no additional transmission or generating facilities would be required. Simultaneous to this application Manitoba Hydro started to operate the coal-fired Selkirk Generating Station <u>just in case</u> there was an emergency resulting from two faulty transformers (r. 18) . Manitoba Hydro's definition of the stand-by emergency Selkirk Station was to operate it at 50 % capacity as it required 12 hours to get the station up to generating speed. However, if you remember the discussion regarding the Mid Continent Power Pool it is obvious that there was no need to operate the Selkirk Station at 50% capacity just in case there is an emergency as all members of the Mid Continent Power Pool are required to hold specific amounts of power in reserve for other members to use in times of emergency. For example; in September of 1996 when tornado force winds destroyed 19 high voltage direct current transmission towers, Manitoba Hydro's system in a fraction of a second went from exporting 1500 MW to importing about 200 MW immediately and shortly thereafter up to 600 to 800 MW (r. 19). Therefore, Manitoba Hydro did not have to operate the polluting Selkirk Station for the months of December 2001, January 2002, February 2002, and March 2002. To add insult to injury the correspondence that I received related to the application to export 100 MW of power indicated that even if the application to export 100

MW of power was permitted that Manitoba Hydro still had 403 MW of surplus hydro generating capacity (r. 20). So what was the real reason that the coal burning polluting Selkirk Station operated for the above mentioned months. Once again Rosie Dumas of South Indian Lake had the answer. But there were other mitigative measures that Manitoba Hydro could have put in place to avoid using the Selkirk Station. However, Manitoba Hydro may have had ulterior motives for operating the Selkirk Station such as getting rid of 87 000 tonnes of coal before the conversion commenced. Once again such actions do not comply with Manitoba Hydro's own Environmental Management Policy and Sustainable Development Policy. It makes one wonder if Manitoba Hydro intends to follow their own Environmental Management Policy and Sustainable Development Policy or follow a policy of deception.

K.

Mr. Wojczynski mentioned the public concern over the operation of the coal-fired Selkirk Station. He stated that in response to allegations of the public that Manitoba Hydro's studies indicated there were no significant impacts as a result of the operation of the coal-fired Selkirk Station. One such study(r. 21) related to the Selkirk Station was titled Air Quality Impact Assessment Coal-fired Generation September 2001. The report stated that it was an update for the years 1993 - 2000 to address the issue of emissions while burning sub-bituminous coal. One problem with that is the Selkirk Station did not always operate with sub-bituminous coal (r. 22). Lignite, a coal with a higher ash content (r. 23) was used for a large part of the time interval stated. The Air Quality Assessment Coal-fired Report also made use of the results of a stack emission test(r. 24) that was performed in February 2001 using a coal with an average ash content of 5.19 %. The September Report of

2001 indicated that the downwind point of impingement of plant emissions off the plant site, ground level concentrations of suspended particulate matter for a 24 hour average would be 221 units(r.25) The limit in the operating licence was 120 (r. 26); the station's emission was 184 % of the limit. Now remember, the September 2001 Report was to allay the fears / concerns of residents by reviewing the operation for the years 1993 - 2000. The generation records(r.22) for the station indicate that the average ash content of the coal used for that time period was 7.09 %. As a result the 24 hour average for suspended particulate matter as indicated by the September 2001 Report is much too low. A comparison (r. 27) of the two ash contents reveals that the 24 hour average should have been closer to 302 units. Even at the 50% capacity rate the Selkirk Station would be violating the 24 hour average of 120. Manitoba Hydro was aware of these facts but in their wisdom chose to ignore them and the limits set out in the operating licence for the Selkirk Station. I am sorry for repeating myself but that attitude does not comply with Manitoba Hydro's own Environmental Management Policy and Sustainable Development Policy and the application of required mitigative measures and leads me to believe that there will be problems regarding mitigative measures related to the Wuskwatim Projects.

L.

The fact that Manitoba Hydro knew in September 2001, and much earlier(r. 28) of exceeding the 24 hour average limit but still operated the coal-fired Selkirk Station for the months of December 2001, January 2002, February 2002 and March 2002 was an unconscionable action; one example, the ash content for February 2002 was 7.7 % . To add insult to injury, the faulty transformers used as an excuse to operate the Selkirk Station for the

above mentioned months were still faulty when Manitoba Hydro shut down the Selkirk Station in mid March 2002 for the commencement of the conversion to natural gas (r.29).

M.

The Splash Model was mentioned (r.30) at one or two points during the early days of the Hearings. A modelling program may be a fine indicator of outcomes but it is only as valid an indicator as the inputs entered into the program. My example of the September 2001 report regarding ash content mentioned above is sufficient to justify that statement. Or to be a little more bold; one could use a modelling program to dictate the outcomes.

N.

On more than one occassion it was mentioned that the electricity generated in Manitoba would be used to replace thermal generating stations used by their export customers. A page from Manitoba Hydro's website (r.31) during the year 2001 boasted of the same scenario. The problem is that Manitoba Hydro was making that statement while showering inappropriately the environment surrounding the coal-fired Selkirk Station with thousands of tonnes of particulate matter. Where does such an action fit in with Manitoba Hydro's Environmental Management Policy and Sustainable Development Policy and the application of required mitigative measures ? It doesn't.....but it does raise doubts regarding the Wuskwatim Projects.

O.

There was a discussion of the Augmented Flow Program during the early days of the Hearings. If the productivity of the Wuskwatim Generation Project is in anyway dependent on the Augmented Flow Program it should be incorporated into the required environmental approvals and licences. That way everyone knows what the situation will be in the future.

P.

As I stated at the beginning of my presentation I have used my first hand experience and knowledge related to encounters with Manitoba Hydro for the past three and one-half years. It should indicate to anyone that they must be cautious when dealing with Manitoba Hydro. Once again I use a quote from the book *As Long as the Rivers Run* by James B. Waldram (r.32) to illustrate this point. From chapter five regarding South Indian Lake, lawyer Yude Henteleff who represented South Indian Lake residents stated, " the fact is they (Hydro) were totally ill-prepared . They approached the situation with considerable arrogance, and felt that anybody who questioned them was, in effect questioning God. Somehow, they were touched by infallibility in terms of decisions. Who has the temerity to question them? " I would like to believe that approximately 30 years later that such an attitude has changed but my experience does not lead me that conclusion.

Q.

In closing I make these final comments. To Manitoba Hydro; my presentation is quite clear and there is nothing to add at this point in time. To the members of the Clean Environment Commission you have the difficult task of making recommedations to the Government knowing full well that the Government may disregard those recommendations. Your recommendations must be based on knowledge of all pertinent documents. If necessary the Commission must insist / demand full disclosure of all completed documents that the Commission deems to be necessary to make valid recommendations. To Councillor Thomas and the Nisichawayasihk Cree Nation; if your people approve these Projects you will need the strength of the Eagle Feather to give you the power to soar above your lands and give you sight to oversee projects like the Wuskwatim Projects in order to realize YOUR VISION for your PEOPLE and others. Remember the comments of Rosie Dumas and Yude Henteleff !

R.

Ladies and gentlemen thank you for this opportunity.

List of References (r. ?) and corresponding page numbers

MR. THOMAS: For the other witnesses, we are calling on Dave Hicks who is in charge of N.D.Lea. They are the advisors for the transmission part of the project. I have got George Rempel, who is also sitting here in front with TetrES. And we will call upon Cam MacInnes who works for UNIES in particular with regard to providing us with engineering advice. We have got Cam Osler, who is with Intergroup, and we have got

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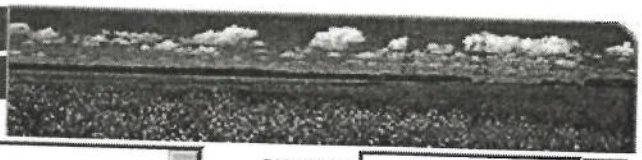
Stuart Davies with North/South Consultants, and then you have myself and Ed Wojczynski.

In terms of the swearing in ceremony, I will be holding an eagle feather while we do the swearing in ceremony. The eagle feather represents truth, honour and respect in our culture, and when we do something like this in public, this is one of the things that we do as First Nations people. So I'm going to be holding one while you swear us in. Thank you.



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Environment

Our Sustainable Development Policy/Principles

In 1993, the Corporation adopted a sustainable development policy and 13 complementary guiding principles based on the principles and guidelines of sustainable development adopted by the Manitoba Round Table on Environment and Economy.

The policy and 13 principles represent a guiding influence for Hydro's decisions, actions, and day-to-day operations.

Sustainable Development Policy

Manitoba Hydro will apply the principles of sustainable development in all aspects of its operations to achieve environmentally sound and sustainable economic development. Through its decisions and actions to provide electrical services, the Corporation will endeavour to meet the needs of the present without compromising the ability of future generations to meet their needs.

Here are the titles of the 13 principles that complement Manitoba Hydro's sustainable development policy. Click on a title for its definition:

1. Stewardship of the Economy and the Environment
2. Shared Responsibility
3. Integration of Environmental and Economic Decisions
4. Economic Enhancement
5. Efficient Use of Resources
6. Prevention and Remedy
7. Conservation
8. Waste Minimization
9. Access to Adequate Information
10. Public Participation
11. Understanding and Respect
12. Scientific and Technological Innovation
13. Global Responsibility

Sustainable Development Principles

Manitoba Hydro will:

1. Stewardship of the Economy and the Environment

Recognize its responsibility as a caretaker of the economy and the environment for the benefit of present and future generations of Manitobans.

Meet the electricity needs of present and future Manitobans in a manner that ensures the long-term integrity and productivity of our economy, our environment, our natural resources and safeguards our human health.

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2. Shared Responsibility

Ensure that Manitoba Hydro's employees, contractors, and agents are aware of our sustainable development policies and guiding principles and encourage them to act accordingly.

Encourage the Corporation's employees to share their knowledge of the concepts and practical application of sustainable development.

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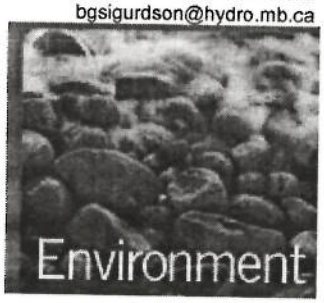
For more information contact:
bgsigurdson@hydro.mb.ca



3. Integration of Environmental and Economic Decisions

Treat technical, economic and environmental factors on the same basis in all corporate decisions, from initial planning to construction to operations to decommissioning and disposal. To the extent practical, include environmental costs in economic and financial analysis.

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Caribou of the Penn Island herd from Ontario crossing under the new transmission line for the North Central Project on their westerly migration across Manitoba

4. Economic Enhancement

Enhance the productive capability and quality of Manitoba's economy and the well-being of Manitobans by providing reliable electrical services at competitive rates.

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5. Efficient Use of Resources

Encourage the development and application of programs and pricing mechanisms for efficient and economic use of electricity by our customers. As well, efficient and economic use of energy and materials will be encouraged throughout all our operations.

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6. Prevention and Remedy

To the extent practical, anticipate and prevent adverse environmental and economic effects that may be caused by Corporate policies, programs, projects and decisions rather than reacting to and remedying such effects after they have occurred.

Purchase, where practical, environmentally sound products taking into account the life cycle of the products.

Address adverse environmental effects of Corporate activities that cannot be prevented by:

- first, endeavouring, wherever feasible, to restore the environment to pre-development conditions or developing other beneficial uses through rehabilitation and reclamation
- second, striving to replace the loss with substitutes that would enhance

the environment and/or associated resource uses while offsetting the type of damage experienced third, making monetary payments for compensable damages on a fair, equitable and timely basis.

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7. Conservation

To the extent practical, plan, design, build, operate, maintain and decommission Corporate facilities in a manner that protects essential ecological processes and biological diversity.

Give preference, where practical, to projects and operating decisions that use renewable resources or that extend the life of supplies of nonrenewable resources.

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8. Waste Minimization

Manage all wastes arising from Corporate activities by:

- first, endeavouring to eliminate or reduce the amount generated
- second, striving to fully utilise reuse and recycling opportunities
- third, disposing of remaining waste in an environmentally sound manner.

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9. Access to Adequate Information

Share relevant information on a timely basis with employees, interested people and governments to promote a greater understanding of Manitoba Hydro's current and planned business activities and to identify impacts associated with the Corporation's plans and operations.

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10. Public Participation

Provide opportunities for input by potentially affected and interested parties when evaluating development and program alternatives and before deciding on a final course of action.

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11. Understanding and Respect

Strive to understand and respect differing social and economic views, values, traditions and aspirations when deciding upon or taking action.

Give preference to those alternatives which best fulfil Corporate objectives while minimizing infringement on the ability, rights, and interests of others to pursue their aspirations.

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12. Scientific and Technological Innovation

Research, develop, test and implement technologies, practices and institutions that will make electrical supply and services more efficient, economic and environmentally sound.

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13. Global Responsibility

Recognize there are no political and jurisdictional boundaries to our environment, and that there is ecological interdependence among provinces and nations.

Consider environmental effects that occur outside of Manitoba when planning and deciding on new developments and major modifications to facilities and to methods of operation.

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Environmental Management Policy

Manitoba Hydro is committed to protecting the environment. In full recognition of the fact that Corporate facilities and activities affect the environment, Manitoba Hydro integrates environmentally responsible practices into its business, thereby;

- preventing or minimizing any adverse impacts, including pollution, on the environment, and enhancing positive impacts,
- meeting or surpassing regulatory requirements and other commitments,
- considering the interests and utilizing the knowledge of our customers, employees, communities, and stakeholders who may be affected by our actions,
- reviewing our environmental objectives and targets annually to ensure improvement in our environmental performance,
- continually improving our Environmental Management System,
- documenting and reporting our activities and environmental performance.

President and Chief Executive Officer

July 12, 2000

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Environment Act Licence
Loi sur l'environnement Licence

Manitoba Conservation
Conservation Manitoba

Licence No./Licence n° 1645 RR

Issue Date/Date de délivrance March 31, 1993

Revised: February 14, 1994
December 13, 1999

IN ACCORDANCE WITH THE MANITOBA ENVIRONMENT ACT (C.C.S.M. c. E125)
THIS LICENCE IS ISSUED PURSUANT TO SECTION 11(1) TO:

MANITOBA HYDRO; "the Licencee"

for the rehabilitation, upgrading and continuing operation of the existing Development, being the Selkirk Thermal Generating Station as outlined in the Licencee's Proposal dated September 24, 1990, the Environmental Impact Assessment report (Volumes I and II) dated February, 1992, the addendum Volume III dated September, 1992, and the May 5, 1999 letter and supporting report requesting revisions to the MWAT values, and located on parts of River Lots 73 to 80 (inclusive) of the Parish of St. Clements in the Rural Municipality of St. Clements in Manitoba, and subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence:

"accredited laboratory" means an analytical facility accredited by the Standard Council of Canada (SCC), or accredited by another accrediting agency recognized by Manitoba Conservation to be equivalent to the SCC, or able to demonstrate, upon request, that it has the quality assurance/quality control (QA/QC) procedures in place equivalent to accreditation based on the Canadian Standard Can/CSA-Z753, extension of the international standard ISO 9000, Guide 25, or otherwise approved by the Director;

"acid-soluble" means extractable, where the liquid sample is acidified with 5 millilitres of 1:1 nitric acid per litre of sample at the time of collection, and shaken well before analysis;

"affected area" means a geographical area, excluding the property of the Development;

"ASTM" means American Society of Testing Materials;

"BOD_5" means five-day biochemical oxygen demand;

"BTU" means British Thermal Units;

"composite sample" means a quantity of effluent consisting of a minimum of 24 equal volumes of effluent collected at approximately equal time intervals over a sampling

(e) is the subject of at least one written complaint, received by the Director in a form satisfactory to the Director, from a person falling within clauses (a), (b) or (c), and the Director is of the opinion that if the unwanted sound had occurred in a more densely populated area there would have been at least 5 written complaints received within a 90-day period from 5 different persons who do not live in the same household;

"**opacity**" means the degree to which visible emissions reduce the transmission of light and obscure the view of an object in the background;

"**particulate matter**" means any finely divided liquid or solid matter other than water droplets;

"**plant**" includes the power house, offices and all the ancillary buildings, facilities and storage areas associated with the operation of the Selkirk Thermal Generating Station, as depicted in Appendix 'A' attached to this Licence;

"**plant site**" means the property described by the legal property boundary lines for that land owned by Manitoba Hydro on which the Selkirk Thermal Generating Station is located;

"**7Q10**" means the average minimum seven-day flow rate which has a recurrence interval of once in ten years;

"**sexual development**" means the condition of a fish described by the Gonado-Somatic Index (GSI), that is, the ratio between the weight of the gonads (testes or ovaries) and the total body weight, and by the state of maturity of the gonads;

"**Standard Methods for the Examination of Water and Wastewater**" means the most recent edition of Standard Methods for the Examination of Water and Wastewater published jointly by the American Public Health Association, the American Waterworks Association and the Water Environment Association;

"**total coliform**" means a group of aerobic and facultative anaerobic, Gram-negative, nonspore-forming, rod-shaped bacteria, that ferment lactose with gas and acid formation within 48 hours at 35° C, and inhabit predominantly the intestines of man or animals, but are occasionally found elsewhere, and include the sub-group of fecal coliform bacteria; and

"**visible emissions**" means any air-borne particulate matter which obscures visibility.

