

Sustainable Development Report

03|04



Nisichawayasihk Cree Nation Helps Develop Wuskwatim Proposal



Wind Power Purchase in the Works



Safeguarding Northern Heritage Resources



Registered to ISO 14001

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The 2003/04 edition of the Sustainable Development Report looks at our efforts to help build the economy of the province while conserving the environment and meeting our social responsibilities, through a series of stories on our sustainable development projects and programs.

Stories have been organized under three headings—environment, economic development, and social responsibility. The concept of sustainability is based on the idea that these three dimensions are linked and interdependent, since actions in one area may affect actions in another. The list dramatizes that interdependence by showing how almost all of the stories overleaf fall under more than one heading.

Highlights from this year's report include: our efforts to minimize the environmental impact of the proposed Wuskwatim Generating Station through the involvement of the Nisichawayasihk Cree Nation, a potential partner if the project goes ahead; our plans to help develop the economy by purchasing wind power from the first non-utility generator in the province to sell electricity to us; and our efforts to safeguard heritage resources if Wuskwatim is built.

The report is aimed at all Manitobans who are concerned about environmental conservation and the economic development of the province.

We are fully committed, not just to the concept of sustainable development but to implementing it in all aspects of our operations. We are