GENERAL TERMS AND CONDITIONS

This Section of the Licence contains requirements intended to provide guidance to the Licencee in implementing practices to ensure that the environment is maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for present and future Manitobans.

7. The Licencee shall at all times carry out an efficient program of general housekeeping, equipment maintenance and mitigative measures so as:
   (a) to minimize the emission of particulate matter through the stack from the boiler operations; and

   (b) to limit the discharge of fugitive emissions from any source within the plant site such that:
   (i) distinct plume forming fugitive emissions do not exceed an opacity of 5%;
   (ii) non plume forming fugitive emissions are not at any time visible;
   when measured or viewed in the atmosphere at any point beyond the plant site.

8. The Licencee shall, within 24 hours of having received notification from an Environment Officer of a complaint from the neighbouring public concerning fugitive emissions, respond effectively and to the satisfaction of the Director by mitigating the fugitive emissions, and submit a report to the Director within seven days outlining why the problem developed, how it was mitigated and what would be done to prevent another similar situation from developing.

9. The Licencee shall ensure that at any downwind point of impingement of plant emissions off the plant site, ground level concentrations of any of the following air pollutants are not in excess of the corresponding limits for any of the listed measurement criteria:

Air Pollutants	Measurement Criteria	Limits
(a) Sulphur Dioxide	1-hour average	900 micrograms per cubic metre
	24-hour average	300 micrograms per cubic metre
	annual arithmetic mean	60 micrograms per cubic metre
(b) Nitrogen Dioxide	1-hour average	400 micrograms per cubic metre
	24-hour average	200 micrograms per cubic metre
	annual arithmetic mean	100 micrograms per cubic metre
(c) Suspended Particulate Matter	24-hour average	120 micrograms per cubic metre
	annual geometric mean	70 micrograms per cubic metre

as determined from any ambient air sample or samples collected and analyzed in accordance with procedures and methods satisfactory to the Director, and corrected to a reference temperature of 25 degrees Celsius and a reference pressure of 101.3 kilopascals (760 millimetres of mercury).

10. The Licencee shall not cause or permit a noise nuisance to be created as a result of the construction, operation or alteration of the Development, and shall take such steps as the Director may require to eliminate or mitigate a noise nuisance.

Respecting Water

11. The Licencee shall not operate more than one of the two power generating units in the generating mode at any time during the months of May and June in any year, unless

(b) conduct a study integrating the data determined pursuant to Sub-clause 33(a) on the control, ash lagoon and coal pile observation wells to determine the direction of movement of pollutants to the groundwater; and

(c) submit an annual report to the Director by the 1st day of February of each year on the data collected pursuant to Sub-clause 33(a) of this Licence and the findings of the study carried out pursuant to Sub-clause 33(b) of this Licence.

Respecting Decommissioning

34. At least one year in advance of the projected date for commencing the decommissioning of the power generating station, the Licencee shall submit to the Director a detailed Closure Plan outlining the measures proposed to address environmental and environmental health issues which might arise in the course of, and subsequent to, the decommissioning of the said station, with the implementation of the Closure Plan subject to its prior approval by the Director.

REVIEW AND REVOCATION

A. This Licence replaces Environment Act Licence No. 1645 R which is hereby rescinded.

B. If, in the opinion of the Director, the Licencee has failed or is failing to comply with any of the specifications, limits, terms or conditions set out herein, the Director may, temporarily or permanently, revoke this Licence.

C. If, in the opinion of the Director, new evidence warrants a change in the specifications, limits, terms or conditions of this Licence, the Director may require the filing of a new proposal pursuant to Section 11 of The Environment Act.

D. This Licence will be reviewed by the Director if the plant is not retired as a thermal generating station in or before the year 2005, or if in the opinion of the Director the operational pattern of the plant has altered from the expected normal operating projections stated in the Licencee's 1992 Environmental Impact Assessment, or if any studies or monitoring programs undertaken pursuant to this Licence, or otherwise, give rise to new evidence to warrant a change to this Licence.

Larry Strachan, P. Eng.
Director
Environment Act

File: 3253.0

ENVIRONMENTAL IMPACT ASSESSMENT
THERMAL LIFE ASSURANCE PROGRAM
SELKIRK GENERATING STATION
VOLUME I: SUMMARY & MAIN REPORT

Prepared for

Manitoba Hydro
P.O. Box 815
Winnipeg, Manitoba
R3C 2P4

Prepared by

SENES Consultants Limited
in association with
North/South Consultants

February 1992

Volume I:	Summary and Main Report	February 1992
Volume II:	Appendices A - Y	February 1992
Volume III:	Addendum	September 1992

1.0 INTRODUCTION

The purpose of this Environmental Impact Assessment (EIA) is to evaluate the impacts of the rehabilitation and upgrade to the Selkirk Generating Station (Selkirk G.S.) and the impacts of the operation of the station until the year 2005.

1.1 THERMAL LIFE ASSURANCE PROGRAM

Manitoba Hydro has proposed a program, called the Thermal Life Assurance Program, to ensure that its thermal generating stations reach the end of their design lifetime. In order for these stations to fulfil their roles in Manitoba Hydro's system and provide economical and reliable power, some operational upgrades to the stations are required.

1.2 THERMAL GENERATING STATIONS IN MANITOBA

The majority of electrical power in the Province of Manitoba is provided by 14 hydroelectric generating stations. However, the power-producing capability of these stations depends on the flow of waters in the rivers which may vary significantly from year-to-year. For over 30 years, Manitoba Hydro has operated two thermal generating stations located in the southern portion of the province, at Brandon and Selkirk, which are used to supplement the capacity of the hydraulic facilities and to provide security of power supply for Manitoba. To fulfil these roles, the stations are used in several ways:

- to satisfy peak loads during periods of high demand for power;
- to provide power during periods of drought when hydraulic capabilities are reduced;
- to provide power during instances of failure of hydraulic units or at times of transmission interruptions; and,
- to create opportunities at hydraulic facilities to maintain or increase reservoir storage.

During periods when the boilers are not in use, solutions of hydrazine in water are added to the boilers as an oxygen scavenger to reduce corrosion in the boilers.

Domestic waste waters are treated by a septic tank system in the sewage pumphouse. Solids settle by gravity and are retained in the septic tank. The liquid wastes are chlorinated to a total residual of 0.5 to 1.5 ppm free chlorine before being discharged to the Red River with water from the station sump. Solid material is removed annually by an outside contractor and hauled to an approved disposal facility.

4.2 Future Plant Processes

There will be no changes to plant processes.

4.3 Construction Phase

The Selkirk G.S. generally operates only in the winter months. Any upgrades or maintenance of the facility will be done from the summer to fall months when no production is planned. There will be no changes in air emissions or water discharges while the upgrades are being implemented.

4.4 Future Plant Operation

From 1992 until its proposed retirement in the year 2005, Manitoba Hydro expects to operate the Selkirk G.S. when the plant's generating capacity is needed to supplement system generation in unscheduled circumstances (i.e. drought). Annual training runs will be held to ensure that facilities are fully operational and that staff are prepared. This level of operation would annually generate 28 Gigawatt hours (GW.h) of power. However, there is a reasonable probability that a higher level of generation will occur from time-to-time as a result of below normal surface water runoff elsewhere in the system, system equipment outages in the power grid, and short-term extreme weather conditions. The latter two factors could require operation of the Selkirk G.S. for several weeks or months, depending on the circumstances. In the case of low water

flows, and particularly in the case of very dry years, there exists a possibility that the Selkirk G.S. could be expected to operate during the entire year. Based on 56 years (1912-1967) of hydraulic system inflow records, the generation planning department of Manitoba Hydro has estimated that the most likely maximum annual generation requirements will not exceed 450 GW.h The probability of occurrence of this level of operation is estimated at less than 5% in any given year, and for the purposes of the EIA report an operating level of 450 GW.h has been selected as the "worst case" scenario for annual generation. There is a 95% probability that the average annual generation over the period 1992-2005, which includes annual generation requirements at 28 GW.h for most years and occasional requirements for more generation in some years, will be less than 200 GW.h.

The expected normal operating requirements for the Selkirk G.S. can therefore be summarized as a "minimum" of 28 GW.h/y in most years, a "95% probability long-term average" of 200 Gw.h/y over the entire period 1992-2005, and a probable "maximum worst-case" of 450 GW.h in some years. These projections assume a) that there will be an increasing need for power generation beginning in 1997 due to projected provincial load growth, b) increased generation needs specifically in the years 1999, 2000, and 2001 due to a need for new generation, and c) a decline in thermal generation requirements in 2001/2002 due to the anticipated power production from the Conawapa Hydro Electric G.S. which is expected to be fully operational in 2005.

These projections are also based on the following assumptions:

- the 56 year record of hydraulic system inflows from 1912-1967 is representative of the inflows to be expected in the period 1992-2005;
- whenever economical, imported electricity from Saskatchewan, Ontario or the United States will be utilized before thermal generation at Selkirk G.S. to meet system demands;
- power will be supplied by thermal generation at Brandon G.S. before Selkirk G.S.;

- Brandon Generating Station units 1 to 4 will be retired in 1996; and

- Manitoba Hydro's development plan for power generation in the province proceeds as planned.

Apart from the anticipated normal generation levels, there is a very low probability (likely <1%) in each year that the plant will be required to operate to its maximum generating capacity. This situation would arise as a result of extreme circumstances such as:

- a sustained extreme drought event;

- a major catastrophe affecting generation or transmission equipment resulting in outages in the grid system or its interconnections;

- an unforeseen and unmanageable growth in power demand; or

- delays in the development of planned additional generation capacity.

Under these circumstances, generation could be as high as 800 GW.h/y and is considered to be outside the range of projected normal operation for the Selkirk G.S.

4.5 CODES OF PRACTICE FOR NEW GENERATING STATIONS

As a requirement of the EIA Guidelines prepared by the TAC, the Environmental Codes of Practice for Steam Electric Generating Stations were reviewed for comparison purposes. A discussion of the applicability and the feasibility of the recommended design practices contained in the Codes is presented in Appendix U.2. Based on the evaluation of the stated intent and purpose of Environment Canada in preparing the Codes, it was determined that the recommendations are not applicable to the types of modifications being considered by Manitoba Hydro. However, a number of the recommendations from the Codes of Practices, particularly those relating to monitoring programs, have been or will be implemented.

As part of the input necessary to prepare a screening level risk assessment, the estimated 95% probability long-term average annual SPM emission rate of 3,220 Mg/y resulting from an average power generation rate of 200 GW.h/y was assumed to occur every year for the 15 year period of the risk assessment, even though the actual period of operations from 1992-2005 only includes 13 years of operation at a 95% probability long-term average generation rate of 200 GW.h. The higher emission rate was used to provide a very conservative estimate of potential exposure to airborne emissions.

While coal is mostly carbon, water and hydrocarbons, there are trace metals present which become concentrated in the ash. Small particles that are not captured by the multiclones are emitted into the atmosphere. On the principal that site specific data are likely to be more accurate than data from generic sources, emission measurements taken at Brandon G.S. #5 (IMET, 1989) and corrected for the operating parameters at Selkirk G.S. are assumed to provide a more representative estimate of trace element emissions. The estimated emission rates for both Brandon G.S. Unit #5 and Selkirk Units 1 and 2 are listed in Table 5-6.

5.2.1.2 Fugitive Emissions

Coal storage piles are regarded as potential sources of fugitive dust. At Selkirk, coal dust can be blown towards the residential community along the northern boundary of the station property. This has led to complaints from residents about soiling, and Manitoba Hydro is pursuing the use of various erosion suppression techniques.

In tests of the effectiveness of dust suppression techniques, a latex coating was applied to the coal pile at Selkirk G.S. After a severe storm, parts of the coating were blown away. Manitoba Hydro will continue to investigate methods of dust suppression during periods of nongeneration. However, for the purposes of conservative modelling, no dust control was assumed.

The coal storage area was modelled as an area source (156 x 240 m). Also, the coal car unloading house was assumed to be an area source (10 x 19 m). From the coal storage area, emissions were assumed to result from wind erosion and material handling of coal over the area.

The coal stock piles are the largest potential source of fugitive dust (120.6 kg/d).

5.2.1.3 Greenhouse Gases

The main reaction in the burning of coal is the reaction of oxygen with carbon to produce carbon dioxide (CO_2).

$$C + O_2 \rightarrow CO_2$$

CO_2 is the only greenhouse gas, other than NO_x, which is emitted directly by Selkirk G.S. Environment Canada (1982) has estimated that 45% of the coal is carbon, and 99% of the fuel carbon is released as CO_2 emissions (Alliance Technologies Corporation, 1990). Table 5-5 lists the maximum sustained CO_2 emission rate for the Selkirk G.S. The 95% probability long-term average annual estimated CO_2 emission based on a power generation rate of 200 GW.h/y is 269,000 Mg/y, approximately 2.1% of the estimated total Manitoba CO_2 emissions of 12,500,000 Mg/y (Jaques, 1987). The maximum predicted annual CO_2 emissions based on power generation of 450 GW.h of power from the Selkirk G.S. is 605,400 Mg/y which makes up approximately 4.8% of the total annual Manitoba emissions.

5.2.1.4 Noise

Some of the generating station's noise sources are continuous and of constant sound pressure level while others are of short duration. Possible sources of noise at the plant are:

- coal unloading facility which includes the shaker house and mobile equipment;
- steam discharges (air extractor and superheater);
- station transformers;
- public announcement system;
- steam generators, turbines and alternators when generating power;
- alternators operating as synchronous condensers.

Most of the operating FGD systems are designed to achieve high control efficiencies in SO_2 removal in the order of 70%-90%, or more. Therefore, most available retrofit cost estimates are for systems with these levels of control efficiency. A previous study (W.P. London and Associates, 1989) has determined that the capital costs for a retrofit FGD process at Selkirk G.S. capable of achieving 90% control of SO_2 emissions would be in the order of $25.3 million to $45.9 million (in 1988 Canadian funds), depending on the type of FGD process chosen and the degree of difficulty involved in the retrofit. In addition, the operation and maintenance (O & M) costs for FGD would amount to $5,070,000 for the period 1992-2005 ($390,000 x 13 years). Construction of a new FGD sludge lagoon to handle the additional waste stream would add approximately $700,000 in capital costs, $40,000 per year in O & M costs, and $500,000 in close out costs.

Retrofit cost estimates for lower control efficiencies using the lime or limestone slurry FGD process are not readily available, and would require a detailed engineering feasability evaluation of the Selkirk facility. Similarly, other FGD process control technologies could be considered but cost estimates for these systems cannot be determined for a retrofit due to limited retrofit experience to date. For example, dry scrubbing systems employing spray dryers ahead of particulate matter control devices are competitive with the limestone slurry process, and have emerged as the preferred option for new coal-fired plants burning low-sulphur western coal, but retrofit experience is limited exclusively to Japan and Germany. Both the limestone slurry process and the spray dryer systems involve high capital costs to provide 90% or more SO_2 removal efficiency, and both systems produce large quantities of waste material. By comparison, a relatively new process involving sorbent furnace injection requires lower capital costs and provides 40%-50% SO_2 removal efficiency. However, sorbent injection systems are still in the developmental stage and have not been demonstrated at commercial scale. There are no reliable estimates of retrofit costs for sorbent injection systems.

It should be noted that the lignite coal burned at Selkirk G.S. is a low sulphur content (0.6%) fuel. Furthermore, the high moisture content of the lignite (~30%) serves to limit formation of NO_x emissions. Therefore, to a certain extent the choice of fuel by Manitoba Hydro already provides a degree of control on these emissions without the use of add-on control systems. The

fact that the Selkirk G.S. has historically operated at less than 10% of its capacity on an annual basis and is proposed to operate in a similar manner in the future, combined with the small size of the generating units at the Selkirk G.S., make the use of add-on control costs ineffective, on a ton-of-contaminant-removed basis. The impact analysis performed for this assessment has demonstrated that additional controls are not required either to meet ambient air quality objectives or to protect public health. For these reasons, the substantial investment for this state-of-the-art pollution control equipment is not justifiable on this small standby station.

7.2 AQUATIC

This section addresses mitigation and management of aquatic chemical and thermal impacts to surface water (Red River and Cooks Creek) by project-related activities. All mitigative measures are designed to protect aquatic biota or ground water. Each potential impact will be accompanied by a measure or measures to prevent or reduce the severity of impact. Residual impacts will be noted.

7.2.1 Surface Water

In the absence of data on invertebrates and importance of fish habitat in Cooks Creek and the Red River, assessment of impacts by Selkirk G.S. was developed primarily for important fish species (Table 2-2). Protection of fish species may also provide indirect protection for invertebrates and sensitive habitat.

Surface water impacts to fish fall within three main categories: 1) impingement on fish screens and entrainment in cooling water flow; 2) temperature effects; and 3) effects of chemical discharges. Mitigation measures and/or strategies are developed based on this premise.

7.2.1.1 Impingement and Entrainment

Collection, identification and size measurement of fish impinged on travelling fish screens at the cooling water intake pumps will be continued. It is recommended that the mesh size of the

Manitoba Hydro

from the Office of the Vice-President

2000 10 20

Mr. L. Strachan, P. Eng.
Director, Environmental Approvals
Manitoba Conservation
160 - 123 Main Street
Winnipeg, MB R3C 1A5

Dear Mr. Strachan:

RE: SELKIRK GENERATING STATION - EXPECTED FIVE YEAR OPERATING PLAN

Please find attached Manitoba Hydro's expected 5 year operating plan for the Selkirk Generating Station.

In developing this forecast, we note that several key factors have changed since the 1993 receipt of the licence:

1. In the original environmental impact assessment, it was anticipated that the Conawapa Generating Station would be fully operational in 2005, with first units coming on line in 2001. The construction of Conawapa was partly predicated on Ontario Hyro's purchase of power from that plant as well as meeting future domestic load requirements. Ontario Hydro pulled out of the power deal in December 1992 effectively halting further work on the project. The loss of Conawapa has meant that all other things being equal, the expected normal operating requirements for Selkirk outlined in the EIA for the balance of the Licence period would have been increased.

2. Over the last three years, we have experienced unexpectedly high failure rates on the Hvdc system bringing hydraulic power from Northern Manitoba. These problems have resulted in Selkirk Generating Station running approximately 14% of the time. We have taken steps to minimize the effect of such failures and are therefore assuming that the requirement for Selkirk operation for this reason will not increase.

3. In the early 1990s, the current economic opportunities for selling power on the export markets were not anticipated nor contemplated. Deregulation in the electricity markets has opened up extremely profitable markets which Manitoba Hydro, in the interests of its customers, has taken advantage of. In 1999-2000, $376 million in export sales were achieved by the

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Corporation. This in turn, has allowed us not only to meet our financial targets and thereby better position ourselves in a rapidly changing industry, but it has permitted us to hold electricity rates for the last four years for our residential customers and nine years for our industrial customers. Since January 1998, these opportunities have resulted in the Selkirk Generating Station running approximately 18% of the time towards export sales. In the proposed operating plan, we are proposing to eliminate this export sales component from Selkirk's operation.

We also note that, although the basis for our estimate of operations has changed from that in the 1992 EIA, with current assumptions, we now expect total generation at Selkirk in the period 1993 to 2005 will be at or about the levels estimated in that EIA.

In addition, we also point out that since the 1992 EIA, we have changed the type of coal consumed from Saskatchewan lignite to Powder River Basin coal. PRB coal has significantly lower emission rates than the lignite.

Yours truly,

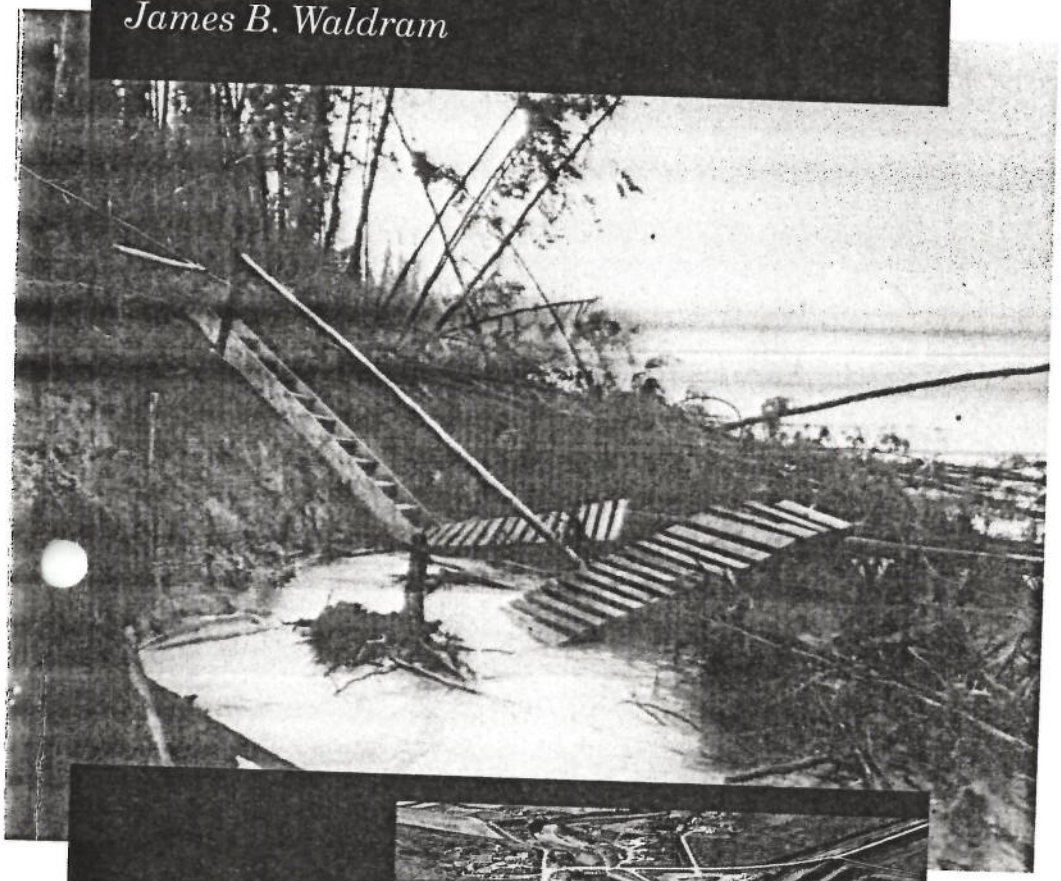
K.R.F. Adams
Vice-President
Power Supply

KRFA/rdc

As Long as the Rivers Run

Hydroelectric Development and Native Communities in Western Canada

James B. Waldram



South Indian Lake and the Churchill River Diversion Project

5

The Hydro has no thought of the people of South Indian Lake, only of the power he can get out of it.[1]

As the 1960s came to a close, it was apparent that a new movement was afoot in Canada. Individuals from all walks of life had begun to express their concerns about the damage being caused to the environment by developers. Pollution too was becoming an issue, and the extent to which the pristine northlands was being affected had become an open question. More than anything else, the image of the northern Native emerged in this period as the symbol of the environmental movement. Here were individuals who, it was believed, continued to live in harmony with nature, and did not abuse it. Yet, industrial projects in the North threatened to disrupt the balance that the Native people had struck with the land. When plans for another, even larger, hydroelectric project for northern Manitoba were announced, the Native people of the North became the centre of a controversy which raged on national and even international fronts.[2] Unlike that of the Cumberland House and Easterville cases, the intense media attention which surrounded the flooding of Southern Indian Lake ensured that this case would be different. The controversy over the flooding would be fought in the public eye, and the Natives were to be at the forefront of a political struggle to stop the project.

THE COMMUNITY OF SOUTH INDIAN LAKE

South Indian Lake is a small Native community in northern Manitoba, some 1,200 air kilometres north of Winnipeg. It remains semi-isolated

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MR. ABRA: Now, with respect to coal-fired, Mr. Wojczynski, we recognize that there are significant environmental regulations that have come into place over the last number of years related to them and probably more in the future. Was it for that reason that you converted the Selkirk plant? I

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remember there being some publicity about that a few years ago about concern there being coal emission. You converted as a result of that?

MR. WOJCZYNSKI: With respect to the Selkirk plant, we were in the process of reviewing the future of the Selkirk plant when a public controversy arose as to whether or not the Selkirk plant emissions were causing problems in a region adjoining to it. There were a lot of concerns by some residents. Our studies were able to demonstrate that there were no significant impacts but that did raise the profile of

BRANDON GENERATING STATION

2003 ANNUAL GENERATION SUMMARY

	January	February	March	April	May	June	July	August	September	October	November	December	Annual Values
OPERATIONAL DATA													
Peak Megawatt Output (MW)	104	102	104	98	100	96	96	97	100	94	106	102	Annual Total
Gross Station Megawatt-Hours (MWh)	56,461	61,235	68,336	60,314	34,281	32,480	59,947	54,524	61,018	35,050	49,031	66,934	639,611
Gross Coal Consumption (Tonnes)	29,160	30,879	34,575	33,688	17,842	16,257	34,262	31,182	34,874	20,033	28,022	38,255	349,009
Gross Fuel Oil Consumption (Litres)	87,907	27,542	16,968	22,330	83,936	49,801	7,016	52,684	20,353	40,023	86,801	3,880	499,241
Gross Natural Gas Consumption (Mm^3)													-
FUEL DATA													
Ash Content (% by wt.)	3.8	3.5	4.0	4.2	4.6	5.0	4.7	5.0	4.4	3.8	5.7	5.4	4.8
Volatile Carbon Content (% by wt.)	32.2	32.9	32.0	33.5	35.8	32.1	31.2	31.5	37.4	31.8	41.3	40.0	34.5
Fixed Carbon Content (% by wt.)	39.1	38.6	39.6	38.6	37.5	39.5	38.4	38.7	45.3	41.0	53.1	51.7	42.1
Sulphur Content (% by wt.)	0.27	0.26	0.20	0.30	0.32	0.35	0.30	0.32	0.37	0.29	0.45	0.53	0.33
Calorific Value (kJ/kg)	21,775.45	21,802.88	21,691.77	21,796.83	20,947.45	21,375.14	20,904.99	20,969.13	25,012.09	22,070.18	28,629.63	27,530.00	23,074.64
STACK EMISSIONS													
Total Monthly SO2 (Tonnes)	119.95	122.26	105.33	153.93	86.98	86.68	156.54	151.88	196.52	88.49	192.07	308.76	1,769.39
Total Monthly NOx (Tonnes)	99.73	105.46	118.04	115.03	61.09	55.61	116.96	106.49	119.07	68.47	95.85	130.57	1192.37
Total Monthly Particulate (Tonnes)	0.55	0.52	0.69	0.71	0.41	0.41	0.79	0.78	0.77	0.38	0.78	1.61	8.40
Greenhouse Gases (CO2) (Tonnes)	53,991	56,988	63,770	62,150	32,443	29,485	61,646	56,298	64,331	37,034	51,890	70,515	640,541
Average Monthly SO2 (ng/J)	188	181	140	209	231	248	218	232	225	199	238	293	216
Average Monthly NOx (ng/J)	156	156	157	156	162	159	163	162	136	154	119	124	149
Average Monthly Particulate (ng/J)	0.9	0.8	0.9	1.0	1.1	1.2	1.1	1.2	0.9	0.9	1.0	1.5	1.0

SELKIRK GENERATING STATION

1998 ANNUAL GENERATION SUMMARY

	January	February	March	April	May	June	July	August	September	October	November	December	Annual Values
OPERATIONAL DATA													
Peak Megawatt Output (MW)	138	142	138	91	69	62	133	128	132	135	132	136	Annual Total
Gross Station Megawatt-Hours (MWh)	37,040	4,851	34,090	2,024	18,370	4,157	52,275	72,424	75,100	75,272	59,548	47,116	N/A
Gross Coal Consumption (Tonnes)	23,522	3,075	21,649	1,286	10,832	2,451	30,826	42,707	44,285	44,387	37,817	29,922	292,759
Gross Fuel Oil Consumption (Liters)	118,659	37,239	138,723	9,750	60,558	17,060	65,648	59,815	79,317	63,784	37,961	99,461	787,975
FUEL DATA													
Ash Content (% by wt.)	4.7	5.8	4.4	4.4	3.9	3.6	8.8	8.8	6.1	6.5	4.2	5.0	6.1
Volatile Carbon Content (% by wt.)	30.9	30.3	30.6	30.6	31.9	32.6	30.5	30.5	30.4	31.2	30.5	31.1	30.8
Fixed Carbon Content (% by wt.)	37.8	35.0	37.1	37.1	39.6	39.5	37.1	37.1	37.6	38.6	39.9	40.1	38.2
Sulphur Content (% by wt.)	0.32	0.32	0.35	0.35	0.33	0.31	0.70	0.70	0.53	0.47	0.33	0.35	0.48
Calorific Value (kJ/kg)	20,776.26	19,563.32	20,287.36	20,287.36	21,603.75	21,709.90	21,341.87	21,341.87	20,288.66	20,899.34	21,277.95	21,463.18	20,985.63
STACK EMISSIONS													
Total Monthly SO2 (Tonnes)	97.70	12.78	98.38	5.84	46.40	9.87	279.96	387.85	304.54	270.65	161.91	135.93	1,811.82
Total Monthly NOx (Tonnes)	90.30	11.86	83.18	4.94	41.60	9.42	118.13	163.58	169.67	170.02	144.82	114.75	1,122.27
Total Monthly Particulate (Tonnes)	175.7	28.3	151.3	9.0	67.2	14.0	430.9	597.0	429.1	458.5	252.2	237.6	2,850.8
Average Monthly SO2 (ng/J)	198	208	221	221	196	183	424	425	338	291	201	210	294
Average Monthly NOx (ng/J)	183	193	187	187	176	175	179	179	188	183	180	178	182
Average Monthly Particulate (ng/J)	360	471	344	345	287	263	655	655	478	494	313	370	464

SELKIRK GENERATING STATION

2000 ANNUAL GENERATION SUMMARY

	January	February	March	April	May	June	July	August	September	October	November	December	Annual Values
OPERATIONAL DATA													Annual Total
Peak Megawatt Output (MW)	144	134	136	140	70	71	126	125	127	132	-	140	N/A
Gross Station Megawatt-Hours (MWh)	71,942	61,725	39,212	43,841	18,493	29,768	32,463	66,003	18,032	42,022	-	45,842	469,143
Gross Coal Consumption (Tonnes)	42,423	36,398	22,767	25,853	10,904	17,554	19,142	38,321	10,633	25,160	-	27,328	276,483
Gross Fuel Oil Consumption (Litres)	91,448	75,118	75,334	35,697	48,447	29,380	67,800	44,890	27,730	52,940	-	83,090	631,864
FUEL DATA													
Ash Content (% by wt.)	4.5	3.6	3.5	3.8	4.0	4.2	4.2	4.0	4.3	3.8	-	4.3	4.0
Volatile Carbon Content (% by wt.)	32.0	34.4	32.6	32.7	31.5	30.1	33.3	33.9	35.7	33.0	-	31.4	32.8
Fixed Carbon Content (% by wt.)	39.7	37.5	40.0	39.8	38.2	39.5	37.8	38.9	41.5	39.5	-	39.6	39.2
Sulphur Content (% by wt.)	0.33	0.33	0.28	0.32	0.31	0.36	0.39	0.35	0.35	0.28	-	0.36	0.33
Calorific Value (kJ/kg)	21,402.30	21,660.42	21,832.42	21,814.49	20,841.15	20,464.02	21,245.02	21,728.03	23,106.28	22,216.04	-	21,696.73	21,631.48
STACK EMISSIONS													
Total Monthly SO2 (Tonnes)	181.66	155.86	82.73	107.34	43.88	81.99	96.89	174.04	48.29	91.41	-	127.66	1,191.75
Total Monthly NOx (Tonnes)	162.57	139.48	87.31	99.03	41.85	67.25	73.42	146.76	40.76	96.42	-	104.78	1,059.63
Total Monthly Particulate (Tonnes)	303.3	208.2	126.6	156.2	69.2	117.1	127.7	243.3	72.6	152.0	-	186.7	1,762.9
Average Monthly SO2 (ng/J)	199	197	166	190	192	228	237	209	196	163	-	214	199
Average Monthly NOx (ng/J)	178	176	175	175	183	187	179	176	165	172	-	176	177
Average Monthly Particulate (ng/J)	334	264	255	277	305	326	314	292	296	272	-	315	295

38.

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Note: CO2 information was added to this sheet on June 2, 2000.

Greenhouse Gases (CO2) (Tonnes)	78,445	67,294	42,173	47,748	20,233	32,435	35,471	70,753	19,675	46,520	0	50,601	511,348

COMPARISON OF PARTICULATE MATTER EMISSIONS BETWEEN BRANDON COAL-FIRED STATION WITH ADEQUATE POLLUTION CONTROL DEVICES AND THE SELKIRK COAL-FIRED STATION WITH INADEQUATE POLLUTION CONTROL DEVICES.

	generated	particulate matter emitted
Brandon Station 2003	639 611 MWh	8.4 tonnes
Selkirk Station 1998	482 267 MWh	2850 tonnes

The Selkirk Station generated $\frac{482\ 267}{639\ 611}$ = 3/4 (75 %) of what the Brandon Station generated BUT emitted $\frac{2850}{8.4}$ = 339 times more than (or 33900% of) what was emitted by the Brandon Station.

Clem - discuss

Manitoba Hydro

P.O. Box 815 • Winnipeg Manitoba Canada • R3C 2P4
Telephone / N° de téléphone : (204) 474-3390
Fax / N° de télécopieur : (204) 474-4974

2001 01 05

Mr. Larry Strachan
Environmental Approvals
Manitoba Conservation
123 Main Street
Winnipeg MB R3C 1A5

Dear Mr. Strachan:

Manitoba Hydro, consistent with Section 14 of the Environment Act, provides notification that the Corporation intends to make physical alterations to the Selkirk Thermal Generating Station to enhance the environmental performance of the facility for the remainder of the term of its operation until 2005 under Environment Act License 1645 RRR .

Specifically, as announced yesterday, the Station is to be altered as soon as possible to use natural gas as the fuel source. Low NOx, high efficiency burners will be installed, the Station will be connected to a new high pressure gas line to be installed by Centra Gas and the use of coal will be terminated once these alterations have been completed. Planning investigations indicate an in-service in the spring of 2002 for the altered Station.

The proposed station alterations include:

- Installation of low NOx, high efficiency burners,
- Removal of coal supply equipment,
- Decommissioning of the coal pile, and
- Decommissioning of the ash lagoon.

Operation of the Station burning natural gas will provide significant improvements in the air emissions, liquid effluents and aesthetics of the facility. Specifically, there will be significant reductions in emissions of particulate matter, sulphur dioxide, carbon dioxide, mercury and other metals, and oxides of nitrogen. The liquid effluent associated with the ash removal system will be eliminated. Decommissioning of the coal pile and ash lagoon will eliminate the source of potential leachates to groundwater, eliminate fugitive dust emissions and will improve site aesthetics.

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While it is not anticipated that there will be any significant adverse environmental impacts associated with this alteration, investigations have been initiated to assess potential impacts of the alterations and the operation with natural gas as a fuel. Detailed assessments of the environmental improvements and potential impacts will be submitted by August, 2001. The following topics will be addressed:

- Stack emissions and associated health risks when burning natural gas,
- Decommissioning plans for the ash lagoon and coal pile,
- Environmental monitoring,
- Public communication program,
- Facility Operating Plan, and
- Environmental improvements resulting from the conversion to natural gas.

Current plans are to extend operation of the Selkirk Generating Station beyond the term of the current Environment Act License which expires in 2005. An Environment Act proposal will be submitted for the Life Extension prior to expiry of the current License and a detailed Environmental Impact Assessment will be conducted.

Centra Gas will be pursuing separate regulatory approvals for the gas pipeline development from Isle Des Chenes to East Selkirk. An Environment Act Proposal and Environmental Impact Statement are anticipated to be filed for this Class 2 project in the fall of 2001.

In the interim period until the Selkirk Generating Station is altered to enable use of natural gas as the fuel source, the facility will continue to burn coal to generate electricity to meet Manitoba system reliability requirements consistent with the revised License 1645 RRR issued on October 25, 2000.

Please do not hesitate to contact myself or Mr. W.A. Brown if you have any questions or concerns regarding this notification.

Yours truly,

D.C. Windsor
Sr. Environmental Officer
Environmental Licensing & Protection

DCW/bgs/2001-0104.1

c: W.A. Brown

Environment Act Licence
Loi sur l'environnement Licence

Manitoba Conservation
Conservation Manitoba

Licence No./Licence n° 1645 RRRR

Issue Date/Date de délivrance March 31, 1993

Revised: February 14, 1994
December 13, 1999
October 25, 2000
May 15, 2002

IN ACCORDANCE WITH THE MANITOBA ENVIRONMENT ACT (C.C.S.M. c. E125) THIS LICENCE IS ISSUED PURSUANT TO SECTIONS 11(1) AND 14(2) TO:

MANITOBA HYDRO; "the Licencee"

for the rehabilitation, upgrading and continuing operation of the existing Development located on parts of River Lots 73 to 80 (inclusive) of the Parish of St. Clements in the Rural Municipality of St. Clements in Manitoba, being the Selkirk Thermal Generating Station as outlined in the Licencee's:

- Proposal dated September 24, 1990, together with the Environmental Impact Assessment report (Volumes I and II) dated February, 1992, and the addendum Volume III dated September, 1992;
- letter of May 5, 1999, and supporting report, requesting revisions to the MWAT values;
- letter of August 28, 2000 respecting fish impingement;
- notice of alteration dated January 5, 2001, complemented with an environmental assessment report dated July 11, 2001 respecting the fuel switching project; and
- revision request of June 5, 2001 respecting the temperature decline rate limit specified in Clause 27 of Licence No. 1645RRR;

subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence:

"**accredited laboratory**" means an analytical facility accredited by the Standard Council of Canada (SCC), or accredited by another accrediting agency recognized by Manitoba Conservation to be equivalent to the SCC, or be able to demonstrate, upon request, that it has the quality assurance/quality control (QA/QC) procedures in place equivalent to accreditation based on the international standard ISO/IEC 17025, or otherwise approved by the Director;

"**acid-soluble**" means extractable, where the liquid sample is acidified with 5 millilitres of 1:1 nitric acid per litre of sample at the time of collection, and shaken well before analysis;

"**affected area**" means a geographical area, excluding the property of the Development;

"**approved**" means approved by the Director in writing;

GENERAL TERMS AND CONDITIONS

This Section of the Licence contains requirements intended to provide guidance to the Licencee in implementing practices to ensure that the environment is maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for present and future Manitobans.

1. In addition to any of the limits, terms and conditions specified in this Licence, the Licencee shall, upon the request of the Director:
   (a) sample, monitor, analyze and/or investigate specific areas of concern regarding any segment, component or aspect of pollutant storage, containment, handling, treatment, and disposal or emission systems, for such pollutants or ambient quality, aquatic toxicity, leachate characteristics and discharge or emission rates, for such duration and at such frequencies as may be specified;

   (b) determine the environmental impact associated with the release of any pollutant(s) from the Development; or

   (c) provide the Director, within such time as may be specified, with such reports, drawings, specifications, analytical data, descriptions of sampling and analytical procedures being used, bioassay data, flow rate measurements and such other information as may from time to time be requested.

2. The Licencee shall, unless otherwise specified in this Licence:
   (a) carry out all preservations and analyses on liquid samples in accordance with the methods prescribed in the most current edition of Standard Methods for the Examination of Water and Wastewater or in accordance with an equivalent analytical methodology approved by the Director; and

   (b) ensure that all analytical determinations are undertaken by an accredited laboratory.

3. The Licencee shall ensure that all monitoring activities, data collection and interpretations requested through the provisions of this Licence are carried out by individuals properly trained or qualified to carry out these tasks.

4. The Licencee shall report all the information requested through the provisions of this Licence in a manner and form acceptable to the Director.

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

Respecting Restrictions on Operation

5. The Licencee shall ensure that, unless otherwise approved by the Director, generation of electrical power at the Development only occurs to fulfill the 'Role and Mode of Operation' as detailed in Section 2.1 of the Licencee's July 2001 "Selkirk Generating Station Fuel Switching Project Environmental Report".

Respecting Air

6. Unless otherwise specified by the Director in or through the provisions of this Licence, the Licencee shall:
   (a) adhere to the protocols and performance specifications outlined in Environment Canada's 1993 Report EPS 1/PG/7, or any future amendment thereto, respecting the

2.0 PROJECT DESCRIPTION

The following sections provide a description of the Selkirk G.S. Fuel Switching Project, including: (1) the role and mode of operation; (2) proposed station alteration; (3) construction details; (4) decommissioning activities; and (5) project schedule.

2.1 ROLE AND MODE OF OPERATION

2.1.1 Operating Role

The station, once converted to gas, will continue in its role as a backup supply to the primary hydraulic system. The station will be operated occasionally, but provide continuous benefit by being available at all times to supplement the hydraulic system if necessary. Having the station available at all times ensures the reliability of power supply to Manitoba and contracted exports. Table 2-1 indicates the operating roles of the station and the reason for operation.

Table 2-1 Selkirk G.S. Operating Roles and Reason for Operation

Operating Role	Reason for Operation**		
	Domestic Reliability	Domestic Backup	Export Backstop
1. Provide power during periods of drought when hydraulic capabilities are reduced;	✓	✓	✓
2. Satisfy peak loads during periods of high demand for power, including supply of MAPP* emergencies;		✓	✓
3. Provide power as a contingency against transmission failures;	✓		
4. Provide power during instances of failure of hydraulic units or during interruptions on the transmission link between Northern and Southern Manitoba;	✓	✓	✓
5. Provide greater operating flexibility of hydraulic facilities, including ponding in anticipation of drought.		✓	✓

* The Mid-Continent Area Power Pool (MAPP). Manitoba Hydro is a member of the MAPP Generation Reserve Sharing Pool that requires Manitoba Hydro to provide power during emergencies within the pool.
** Domestic refers to load and markets within Manitoba. Export refers to load and markets beyond provincial boundaries.
Note: In addition to the operating roles described in Table 2-1, the station will occasionally be operated for training, maintenance and testing purposes.

2.1.1.1 Reasons for Operating

Domestic Reliability - Operation for reasons where there is no other supply alternative or where alternative sources of supply would not correct the deficiency. (e.g. during ice storms where a local source of supply is required, or during severe droughts where import capability has been fully utilized.)

Domestic Backup - Operation for reasons where there may be alternative sources of supply, but that source may not be economic relative to the cost of operating the Selkirk G.S. (e.g. should a generating unit fail, causing Manitoba Hydro to seek replacement of that lost generation, the decision to source that replacement power will be based on economics. If operation of Selkirk is lower cost than all alternatives, including importing and curtailing of export contracts, then the station will be placed into service while the failed generating unit is repaired.)

Export Backstop - The same as operation for domestic backup. Since the 1992 Licence was issued, there has been clarification between Manitoba Conservation and Manitoba Hydro on the definitions of export "Backstopping". The following provides a summary of these clarifications:

Backstopping of Forward Sales vs. Spot Exports

An important clarification has been developed regarding the role of the station in "backstopping" forward export sales. Similar to the use of the station to backup domestic supply capability; the use for backstopping can be described by the roles discussed in Section 2.1.1. In fact, backup of domestic supply and backstopping of forward export sales is essentially indistinguishable in a system planning and operation sense. The use of Selkirk G.S. in backstopping forward export sales differs from use for spot export sales in that the latter refers to sales that are entered into either for the next day or next hour, where the incremental supply for that sale is expected to be mainly obtained through operation of the station (i.e. remaining system supply is likely exhausted for the period and the ability to serve the sale requires the Selkirk G.S. to be dispatched). The current operating licence does not permit the use of Selkirk in this way.

Backstopping of forward sales on the other hand is permitted. The two different types of operation can be distinguished to some degree by the length of time that elapses between Manitoba Hydro's commitment to supply the sale and actual delivery of the sale, but more important is the expectation of whether the station will be needed to help serve the sale. Whereas spot sales are contracted and delivered in the very short term (hourly or daily), forward sales are planned one month to several years before delivery. Also, forward sales are made such that there is a low probability that the station will need to be operated to serve sale (i.e. the sale is planned to be delivered from the hydraulic system).

National Energy Board
Office national de l'énergie

CANADA

TABLE 2A
Export Summary Report
by Source, Authorization and Exchange Type

Source	Authorization	Exchange Type	Energy (MW.h) DEC03	Energy (MW.h) JAN03 - DEC03	Revenue (CAN$) [1] DEC03	Revenue (CAN$) [1] JAN03 - DEC03	CAN$/MW.h [2] DEC03	CAN$/MW.h [2] L12M
TransAlta Ener	Permit 168	F	311	51 036	11 802	2 227 975	37.95	43.65
Subtotal Firm and Interruptible Exports: British Columbia			**974 546**	**7 166 721**	**38 520 300**	**383 715 997**	**39.53**	**53.54**
Manitoba								
Manitoba Hydro	Licence 170	F	36 080	2 010 230	6 806 612	120 586 187	188.65	59.99
	Permit 33	F	0	155 608	0	6 692 993	0.00	43.01
	Permit 34	F	0	122 030	0	5 249 913	0.00	43.02
	Permit 35	F	0	122 255	0	6 876 501	0.00	56.25
	Permit 45	F	0	342 292	403 535	29 091 178	0.00	84.99
	Permit 46	I	15 112	587 465	1 223 225	33 076 157	80.94	56.30
		N	11 989	232 436	0	0	0.00	0.00
	Permit 68	F	1 972	154 511	245 556	6 259 003	124.52	40.51
	Permit 72	F	12	12	1 245	1 245	103.71	103.71
	Permit 128	F	614	6 226	30 949	335 398	50.42	53.87
	Permit 144	F	800	153 144	209 110	12 612 661	261.39	82.36
	Permit 155	F	2 880	171 339	495 856	12 627 361	172.17	73.70
	Permit 207	F	36 754	416 820	2 462 747	30 331 204	67.01	72.77
Powerex Corp.	Permit 116	I	0	10	0	0	0.00	0.00
Subtotal Firm and Interruptible Exports: Manitoba			**94 224**	**4 241 942**	**11 878 835**	**263 739 800**	**126.07**	**62.17**

Footnotes:
1. Includes capacity and energy charges.
2. Average value for the month and the last 12 months (excludes capacity charge).

F - Firm Sales
I - Interruptible Sales
P - Purchase (Import)
N - Non-Revenue (Non-Revenue or Inadvertent)
S - Service (Spinning Reserve, Storage, Unit Rental, Transmission, etc.)

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National Energy Board
Office national de l'énergie

CANADA

TABLE 2B
Import Summary Report
by Destination, Authorization and Exchange Type

Destination	Authorization	Exchange Type	Energy (MW.h) DEC03	Energy (MW.h) JAN03 - DEC03	Revenue (CAN$) [1] DEC03	Revenue (CAN$) [1] JAN03 - DEC03	CAN$/MW.h [2] DEC03	CAN$/MW.h [2] L12M
TransAlta Ener	-	P	31 538	65 285	1 718 572	3 704 494	54.49	56.74
Subtotal Purchased Imports: British Columbia			**169 343**	**5 087 189**	**5 779 875**	**190 507 016**	**34.13**	**37.45**
Manitoba								
Manitoba Hydro		N	0	2 372	0	0	0.00	0.00
		P	521 868	5 906 405	22 371 398	252 704 802	42.87	42.78
Subtotal Purchased Imports: Manitoba			**521 868**	**5 906 405**	**22 371 398**	**252 704 802**	**42.87**	**42.78**
New Brunswick								
NB Power		P	0	70 041	0	5 058 564	0.00	72.22
WPS Power Dev.		P	312	2 045	13 644	88 604	43.80	43.32
Subtotal Purchased Imports: New Brunswick			**312**	**72 086**	**13 644**	**5 147 168**	**43.80**	**71.40**
Nova Scotia								
NS Power Inc.		P	1 221	1 221	118 443	118 443	97.00	97.00
Subtotal Purchased Imports: Nova Scotia			**1 221**	**1 221**	**118 443**	**118 443**	**97.00**	**97.00**

Footnotes:
1. Includes capacity and energy charges.
2. Average value for the month and the last 12 months (excludes capacity charge).

F - Firm Sales
I - Interruptible Sales
P - Purchase (Import)
N - Non-Revenue (Non-Revenue or Inadvertent)
S - Service (Spinning Reserve, Storage, Unit Rental, Transmission, etc.)

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National Energy Board
Office national de l'énergie

CANADA

TABLE 3A

Export Sales Summary Report by Destination and Source

Destination	Source	Energy (MW.h) DEC03	Energy (MW.h) JAN03 - DEC03	Revenue (CAN$)[1] DEC03	Revenue (CAN$)[1] JAN03 - DEC03	CAN$/MW.h[2] DEC03	CAN$/MW.h[2] L12M
Minnesota	Ontario	16 364	153 356	976 072	8 699 839	59.65	56.73
Subtotal Exports: Minnesota		**16 364**	**153 356**	**976 072**	**8 699 839**	**59.65**	**56.73**
Montana	British Columbia	3 715	11 070	240 216	783 055	64.66	70.74
Subtotal Exports: Montana		**3 715**	**11 070**	**240 216**	**783 055**	**64.66**	**70.74**
ND/Minn	Manitoba	94 224	4 241 932	11 878 835	263 739 800	126.07	62.17
Subtotal Exports: ND/Minn		**94 224**	**4 241 932**	**11 878 835**	**263 739 800**	**126.07**	**62.17**
Nebraska	British Columbia	0	2 402	0	197 042	0.00	82.03
Subtotal Exports: Nebraska		**0**	**2 402**	**0**	**197 042**	**0.00**	**82.03**
Nevada	British Columbia	43 018	250 175	2 423 460	19 859 412	56.34	79.38
Subtotal Exports: Nevada		**43 018**	**250 175**	**2 423 460**	**19 859 412**	**56.34**	**79.38**
New England	New Brunswick	0	95 883	0	6 090 360	0.00	63.52
	Ontario	2 841	3 529	159 416	194 640	56.11	55.15
	Quebec	37 864	139 892	2 281 484	8 627 139	60.25	61.67
Subtotal Exports: New England		**40 705**	**239 304**	**2 440 900**	**14 912 140**	**59.97**	**62.31**
New Mexico	British Columbia	6 801	29 436	453 676	2 256 314	66.71	76.65
Subtotal Exports: New Mexico		**6 801**	**29 436**	**453 676**	**2 256 314**	**66.71**	**76.65**
New York	New Brunswick	0	12 302	0	798 603	0.00	64.92
	Nova Scotia	0	111 339	0	7 310 476	0.00	65.66
	Ontario	259 766	2 857 998	10 865 995	146 183 908	41.83	50.54
	Quebec	119 810	7 012 902	4 006 593	566 904 183	33.44	77.30
Subtotal Exports: New York		**379 576**	**9 994 541**	**14 872 588**	**721 197 170**	**39.18**	**69.50**

Footnotes:
1. Includes capacity and energy charges.
2. Average value for the month and the last 12 months (excludes capacity charge).

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National Energy Board
Office national de l'énergie

CANADA

TABLE 3B
Import Purchases Summary Report by Source and Destination

Source	Destination	Energy (MW.h) DEC03	Energy (MW.h) JAN03 - DEC03	Revenue (CAN$)[1] DEC03	Revenue (CAN$)[1] JAN03 - DEC03	CAN$/MW.h[2] DEC03	CAN$/MW.h[2] L12M
Illinois	Ontario	2 328	160 185	51 497	14 289 895	22.12	89.21
Subtotal Imports: Illinois		**2 328**	**160 185**	**51 497**	**14 289 895**	**22.12**	**89.21**
Iowa	Ontario	0	1 319	0	40 700	0.00	30.86
Subtotal Imports: Iowa		**0**	**1 319**	**0**	**40 700**	**0.00**	**30.86**
Maine	New Brunswick	312	72 086	13 644	5 147 168	43.80	71.40
	Quebec	19 558	425 962	1 780 045	36 348 606	91.01	85.33
Subtotal Imports: Maine		**19 870**	**498 048**	**1 793 688**	**41 495 774**	**90.27**	**83.32**
Massachusetts	Ontario	0	2 537	0	410 165	0.00	161.67
	Quebec	0	40 800	0	4 077 796	0.00	99.95
Subtotal Imports: Massachusetts		**0**	**43 337**	**0**	**4 487 961**	**0.00**	**103.56**
Michigan	Ontario	497 135	4 817 768	21 226 228	252 521 314	42.70	52.41
Subtotal Imports: Michigan		**497 135**	**4 817 768**	**21 226 228**	**252 521 314**	**42.70**	**52.41**
Minnesota	Alberta	200	9 567	7 693	675 178	38.47	70.57
	Ontario	96 246	1 203 893	4 144 548	67 244 073	43.06	55.86
Subtotal Imports: Minnesota		**96 446**	**1 213 460**	**4 152 241**	**67 919 251**	**43.05**	**55.97**
Missouri	Ontario	0	208	0	10 166	0.00	48.88
Subtotal Imports: Missouri		**0**	**208**	**0**	**10 166**	**0.00**	**48.88**
Montana	Alberta	0	1 001	0	56 694	0.00	56.64
Subtotal Imports: Montana		**0**	**1 001**	**0**	**56 694**	**0.00**	**56.64**
ND/Minn	Manitoba	521 868	5 906 405	22 371 398	252 704 802	42.87	42.78
Subtotal Imports: ND/Minn		**521 868**	**5 906 405**	**22 371 398**	**252 704 802**	**42.87**	**42.78**

Footnotes:
1. Includes capacity and energy charges.
2. Average value for the month and the last 12 months (excludes capacity charge).

TABLE 5
Source of Production Report [1] by Exporter

Exporter	Fuel Type	Authorization	DEC03 Energy (MW.h)	DEC03 Revenue (CAN$) [2]	DEC03 CAN$/MW.h [2]
Enmax Marketing	Canadian Coal	Permit 169	930	34 979	37.61
		Subtotal	**930**	**34 979**	**37.61**
	Subtotal		**930**	**34 979**	**37.61**
Hydro-Quebec	Hydraulic	Licence 180	92 323	3 323 349	36.00
		Licence 181	14 825	533 655	36.00
		Licence 182	14 465	520 696	36.00
		Licence 183	23 048	829 658	36.00
		Licence 184	16 612	597 982	36.00
		Permit 20	369	27 101	73.39
		Permit 64	103 748	3 214 945	30.99
		Subtotal	**265 390**	**9 047 386**	**34.09**
	Subtotal		**265 390**	**9 047 386**	**34.09**
Manitoba Hydro	Hydraulic	Licence 170	24 806	4 679 757	188.65
		Permit 45	0	277 443	0.00
		Permit 46	10 390	841 005	80.94
		Permit 68	1 356	168 827	124.52
		Permit 144	550	143 770	261.39
		Permit 155	1 980	340 916	172.17
		Permit 207	25 270	1 693 215	67.01
		Subtotal	**64 352**	**8 144 933**	**126.57**

Footnotes:
1. Source of production data filed by major exporters only.
2. Revenue figures are for illustrative purposes only and are strictly allocatable by energy source.

TABLE 5
Source of Production Report [1] by Exporter

Exporter	Fuel Type	Authorization	DEC03 Energy (MW.h)	DEC03 Revenue (CAN$) [2]	DEC03 CAN$/MW.h [2]
Manitoba Hydro	Imported Coal	Licence 170	1 039	196 099	188.65
		Permit 45	0	11 626	0.00
		Permit 46	435	35 241	80.94
		Permit 68	57	7 074	124.52
		Permit 144	23	6 024	261.39
		Permit 155	83	14 286	172.17
		Permit 207	1 059	70 952	67.01
		Subtotal	**2 697**	**341 302**	**126.57**
	Other	Licence 170	10 234	1 930 757	188.65
		Permit 45	0	114 466	0.00
		Permit 46	4 287	346 979	80.94
		Permit 68	559	69 654	124.52
		Permit 144	227	59 316	261.39
		Permit 155	817	140 654	172.17
		Permit 207	10 426	698 580	67.01
		Subtotal	**26 550**	**3 360 406**	**126.57**
	Subtotal		**93 598**	**11 846 641**	**126.57**
NB Power	Canadian Coal	Permit 90	901	62 132	68.92
		Permit 91	2 397	151 728	63.29
		Subtotal	**3 299**	**213 859**	**64.83**
	Imported Coal	Permit 90	2 283	157 358	68.92
		Permit 91	11 983	758 378	63.29
		Subtotal	**14 266**	**915 736**	**64.19**

Footnotes:
1. Source of production data filed by major exporters only.
2. Revenue figures are for illustrative purposes only and are strictly allocatable by energy source.

MANITOBA HYDRO - SELKLIRK G.S.
UNIT #2 ANNUAL AIR EMISSIONS REPORT

Year: 2003
Unit No.: 2

Month	Run Time	ENERGY OUTPUT Peak	ENERGY OUTPUT Total	NATURAL GAS INPUT Quantity	NATURAL GAS INPUT Rated GCV	FLUE GAS OUTPUT Daily Total	EMISSIONS TO ATMOSPHERE NO_x as NO_2 Peak 720 Hr. Rolling Avg	NO_x as NO_2 Total Emitted	NO_x as NO_2 Peak 720 Hr. Rolling Avg	NO_x as NO_2 Peak 720 Hr. Rolling Avg	GREENHOUSE GASES CO_2 Emitted	GREENHOUSE GASES N_2O Emitted	GREENHOUSE GASES CH_4 Emitted	GREENHOUSE GASES Total CO_2 Equivalent	SO_2 Total Emitted	VOC's Total Emitted	P.M. Total Emitted	CEM CEM Operation/ Run Time	CEM Valid Data/ Run Time
	hh:mm	MW	MWh	m^3	MJ/m^3	m^3	tonnes/hr	tonnes	ng/J (input)	kg/MWh	kg	kg	kg	kg	kg	kg	kg	%	%
January	181:45	63.8	7,023.1	2,260,430	37.501	20,937,794	0.0131	2.551	34.05	0.363	4,340,026	23.147	83.183	4,348,949	21.700	198.92	274.87	99.36	99.41
February	00:00				37.501		0.0122		31.30	0.335								n/a	n/a
March	130:10	65.1	6,729.9	2,091,140	37.501	19,369,700	0.0135	2.501	31.48	0.344	4,014,989	21.413	76.954	4,023,243	20.075	184.02	254.28	99.24	99.24
April	00:00				37.501		0.0135		31.48	0.344								n/a	n/a
May	00:00				37.501		0.0135		31.48	0.344								n/a	n/a
June	13:45	0.0	0.0	16,793	37.501	155,553	0.0135	0.020	31.48	0.344	32,243	0.172	0.618	32,310	0.161	1.48	2.04	90.36	90.36
July	15:30	64.4	219.9	66,932	37.501	805,231	0.0132	0.095	31.68	0.336	166,910	0.890	3.199	167,253	0.835	7.65	10.57	97.59	97.59
August	287:45	66.4	11,492.9	3,813,687	37.501	35,325,215	0.0131	4.720	31.75	0.332	7,322,279	39.052	140.344	7,337,332	36.611	335.60	463.74	99.60	99.63
September	227:55	63.0	6,337.2	2,174,588	37.501	20,142,656	0.0131	2.557	31.74	0.331	4,175,209	22.268	80.026	4,183,792	20.876	191.36	264.43	99.94	100.00
October	240:50	65.1	13,281.8	4,052,178	37.501	37,534,297	0.0132	5.268	31.78	0.335	7,780,181	41.494	149.121	7,796,178	38.901	356.59	492.74	100.00	100.00
November	296:25	65.9	17,973.9	5,443,482	37.501	50,421,596	0.0131	7.167	31.66	0.330	10,451,485	55.741	200.320	10,472,972	52.257	479.03	661.93	100.00	100.00
December	00:00				37.501		0.0131		31.66	0.330								n/a	n/a
TOTALS =	1396:05		63,056.7	19,939,230		184,692,041		24.879			38,283,322	204.178	733.765	38,362,027	191.416	1,754.65	2,424.61	99.63	99.65
MAX. =		66.4					0.0135		34.05	0.363									

I certify that I am familiar with the foregoing information and that it is true, complete, and accurate.

Brian Yarmill for Jarvis Swiderski
Signature of Responsible Person

Operating Supervisor
Title

D	M	Y
27	February	2004

Date

L:\90842-2\Selkirk CEMS Annual Summary

MANITOBA HYDRO - SELKLIRK G.S.
UNIT #1 ANNUAL AIR EMISSIONS REPORT

Year: 2003
Unit No.: 1

Month	Run Time	ENERGY OUTPUT Peak	ENERGY OUTPUT Total	NATURAL GAS INPUT Quantity	NATURAL GAS INPUT Rated GCV	FLUE GAS OUTPUT Daily Total	EMISSIONS TO ATMOSPHERE NO_x as NO_2 Peak 720 Hr. Rolling Avg	NO_x as NO_2 Total Emitted	NO_x as NO_2 Peak 720 Hr. Rolling Avg	NO_x as NO_2 Peak 720 Hr. Rolling Avg	GREENHOUSE GASES CO_2 Emitted	GREENHOUSE GASES N_2O Emitted	GREENHOUSE GASES CH_4 Emitted	GREENHOUSE GASES Total CO_2 Equivalent	SO_2 Total Emitted	VOC's Total Emitted	P.M. Total Emitted	CEM CEM Operation/ Run Time	CEM Valid Data/ Run Time
	hh:mm	MW	MWh	m^3	MJ/m^3	m^3	tonnes/hr	tonnes	ng/J (input)	kg/MWh	kg	kg	kg	kg	kg	kg	kg	%	%
January	156:20	66.9	6,469.9	2,028,088	37.501	18,785,664	0.0115	2.591	26.63	0.341	3,893,929	20.766	74.634	3,901,934	19.470	178.47	246.62	99.21	99.21
February	00:00				37.501		0.0115		26.63	0.341								n/a	n/a
March	103:35	67.8	5,546.8	1,681,289	37.501	15,573,353	0.0130	2.195	28.20	0.351	3,228,075	17.216	61.871	3,234,711	16.140	147.95	204.44	98.80	98.80
April	00:00				37.501		0.0129		28.20	0.351								n/a	n/a
May	00:00				37.501		0.0129		28.20	0.351								n/a	n/a
June	00:00				37.501		0.0129		28.20	0.351								n/a	n/a
July	08:05	0.0	0.0	8,098	37.501	75,011	0.0129	0.008	28.20	0.351	15,548	0.083	0.298	15,580	0.078	0.71	0.99	89.32	89.32
August	290:20	69.3	11,859.3	3,888,327	37.501	36,016,588	0.0129	4.903	28.46	0.348	7,465,588	39.817	143.091	7,480,936	37.328	342.17	472.82	99.49	99.54
September	227:14	64.2	6,048.9	2,073,756	37.501	19,208,677	0.0129	2.367	28.45	0.350	3,981,612	21.235	76.314	3,989,797	19.908	182.49	252.17	99.95	100.00
October	241:15	67.0	13,767.1	4,215,332	37.501	39,045,556	0.0130	5.879	28.48	0.348	8,093,438	43.165	155.125	8,110,077	40.467	370.95	512.58	100.00	100.00
November	296:45	66.6	18,319.1	5,594,457	37.501	51,820,038	0.0129	7.924	28.36	0.347	10,741,357	57.287	205.878	10,763,440	53.707	492.31	680.29	100.00	100.00
December	02:35	0.0	0.0	3,372	37.501	31,232	0.0129	0.002	28.36	0.347	6,474	0.035	0.124	6,467	0.032	0.30	0.41	100.00	100.00
TOTALS =	1326:09		62,011.1	19,492,719		180,556,119		25.869			37,426,021	199.606	717.335	37,502,962	187.130	1,715.35	2,370.32	99.63	99.65
MAX. =		69.3					0.0130		28.48	0.351									

I certify that I am familiar with the foregoing information and that it is true, complete, and accurate.

Brian Yarmill for Jarvis Swiderski
Signature of Responsible Person

Operating Supervisor
Title

D	M	Y
27	February	2004

Date

L:\90842-2\Selkirk CEMS Annual Summary

Excerpt.

December 17, 2001

The National Energy Board
Mr. Michel L. Mantha
Secretary of the Board
444 Seventh Ave. SW
Calgary Alberta
T2P 0X8

Dear Mr. Mantha:

re: APPLICATION TO EXPORT ELECTRICITY TO WISCONSIN PUBLIC SERVICE CORPORATION OF THE UNITED STATES

APPLICATION SUBMITTED BY MANITOBA HYDRO

Please accept this letter as my formal submission requesting that the Board reject Manitoba Hydro's application to export electricity to the Wisconsin Public Service Corporation.

At this point in time my main reason for requesting that the Board reject Manitoba Hydro's application to export power to the Wisconsin Public Service Corporation is ..the impact of the exportation on the environment.. .

I will use the Selkirk Thermal Generating Station which is operated by Manitoba Hydro to justify my request for the Board to reject Manitoba Hydro's application.

The Selkirk Station, which consists of two units at 66 MW each with unsatisfactory stack emission control devices, has operated on coal since 1960. During January of 2001, Manitoba Hydro announced that the Selkirk Station would be converted to natural gas by mid-2002. I am aware of the benefits of making the conversion to natural gas. In fact the amount of carbon dioxide emitted after conversion will be decreased by approximately 50 percent. However, Manitoba Hydro's ability to use creative mathematics/reasoning will result in more carbon dioxide being emitted. The Environmental Impact Assessment (EIA), 1992, was the basis for granting Manitoba Hydro a licence to operate the Selkirk Station.

The EIA, 1992, makes many statements indicating that the Selkirk Station would be used as in the past. Statements such as:

A. the plant is a stand-by station and is used infrequently

B. the plant is used to secure the power supply for Manitobans during threats to Manitoba's power supply

 A. Ciekiewicz

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Manitoba Hydro

K.M. Tennenhouse
General Counsel and
Corporate Secretary

EXCERPT

November 14, 2001

Mr. Michel L. Mantha
Secretary
National Energy Board
444 - Seventh Avenue, SW
Calgary, Alberta
T2P 0X8

Dear Mr. Mantha:

RE: ELECTRICITY EXPORT APPLICATION BY THE MANITOBA HYDRO-ELECTRIC BOARD

Enclosed herewith are fifteen (15) copies of The Manitoba Hydro-Electric Board's Electricity Export Application for filing with the Board. The Application is for approval to export system participation power to the Wisconsin Public Service Corporation, a utility located in Green Bay, Wisconsin, of the United States of America.

Yours truly,

K.M. TENNENHOUSE

Encl.

cc: Mr. Joel Singer, Ontario Power Generation Inc.
Mr. Myron Gulke-Tiechko, SaskPower

P.O. Box 815 • Winnipeg, Manitoba • CANADA R3C 2P4 • kmtennenhouse@hydro.mb.ca
Telephone/*N° de téléphone:* (204) 474-3541 • Fax/*N° de télécopieur:* (204) 474-4947

P.O. Box 815
453 Dovercourt Drive · Winnipeg Manitoba Canada · R3C 2P4
Telephone : (204) 487-5489 · Fax: (204) 487-5360
tetymofichuk@hydro.mb.ca

2001 11 30

L. Strachan
Director, Environmental Approvals Branch
Manitoba Conservation
123 Main Street, Suite 160
Winnipeg Manitoba R3C 1A5

Dear Mr. Strachan:

This letter will confirm your conference call with our Nick Read, Thermal Technical Services and Dan Shiels, Transmission Services, on Friday, November 23, 2001.

As discussed, we will operate both units at Selkirk Generating Station for a significant amount of time this winter for reliability reasons. This operation will be in accordance with sections 5b and 5d of the Environmental Licence.

Manitoba Hydro has experienced two transformer failures on our HVdc system that reduces our HVdc transmission capacity by 500 MW. Operation of Selkirk Generating Station during high load periods will reduce the amount of potential manual load shedding within Manitoba following the contingency loss of a highly loaded HVdc Bipole.

The earliest expected in service date for the first transformer is mid-January 2002. As a result, we expect that both Selkirk units will operate through most weekdays and will be shut down most weekends through to the middle of January. Once the first transformer has been returned to service, Selkirk will operate only in cold weather.

It was agreed that notification of our intent to operate will be sent by email rather than sending out a fax each time the units are started and stopped.

If you have any questions about the Selkirk operation please call Dan Shiels at 487-5443.

Yours truly,

Original signed by

T.E. Tymofichuk
Division Manager
Transmission System Operations

DS/eeh/011130-1.wpd

LEGISLATIVE ASSEMBLY OF MANITOBA

THE STANDING COMMITTEE ON PUBLIC UTILITIES AND NATURAL RESOURCES

Friday, October 25, 1996

TIME – 10 a.m.

LOCATION – Winnipeg, Manitoba

CHAIRPERSON – Mr. Frank Pitura (Morris)

VICE-CHAIRPERSON – Mr. Gerry McAlpine (Sturgeon Creek)

ATTENDANCE - 11 – QUORUM - 6

Members of the Committee present:

Hon. Messrs. Ernst, Praznik, Reimer

Messrs. Helwer, Kowalski, McAlpine, Ms. Mihychuk, Mr. Pitura, Mrs. Render, Messrs. Sale, Santos

APPEARING:

Mr. John McCallum, Chairman, Manitoba Hydro-Electric Board
Mr. Robert Brennan, President and Chief Executive Officer, Manitoba Hydro

MATTERS UNDER DISCUSSION:

The Manitoba Hydro-Electric Board 44th Annual Report for the year ended March 31, 1995.

The Manitoba Hydro-Electric Board 45th Annual Report for the year ended March 31, 1996.

***

Mr. Chairperson: Good morning. Will the Standing Committee on Public Utilities and Natural Resources please come to order.

Before the committee can proceed with the business before it, it must first proceed to elect a Vice-Chairperson. Are there any nominations? We need to elect a Vice-Chairperson. Are there any nominations?

Mr. Edward Helwer (Gimli): I would like to nominate the member for Sturgeon Creek, Mr. McAlpine.

Mr. Chairperson: Mr. McAlpine has been nominated. Are there any further nominations? Seeing as there are none, then Mr. McAlpine is elected as Vice-Chairperson for the committee.

This morning, the committee will be considering the Annual Reports of Manitoba Hydro-Electric Board for years ended March 31, 1995, and March 31, 1996.

Does the minister responsible for Manitoba–

Ms. MaryAnn Mihychuk (St. James): Mr. Chairman, I would request that the committee deal with the 1995 annual report in today's meeting and reconvene to deal with 1996. The contents of the March 1995 report deal with the year '94-95.

In fact this is the first time that this committee has been recalled since the election. That is an extraordinary length of time to not have Manitoba Hydro and the minister responsible before a committee which it is ultimately accountable for. So I would urge the minister–we did have this debate on a previous report, Manitoba Mineral Resources. We dealt with a report that was very outdated. For the same reasons, I urge the committee to allow due process and allow for a fair hearing of each report separately.

Mr. Chairperson: Thank you.

Hon. Darren Praznik (Minister charged with the administration of The Manitoba Hydro Act): Mr. Chair, I appreciate the comments of the member for St. James. I am not quite sure why, with the scheduling I guess around a general election and other things, that a committee was not held.

What I would suggest we do today is that because, as we discovered with Manitoba Mineral Resources, there are so many issues that are intertwined that Hydro in itself is not judged or questioned on a year-to-year

being driven by their sales into the United States and their need to have a reciprocal arrangement in order to maximize their ability to sell into their largest market. I only share this with members of the committee not as an indication necessarily of policy decisions that we have taken at this time but certainly to give members of the committee a sense of what is happening in a very fast changing environment in North America.

Just to remind members of the committee, a quarter of our revenues, some $250 million approximately, is derived from sales into the United States, and certainly we all as legislators, as the trustees of the public shares, have an obligation to ensure that we are keeping up to date with those changes to protect the value of our asset and its future potential. So I just share this with members of the committee today to give a context to some of our discussions about the future.

Before we begin in detail, however, I would like to take this appropriate opportunity to congratulate the men and women of Manitoba Hydro for their handling of the most serious occurrence on September 5 of this year. You will recall that early morning storm when tornado force winds destroyed 19 high voltage direct current transmission towers near Grosse Isle. It is these lines which transmit approximately 75 percent of Manitoba Hydro's power from the generating stations on the lower Nelson River to the Dorsey HVDC converter station near Rosser. That event was one of the most serious incidents to befall Manitoba Hydro in its entire history and it is an occurrence that could have had catastrophic results throughout our province. It did not, primarily through the combination of skill, hard work and dedication put forth by the people of Manitoba Hydro to keep our lights on.

I had the opportunity to visit the scene only hours after the accident, and, frankly, I was overwhelmed with the extent of the damage but more so with the organized effort underway to effect repairs in a timely and efficient manner.

Although the cost of this incident reached approximately $10 million and work was undertaken in some very difficult terrain and weather conditions, the line was placed back in service on September 10 with no major system outages and, most importantly, no injuries.

We in Manitoba tend to take reliability of our electrical supply for granted. I believe that the occurrence brought home very clearly what an indispensable part electricity plays in our daily lives and how, quite frankly, vulnerable any utility can be to accidents. Just for the information of members of the committee, I think we went in the space of a millisecond from exporting 1,500 megawatts to importing about 200 megawatts immediately and shortly thereafter up to 600 to 800 megawatts.

What is truly remarkable about the incident, and it speaks to not only the system that we have designed but our interconnections with other utilities, particularly into the United States, is that in that millisecond in which our lines went down, and we went from exporting that huge amount of power to importing 200 megawatts instantly, I do not think that there was one light, clock or electrical appliance in this province that was affected by that change.

Just for a moment, what impressed me about the whole system was the fact that we went from exporting such a huge amount of power to importing the power in a millisecond, and, yet, the next morning I do not think there was a digital clock in the province that was blinking because it had had an interruption of electricity. So that speaks very highly to the way our system is designed and, I think, very importantly, to the huge interconnect that exists across North America, part of the grid of which we are an integral part, that we in North America are very fortunate compared to many areas of the world, and it is a tremendous advantage to have that kind of interconnection of electrical utilities. We certainly saw its advantage when we were in these straits.

So, Mr. Chair, and ladies and gentlemen of the committee, I would ask you that you join with me today in extending our congratulations and sincere thanks to all of the people at Manitoba Hydro for their efforts in what could have been a very catastrophic moment for the province of Manitoba.

I will now ask Mr. McCallum to comment upon Manitoba Hydro's operations from a board perspective after which–

Ms. Mihychuk: I am sorry to interrupt. Just on the topic of the recent storm that we all faced, it may be a nice gesture for the committee to recognize the

Manitoba Hydro

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kjmoroz@hydro.mb.ca

March 15, 2002

VIA COURIER

Michel L. Mantha
Secretary
NATIONAL ENERGY BOARD
444 Seventh Avenue, S.W.
Calgary, Alberta T2P 0X8

Dear Sir:

RE: APPLICATION BY MANITOBA HYDRO dated November 14, 2001 FOR ELECTRICITY EXPORT PERMIT

Enclosed for filing with the Board are 15 copies of:

1. An Application for Review; and
2. Response to Information Request No.1.

Please contact the writer if you have any questions or concerns.

Yours truly,

MANITOBA HYDRO LAW DEPARTMENT
Per:
K. JENNIFER MOROZ
Barrister and Solicitor

KJM/sc
encl

cc: Mr. A. Ciekiewicz
Box 201
RR #2
DUGALD, Manitoba R0E 0K0

(v) As per Section 2, part (o) of Manitoba Hydro's Application, there are no environmental impacts related to the proposed export. Therefore, no measures for mitigation are to be taken.

As further clarification to the above-referenced responses, Manitoba Hydro provides the following additional information.

As indicated in Manitoba Hydro's Application, Manitoba Hydro's Net Total Peak load for January 2002 (the yearly peak) is 3616 MW (Appendix 2, System Load Forecast, page 41 of the Application), whereas Manitoba Hydro's Total Hydro Capacity in 2001 was 4979 MW (Table 1 of Section 2(b) of the Application). Manitoba Hydro's existing long term export commitments (including existing long term extraprovincial sales to the U.S. and Canada and the proposed 100 MW WPS sale) are 960 MW in January 2002, leaving 403 MW of surplus hydro generating capacity. On top of the 403 MW of surplus hydro capacity, there is also 231 MW of existing thermal capacity, plus 500 MW of import winter capacity available under the NSP and GRE diversity sales agreements (NEB Permits EPE 33, 34 & 35), and finally the 260 MW Brandon CT which will come into service in 2002.

As part of its pre-established long-term resource development plan, Manitoba Hydro is currently constructing a 260 MW gas combustion turbine plant at Brandon, MB (Brandon CT) for an in-service date of June of 2002 (refer to Section 2, part (b) "Manitoba Hydro's Development Plan" included on page 6 of Manitoba Hydro's Application). Although the in-service date for the plant falls within the delivery schedule of the proposed export, the development of this power plant is independent from the proposed export, in that it is an addition to Manitoba Hydro's system

FROM THE COAL BROCHURE (r. 23)

LIGNITE COAL ------ASH CONTENT----- 9.0 %

SUB-BITUMINOUS COAL ---ASH CONTENT--- 4.25 %

REVIEW OF ASH CONTENT OF COAL 1993 - 2000

(this information is taken from the annual generation charts for the Selkirk Station)

1993----- 9.1 %
1994----- 8.2 %
1995----- 8.2 %
1996----- 8.4 %
1997----- 8.6 %
1998----- 6.1 %
1999-----4.1 %
2000-----4.0 %

WHEN THESE PERCENTAGES ARE COMPARED TO THE ASH CONTENTS FROM THE COAL BROCHURE IT BECOMES OBVIOUS THAT FOR MANY OF THE YEARS 1993 - 2000 THE COAL WAS SOMETHING OTHER THAN SUB-BITUMINOUS.

THE AVERAGE ANNUAL ASH CONTENT FOR THE YEARS 1993 - 2000 WOULD BE THE SUM OF THE 8 YEARS DIVIDED BY 8 WHICH IS

56.7 DIVIDED BY 8 = **7.09 %**

••••• THE AIR QUALITY IMPACT ASSESSMENT COAL-FIRED GENERATION SEPT. 2001 REPORT MADE USE OF THE RESULTS OF THE MAXXAM STACK EMISSION TEST. MAXXAM'S TEST USED AN AVERAGE ASH CONTENT OF **5.19 %**

A Premium Coal at the Best Price

More heat, longer burning time, less ash and cleaner burning

Manitoba Hydro is the biggest user of coal in the province. We use the best quality coal we can find – Powder River coal from Montana.

Although our coal can cost more per ton than lower heat coal, for many regions of the province it is a better bargain because of its exceptional heat content.

MORE HEAT PER POUND

Powder River Coal has a heat content of about 9350 BTUs/pound – more than 30 per cent higher than lignite coal at 7000 BTUs/pound.

Powder River Coal produces much less ash than lignite coal. It is also more environmentally friendly, because it produces less sulphur stack emissions than lignite.

OVER 30% MORE HEATING POWER

	Powder River Spring Creek Mine	Lignite
BTUs per pound	9350	7000
Moisture content	25%	33%
Ash	4.25%	9.0%
Sulphur	0.36%	0.5%

TYPICAL COAL SPECIFICATIONS

CHEAPER TO TRANSPORT

Powder River coal is cheaper to transport long distances, because less of it is required to produce the same amount of energy as lower heat coal.

Shipping savings are highest for coal users close to Brandon or Selkirk generating stations and for users farther from other sources of coal such as Saskatchewan.

BEST PRICE

We buy coal by the unit train, which is a train 100 to 115 cars long that carries nothing but coal. Unit trains run back and forth between the generating stations and the mines on dedicated service.

Because we buy by the trainload, we can get the lowest possible price and pass those savings on to you.

TWO CHOICES

Most of our customers prefer to buy our premium double-screened coal where both fine particles and any large lumps are removed.

We also sell 2-inch minus coal, directly off the train. This product can contain significant amounts of fine particles but is available at a lower price and may suit your needs if your coal handling system and boiler can handle it.

TROUBLE-FREE

Because of its high heat and low moisture content, Powder River coal tends to cause fewer hang-up and bridging problems in bunkers.

This premium coal is also easier to ignite and burns more reliably and trouble-free than other lower-heat coals.

COAL HOT LINE

The selling price of the coal varies, depending on mine prices, freight rates, and exchange rates. Give us a call for the latest prices. See the back panel of this brochure for numbers where you can reach us by phone or fax.

You can also check out the latest prices on our corporate web site:

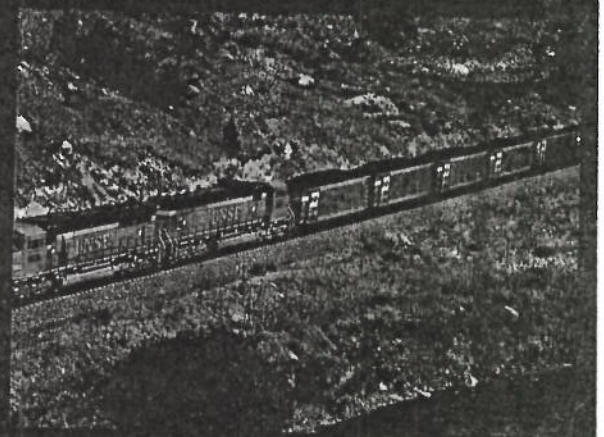
http://www.hydro.mb.ca
Products and Services Section #4

POWDER RIVER BASIN COAL

The Powder River Basin is located in the vast, rich coal fields of Montana and Wyoming.

It is the largest coal mining area in the USA and is also the fastest growing.

The Powder River Basin has reserves of about 60 billion tons of low-sulphur, sub-bituminous coal, which is more environmentally friendly than lignite as less sulphur and ash is released during combustion.



MaxxamAnalytics Inc

Manitoba Hydro

Stack Emission Testing - Selkirk Generating Station
Performed on February 4 - 7, 2001

The attached reports were prepared based on one or more of the following Method(s) or Guideline(s):

Alberta Environment Stack Sampling Code (Ref. 89)
&
Alberta Environment Continuous Emission Monitoring System (CEMS) Code (Ref. 107)
&
Methods Manual for Chemical Analysis of Atmospheric Pollutants (AECV 93-M1)
&
Environment Canada Reference Methods for Source Testing (EPS)
&
United States Environmental Protection Agency Code of Federal Regulations (40 CFR, Pt60)
&
United States Environmental Protection Agency Test Methods for Evaluating Solid Waste (SW-846)
&
British Columbia Ministry of Environment Stationary Code

Report Distribution

Invoice(s)		No.: 83380-IE			
0 Report(s)	Accounts Payable Section	Manitoba Hydro	1565 Wilson Place	Winnipeg, MB
5 Report(s)	Doug Johnson	Manitoba Hydro	1565 Wilson Place	Winnipeg, MB

Supervisory Approval
Industrial Division

Signature

Wed. Feb 28, 2001
Date of Issue

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SUMMARY

In February 5 to 7, 2001, the Edmonton office of Maxxam Analytics Inc. conducted a source emission survey on the Boiler #1 Exhaust Ducts at Manitoba Hydro's facility in Selkirk, Manitoba. Sampling was carried out to determine concentrations and emission rates of particulate, metals, sulphur dioxide, carbon monoxide, oxides of nitrogen, fluoride, and hydrogen chloride. Sampling was also conducted in order to determine particle size distribution (PM_{10}/ $PM_{2.5}$).

The summary of results is as follows:

BOILER #1 EXHAUST DUCTS

RUN: / DATE: / TIME:		#1 February 5, 2001 14:34 – 17:01	#2 February 6, 2001 11:16 – 13:29	#3 February 7, 2001 10:35 – 12:47	AVERAGE
PARTICULATE MATTER					
	(mg/m³ wet)	2121	1339	989	1483
	(mg/m³ dry)	2347	1490	1094	1644
	(mg/m³ dry @12% CO_2)	3750	5881	1731	3787
	(kg/hr)	627	416	288	444
	(g/kg of effluent wet)	1.83	1.18	0.849	1.29
	(ng/J)	764	498	352	538

RUN: / DATE: / TIME:		#1 February 5, 2001 18:05 – 19:44	#2 February 6, 2001 14:38 – 16:15	#3 February 7, 2001 13:41 – 15:07	AVERAGE
PARTICLE SIZE (PM_{10}/$PM_{2.5}$)					
*Total**	*(mg/dscm)*	1516	845	646	1002
	(kg/hour)	414	231	176	274
*PM_{10} **	*(mg/dscm)*	729	696	559	661
	(kg/hour)	199	190	152	180
*$PM_{2.5}$**	*(mg/dscm)*	303	306	259	289
	(kg/hour)	82.8	83.5	70.6	79.0
*Condensible Particulate**	*(mg/dscm)*	25.5	42.5	34.8	34.3
	(kg/hour)	6.98	11.6	9.47	9.35

NOTE: Results for particle size concentrations and emissions include all particulate below the designated cut size.

BOILER #1 EXHAUST DUCTS (cont.)

RUN:	#1	#2	#3	AVERAGE
DATE:	February 5, 2001	February 6, 2001	February 7, 2001	
TIME:	10:12 – 10:15	9:15 – 9:17	08:55 – 8:57	
OXIDES OF NITROGEN (as NO_2)				
(ppmv wet)	335	352	343	343
(ppmv dry)	370	391	379	380
(mg/m³ dry @12% CO_2)	1112	2902	1128	1714
(kg/hr)	185	205	186	192
(ng/J)	225	245	228	233

COMPOSITE COAL SAMPLE ANALYSIS

RUN:	#1	#2	#3	AVERAGE
DATE:	February 5, 2001	February 6, 2001	February 7, 2001	
ULTIMATE ANALYSIS				
*% Moisture**	1.94	3.41	2.00	2.45
*%C**	68.71	68.11	69.47	68.76
*%H**	5.09	5.25	5.17	5.17
*%N**	1.06	0.80	0.84	0.90
*%S**	0.45	0.43	0.45	0.44
*%Cl**	0.0077	0.0067	0.0061	0.0068
*%Ash**	5.68	4.90	4.98	5.19
*Oxygen (by difference)**	17.07	17.10	17.09	17.09
PROXIMATE ANALYSIS				
*A.D.M.%**	25.64	24.76	25.45	25.28
*Vol. %**	40.53	40.43	40.97	40.64
*F.C. %**	51.85	51.26	52.05	51.72
*kJ/kg***	21,028	21,113	21,199	21,113

**Air-dried basis*
***As received basis*

SUB-BITUMINOUS COAL-FIRED GENERATION
SELKIRK GENERATING STATION

VOLUME II

AIR QUALITY IMPACT ASSESSMENT

FINAL

Prepared for:

Manitoba Hydro
1565 Willson Place
Winnipeg, MB R3T 4H1

Prepared by:

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3.0 SOURCE DATA

The air emissions from coal combustion primarily consist of common contaminants such as oxides of nitrogen (NO_x) and carbon monoxide (CO), sulphur dioxide (SO_2) and particulate matter. There are also small quantities of some volatile organic compounds, and trace quantities of both organic compounds and inorganic elements associated with the particulate matter. Lastly, the combustion of coal results in emissions of carbon dioxide (CO_2), and small quantities of other greenhouse gases such as methane (CH_4) and nitrous oxide (N_2O).

Table 7 summarises the estimated emission rates of these contaminants. The derivation of the emission estimates is discussed below. Most emissions listed in Table 7 will be reduced by amounts ranging from 93% to more than 99% after conversion of the facility to natural gas-fired operation in 2002.

Theoretically, the station is capable of operating for a maximum of close to 90% of its rated capacity in any given year, but the maximum annual generation in any given year from 1993-2000 was 482.3 GW.h per year in 1998. This was only about 7% higher than the maximum projected generation rate of 450 GW.h/yr used in the 1992 EIA for the plant's licence renewal application and represents approximately 42% of the plant's rated capacity. Over the same period of operation (i.e., 1993-2000), the average annual generation rate was 185.3 GW.h/yr, or 16% of the rated capacity, as listed below. Over the period of operations since the plant was commissioned in 1961, the average annual power generation was 106.3 GW.h/yr, or less than 10% of the plant's rated capacity.

Table 8
Annual Power Generation at Selkirk G.S.

Period of Operations	Annual Generation (GW.h/yr)
1993	43.1
1994	61.0
1995	50.7
1996	87.5
1997	89.9
1998	482.3
1999	198.8
2000	469.1
1993-2000 Average	185.3
1961-2000 Average	106.3

The emission rates listed in Table 7 for the common contaminants, as well as for most of the trace metal species, were derived from measured emissions from stack sampling conducted in February 2001 (Maxxam 2001). The sampling was conducted on the exhaust ducts from Boiler #1, operating at an average generation rate of 63 MW. These data were scaled upward to 66 MW per boiler to represent the potential maximum emissions rate at the maximum (short-term) sustained generation rate of 132 MW for the two boilers combined. Maximum sustained generation assumes a coal combustion rate of 0.66 ton/MW, or 87.12 tons/hr at the rated capacity of 132 MW. Note that the facility would not normally run at the maximum sustained generation rate for any long periods of operation. Thus, the emissions listed in Table 7 represent a conservative estimate of emission rates.

Emission rates for the volatile organic compounds (VOCs), greenhouse gases, some trace inorganics, as well as all of the polycyclic aromatic hydrocarbons (PAHs) and dioxins/furans, were derived from emission factors, as described in the following report Sections 3.1.2 through 3.1.4.

In order to address the different averaging periods for comparison with established ambient air quality objectives, standards and guidelines, as well as for short- and long-term human health and ecological risk assessment, appropriate adjustments were made to the estimated emission rates for the facility as follows:

- The emission rates listed in Table 7 at the maximum sustained power generation rate were used to calculate short-term ambient air concentrations (i.e., 1-hour, 8-hour, 24-hour averages) for comparison with Provincial and Federal ambient air quality guidelines and objectives, as well as in calculating potential acute human health impacts (Volume III).
- The maximum annual average generation rate in 1998 (see Table 8), representing a capacity factor of 42%, was used to provide a worst-case comparison with Federal and Provincial ambient air quality objectives and guidelines on an annual average basis. The maximum emission rates listed in Table 7 were multiplied by a factor of 0.42 to obtain maximum annual average emissions for the 1993-2000 period.
- The long-term average annual emission rate over the period 1993-2000 inclusive, representing 16% of the total plant capacity factor, was used for the purposes of evaluating chronic (long-term) exposure to potentially toxic compounds evaluated in the human health and ecological risk assessments. For the latter, the maximum emission rates listed in Table 7 were multiplied by a factor of 0.16 to obtain average annual emissions for the 1993-2000 period.

Table 23: Comparison of Predicted Incremental Ground-level Concentrations (ug/m^3) Resulting From Operation of the Selkirk G.S. with Relevant Ambient Air Quality Criteria

Contaminant	Jurisdiction	Classification	Averaging Period	Air Quality Criteria		Maximum Predicted Ground-level Concentration	Percent of Applicable Criterion**
				Maximum Acceptable Level	Other		
NO_2	Manitoba	Objective	1-hour	400		196.0	49%
			24-hour	200		40.0	20%
			annual***	100		0.43	0.43%
CO	Manitoba	Objective	1-hour	35,000		15.0	0.04%
			8-hour	15,000		4.9	0.03%
SO_2	Manitoba	Objective	1-hour	900		268.0	29.8%
			24-hour	300		54.0	18%
			annual***	60		0.58	1%
Suspended Particulate Matter	Manitoba	Objective	24-hour	120		221.0	184%
			annual***	70		12	17%
Formaldehyde	Manitoba	Interim Guideline	1-hour	60		0.005	0.01%
Lead	Manitoba	Guideline	24-hour	5		0.00002	0.0004%
$PM_{2.5}$	Canada-Wide Standard*		24-hour		30	8 (98th percentile) 26 (100th percentile)	86%
PM_{10}	B.C., Ontario, Newfoundland		24-hour		50	61	122%
Acetaldehyde	Alberta		1-hour		90	0.011	0.01%
Acrolein	Ontario		24-hour		23.5	0.0011	0.005%
Benzene	Alberta		1-hour		30	0.025	0.1%
Ethylbenzene	Ontario		1-hour		4000	0.002	0.01%
Naphthalene	Ontario		24-hour		22.5	0.0006	0.0025%
Toluene	Ontario		24-hour		2000	0.0009	0.00005%
Xylenes	Ontario		24-hour		2300	0.0001	0.00001%
Arsenic	Ontario		24-hour		0.3	0.002	0.7%
Beryllium	Ontario		24-hour		0.01	0.0002	2.2%
Cadmium	Ontario		24-hour		2	0.0001	0.006%
Chromium	Alberta		1-hour		1	0.022	2.2%
	Ontario		24-hour		1.5	0.004	0.3%
Lead	Alberta		1-hour		1.5	0.009	0.6%
Manganese	Ontario		24-hour		2.5	0.02	0.7%
Mercury	Ontario		24-hour		2	0.008	0.4%
Nickel	Ontario		24-hour		2	0.004	0.22%
Selenium	Ontario		24-hour		10	0.001	0.01%

* Canada-Wide Standard: achievement based on the 98th percentile ambient measurement annually, averaged over three consecutive years.
**Percent of Applicable Criterion based on Maximum Acceptable Level criteria in Manitoba.
***Maximum annual average SPM, NO_2 and SO_2 concentrations are based on a 42% capacity factor for power generation in 1998

concentration 98% of the time, even if the fugitive emissions were being emitted at the maximum daily emission rate every day of the year.

Table 24
Probability Frequency Distributions
For Maximum Predicted Incremental Concentrations of Particulate Matter
At the Maximum Point of Impingement

	Percentiles					
	50th (Mean)	90th	95th	98th	99th	Maximum
SPM	3	54	86	113	158	221
PM_{10}	0.0005	3	9	19	41	61
$PM_{2.5}$	0.0001	1	4	8	18	26

Under a more realistic set of assumptions, the actual frequency of exceedance of the Maximum Acceptable level would likely be less than 1% of the time, equivalent to perhaps 1-3 days per year at most, and only at locations adjacent to the facility property line. The maximum predicted concentrations quickly drop below the 120 $\mu g/m^3$ criterion level within less than 1000 m from the site.

Figure 14 also shows that maximum point of impingement for SPM emissions from the stack occurs in the vicinity of Receptor 8 in the industrial park north of Selkirk. The maximum predicted SPM concentration in this area is 86 $\mu g/m^3$. Therefore, the primary impact of SPM emissions from the Selkirk G.S. is related to fugitive emissions from the coal and ash storage areas, and there is considerable uncertainty and overestimation of these impacts as discussed above.

Maximum annual average SPM levels are predicted to be 12 $\mu g/m^3$, which represents only 17% of the Manitoba Maximum Acceptable objective (see Figure 15). Residential areas of east Selkirk are estimated to receive about 1-5 $\mu g/m^3$ SPM on an annual basis, almost entirely related to fugitive dust emissions. Beyond a distance of about 2 km from the plant, impacts on annual average SPM concentrations due to stack emissions are generally on the order of 0.25 $\mu g/m^3$ or less. Therefore, even under extremely conservative assumptions about fugitive emissions from the facility, predicted maximum annual average concentrations are not particularly significant, and would not be the primary cause of exceedance, if any, of the annual average criterion level. Emissions from the combustion stack have an insignificant impact on annual average SPM concentrations.

Table 13
Estimated[1] Fugitive Coal Dust Emission Rates (kg/day)

Coal Handling Process	Average Daily Emissions			Maximum Daily Emissions		
	SPM	PM_{10}	$PM_{2.5}$	SPM	PM_{10}	$PM_{2.5}$
Coal train unloading	0.41	0.08	0.01	13.47	2.75	0.26
Continuous drop to active pile	3.50	0.71	0.07	116.03	23.72	2.20
Reclaim from active pile	1.75	0.36	0.03	22.04	4.52	0.42
Disposal/reclaim - long term storage pile	3.50	0.71	0.07			
Wind erosion - active pile	98.96	20.23	1.88	192.43	39.33	3.66
Wind erosion - long term storage pile	7.83	1.60	1.20	7.85	1.60	1.20
Total Emissions	115.95	23.69	3.25	351.82	71.93	7.74

[1] Estimated emissions may be overestimated for the following reasons:

- maximum daily emission rates assume that an entire trainload of coal is unloaded in one day and distributed/reclaimed from the active storage area sufficient to support power generation at the maximum sustained generation rate for the entire day;
- emission estimates do not consider emission reductions achieved through proactive management practices implemented by Manitoba Hydro to curtail or modify coal handling operations during periods when visible emissions are observed to be transported off-site;
- watering of coal pile during high winds has not been considered;
- interception by the berm around the perimeter of the coal storage area cannot be incorporated into the dispersion modelling analysis;
- reduction in wind speed that affects wind erosion rates and the interception of fugitive dust emissions by perimeter trees cannot be incorporated into the dispersion modelling analysis.

3.2.2 *Wind Erosion of Coal and Ash Storage Areas*

Field testing of coal piles and other exposed materials using portable wind tunnels has shown that wind speeds need to be in excess of 5 m/s (18 km/hr) at a height of 15 cm above the exposed surface, or 10 m/s (36 km/hr) at 7 metres above the surface, before fugitive dust will be generated (U.S. EPA AP-42 1995). Moreover, the particulate emissions tend to decay rapidly (i.e., in a few minutes) during an erosion event. The average wind speed in the Selkirk area is about 4.6 m/s. Therefore, most of the time, there is little potential for wind erosion of the coal or ash storage areas. Furthermore, frost and snow cover further reduce or eliminate the potential for such emissions during significant portions of the year.

As a rule, fugitive emissions do not travel very far. The drift distance for fugitive materials is in part dependent on the size of the suspended particles and the mean wind speed. Approximately 60-90% of the suspended particles will remain below a height of two metres above the surface, and up to 90% will be re-deposited to the surface within a distance of about 50 metres. Thus, the impact of fugitive dust emissions on ambient air quality is typically limited to a few hundred metres downwind of the source.

In summary, the dispersion modelling analysis indicates that peak concentrations from both fugitive dust and combustion stack emissions can be significant, but the locations of maximum impacts are fairly small. Fugitive dust emissions from the coal and ash storage areas have the potential to significantly affect SPM concentrations within about 1 km from the property line. Maximum PM_{10} and $PM_{2.5}$ impacts due to combustion stack emissions are limited to a small area in the industrial park at the north end of Selkirk. The conversion of the Selkirk G.S. from coal to gas-fired operations in 2002 will entirely eliminate sources of fugitive dust emissions and reduce particulate matter emissions from the combustion stack by 98-99% for all size fractions, reducing maximum predicted 24-hour average concentrations to approximately 0.5 $\mu g/m^3$. This concentration level is below the limits of detection for ambient particulate monitoring equipment, meaning that there will be no measurable impact on ambient SPM, PM_{10} and $PM_{2.5}$ levels after conversion of the station to natural gas fuel.

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The coal storage pile can be subdivided into two distinct areas: 1) the active area where the coal is unloaded from the railcars and distributed in an arc by a mechanical, pivoted conveyor system, and 2) a longer term storage area where the coal is disturbed less frequently, thus reducing the potential for fugitive dust emissions. The entire coal storage pile covers an area of approximately 4.7 hectares. The active coal storage pile comprises approximately 10% of the entire coal storage area.

The estimate of coal dust emissions from the active area of the coal storage pile were based on the emission factor listed in AP-42 (Section 11.9, 1998) for wind erosion and maintenance of an active storage pile. The emission factor for total suspended particulate matter is based on the following equation:

SPM emitted = 1.8u (where u is the wind speed in kilometres per hour).

For the purposes of this calculation, the climatological monthly average wind was used to calculate the emission rates from the active coal storage area.

The longer term coal storage area covers 90% of the coal storage pile. This area experiences less frequent disturbance. Such areas experience much lower emission rates because a surface crust forms after the suspendable material is removed in a few erosion events between disturbances. In addition, this portion of the coal storage area tends to freeze over during the winter, and much of the area tends to remain frozen through the spring until July. In order to further reduce fugitive dust emissions from this area, Manitoba Hydro applies a chemical binder to the surface over the summer months. Such binders are estimated to reduce fugitive dust emissions from exposed areas by up to 90%.

Emissions from the longer term storage area were estimated using the emission factor of 0.85 tonnes per hectare per year (U.S. EPA AP-42 1998). The factor was applied on a monthly basis, taking into account the fact that emissions from this area are effectively reduced to zero during the cold season, and are reduced by 90% during the summer months of July-September when the area would typically have been sprayed with the chemical binder material.

For the ash lagoon, the same emission factor of 0.85 tonnes per hectare per year was applied to the exposed areas of the ash disposal area. The total area covered by the ash lagoon was estimated at 21.2 hectares. From aerial photographs of the site, it was estimated that over 70% of the ash lagoon is covered by either water or vegetation. Therefore, the emission factor was applied to only that portion of the lagoon that has exposed surfaces.

A COMPARISON OF THE 24 HOUR AVERAGE LIMIT FOR SUSPENDED PARTICULATE MATTER FOR COALS WITH AN ASH CONTENT OF 5.19 % AND 7.09 %

1. THE LICENCE LIMIT IS SET AT 120 UNITS.

2. THE AIR QUALITY IMPACT ASSESSMENT COAL-FIRED GENERATION SEPT. 2001 REPORT (FOR THE YEARS 1993 - 2000) USED AN ASH CONTENT OF 5. 19 % AND INDICATED THAT THE 24 HOUR RESULT WOULD BE 221 UNITS.

3. IF THE ACTUAL AVERAGE ASH CONTENT FOR THE YEARS 1993 - 2000 OF 7.09 % HAD BEEN USED THE 24 HOUR AVERAGE WOULD BE:

$$\frac{7.09}{5.19} \times 221 = 302 \text{ UNITS}$$

••• EVEN A GENERATION RATE OF 50 % WOULD VIOLATE THE LIMIT OF 120 AS STATED IN THE OPERATING LICENCE.

Response(excerpt) by Manitoba Environmental Control Branch to Manitoba Hydro re: the Selkirk Station . **July 1977**

Particulate emissions are currently controlled by multiclone dust collectors with an estimated efficiency of 60-70%. By the use of electrostatic precipitators, this efficiency of collection can be increased to 99%+ range. Electrostatic precipitation of emissions from this facility is practical and should be implemented.

Response (excerpt) by Manitoba Environmental Control Branch to Manitoba Hydro re: the Selkirk Station. **March . 1978**

Particulates - Historically, the operation of the generating station is most frequent during the months of October through March, the period of the year in which the dispersive ability of the atmosphere is low.

As discussed in Appendix A, the Selkirk area is an area of high air pollution potential during the winter months and predictions of maximum ground level concentrations have indicated that the maximum acceptable level is frequently exceeded under limited mixing conditions.

Because of these reasons, we are of the opinion that control of particulate emission from the facility is warranted.

A response(excerpt) from Manitoba Hydro to the Air Pollution Control Section of the Manitoba Department of the Environment re: the Selkirk Station. **January 1983**

1.A (c) The applicant shall limit the emission of contaminants from the said operation to such an extent that:

- emissions of particulate matter from the said operation do not exceed 0.57 grams, at the point of emission, per standard cubic meter calculated at 25° Celsuis and 760 millimeters of mercury (0.25 grains per standard cubic foot calculated at 77° Fahrenheit and 29.92 inches of mercury) corrected to 12 per cent carbon-dioxide for processes involving combustion;

Response: Particulate emissions from the Manitoba Hydro thermal plants currently exceed the proposed limits. However, there is no evidence or indication that the non-toxic particulate discharges are causing or have caused any detremental ecological effects. Implementation of the EMD proposal for particulate reductions would require the installation of electrostatic precipitators which are estimated to cost $6 000 000 or more for each plant. Factors mitigating the need for additional particulate controls are:

Manitoba Hydro

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Telephone / N° de téléphone : (204) 474-3639 • Fax / N° de télécopieur : (204) 474-4947
rdbettner@hydro.mb.ca

January 7, 2003

Allan Ciekiewicz
Box 201, R.R. #2
Dugald, Manitoba
R0E 0K0

Dear Sir:

RE: APPLICATION FOR ACCESS UNDER PART II OF THE FREEDOM OF INFORMATION & PROTECTION OF PRIVACY ACT

The following is in reply to your application seeking the status of two DC transformers which failed in late 2001 and a description of measures taken to alleviate the 500 MW reduction in HVDC transmission capacity during the period of outage.

In respect of the status of transformers, we attach for reference daily reports of the System Control Department dated July 22, 2002 and December 15, 2002. The portions deleted are not related to your request.

With respect to system operation in general and the relationship to the operation of the Selkirk Generating Station during this period, the system was evaluated on a daily basis. Considerations included availability of Manitoba system resources, availability of extra-provincial supply, tie line availability and anticipated Manitoba load. These factors would be considered each day for several days ahead and determination made as to whether or not Selkirk GS should be brought on-line. As you know, approximately 12 hours is required to bring Selkirk GS on-line.

In conjunction with daily supply management activities, the transmission capacity reduction was in part alleviated by increasing loadings on bi-pole 1, and utilizing spare transmission capacity. In the result (but subject to line losses), the transmission capacity loss had effectively been dealt with at the time the first transformer returned to service in July, 2002.

This request has been completed within the time allowance provided pursuant to the Act and Regulations, therefore no fees are exigible.

Yours truly,

MANITOBA HYDRO
Per:

R. D. BETTNER
Access & Privacy Coordinator

BB/klt
Attachment

bb/bb021107/ciekiewicz dec.30

Manitoba Hydro

System Control Department

Daily Report

Monday, July 22, 2002

1

2. At 05:18 HVDC VG42 was returned to service in 12 pulse operation. VG42 had been in 6 pulse operation since 2001 11 16 due to the failure of Dorsey T42S converter transformer.

Transmission System Operations
2002 07 22
JCI/jci

Manitoba Hydro

System Control Department

Daily Report

Sunday, December 15, 2002

3. At 20:33 HVDC Pole 3 was removed from service to return Dorsey VG32 to service as a 12 pulse group. At 23:56 Dorsey VG32 (with a new T32S transformer) was de blocked returning Pole 3 to service. VG31 was de blocked at 2002 12 16 00:03.

Transmission System Operations
2002 12 15
CGM/pas

the power system was operated in the past. But the question is, what will happen in the future if we build Wuskwatim and now have to operate that? Lots of things can change between now and the future that the operators don't know. At this point we use our computer models in order to help us predict the effect of operations from the Wuskwatim plant.

Our computer modeling system is called SPLASH, and it is a simulation program that looks at what the Manitoba load will be in the future, looks at our export power commitments, looks at our historical water supply record, looks at our export market price forecast and our interconnection capability. It can look at these variables and predict how the system will operate in the future, and then we can add Wuskwatim to that computer model and see what the effect on system operation is with and without Wuskwatim.

Air management

Methane and carbon dioxide are the natural products of decay of dead vegetation, whether on land or under water. Research in this area is now concluding that the greenhouse gas releases caused by hydroelectric reservoirs in northern Canada represent a very small percentage --less than 3 per cent-- of the emissions of coal-fired generators producing an equivalent amount of energy.

The utility is an early participant in the federal government's Voluntary Challenge Registry, in which company's state their plans to control greenhouse gases. Manitoba Hydro stated that emissions will drop because of expanded reliance on hydraulic generation, the development of active conservation programs which reduce the demand for electricity and improve efficiencies in producing electricity, the recent elimination of nine diesel generating stations in remote communities and the recent retirement of four coal-burning units at the Brandon facility. Manitoba Hydro is committed to reducing the net greenhouse gas emissions from its hydro operations by 6 per cent (relative to 1990 levels) from 1991 2012. Manitoba Hydro's two coal-burning stations account for 0.1 per cent of Canada's total greenhouse gas production. This is the most aggressive commitment that any utility has made in Canada.

Estimated US Emissions Displaced by Manitoba Hydro's Exports

The total exports to the US over the last 30 years (1970 to 2000): 131,986 GWh.

	CO2	NOX	SOX
Emissions (tonnes)	142,544,616	263,974	565,383
Emissions (tons)	157,128,356	290,982	623,227

Note: This is based on the displacement of coal-fired generation. (Manitoba Hydro's exports over this period would not have displaced nuclear or renewable generation. Nor would it have displaced significant natural gas or oil-fired generation.)

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Wildlife Management

Export power aids neighbouring utilities in time of emergency to the extent such exports will not jeopardize service to customers in Manitoba, and import power from neighbouring utilities in times of emergency to maintain necessary service to consumers in Manitoba. For example, in 1997 during a spring ice storm, Manitoba Hydro was able to assist Minnkota Power Cooperative Inc. in their restoration activities as well as power supply requirements. A year earlier when a major wind storm brought down some of Manitoba Hydro's major transmission supply lines, neighbouring utilities in the U.S. were able to assist in supplying electricity through existing interconnections.

Manitoba Hydro Export Sales to USA fiscal years 1970-71 to 1999-2000

Fiscal Year Ending	Sales GW.H (2)
1971	461
1972	772
1973	856
1974	986
1975	1384
1976	1031
1977	514
1978	963
1979	3719
1980	3966
1981	3215
1982	3147
1983	6533
1984	5402
1985	4720
1986	6135
1987	7003
1988	2140
1989	693
1990	1235
1991	2114
1992	3826
1993	6701
1994	8399
1995	8772
1996	8946
1997	10332
1998	11954
1999	9701
2000	6366
TOTAL	**131986**

NOTES:

1. Fiscal Year 1999-2000 - April to December
2. GW.h - one gigawatt-hour equals one billion watt hours or one million kilowatt hours. A

Most of this initial hearing was taken up by Harold Buchwald's questioning of Ed Overgaard, Manitoba Hydro's Chief Engineer. The questioning, at some points grilling, brought out a number of disturbing facts for the people of South Indian Lake to consider. First, Hydro had seemingly discounted a number of possible alternatives to the flooding of Southern Indian Lake without extensive investigation. Second, both Overgaard and Kris Kristjanson were unable to discuss in specific terms either the costs of the hydro plan under consideration or the costs of these alternatives. Third, Overgaard was forced to admit that no studies had been done on the likely effect of the diversion project on the fisheries and wildlife resources on the lake. Henteleff later commented: "The fact is they [Hydro] were totally ill-prepared. They approached the situation with considerable arrogance, and felt that anybody who questioned them was, in effect, questioning God. . . . Somehow, they were touched with infallibility in terms of decisions. Who had the temerity to question them?"[45]

The initial hearing produced another surprise: Manitoba Hydro officially tabled their compensation package for the community. Looking suspiciously like the Letter of Intent (or Forebay Agreement) signed with the Chemawawin Band at Easterville only a few years before, the package focused on a variety of structural commitments. Among other things, the Manitoba government, through Manitoba Hydro, agreed to provide: new docking facilities; replacement of fish camps; reimbursement for the cost of relocation; electricity "on the standards which now apply in other comparable communities"; work training programs; and $60,000 for a floating fish plant and an electronically-equipped boat to search for fish (see Appendix 3 for the complete text).[46] The people of South Indian Lake rejected this proposal outright. At the close of the hearing Buchwald made the community's position clear: answers to their many questions would be expected at the next round of hearings.[47]

The second round of hearings was scheduled for Winnipeg on 27 January 1969. However, shortly after the conclusion of the South Indian Lake hearing, Harry Enns announced that an "interim licence" would be granted to Manitoba Hydro to proceed with the diversion. According to Enns, the Winnipeg hearings were designed primarily to address the concerns and needs of the residents of South Indian Lake; they were not to decide the fate of the project, nor to question the engineering or economic aspects of it.[48] Buchwald and Henteleff were shocked at the news. In the wake of the public outrage that followed, stories began to circulate that Manitoba Hydro had in their possession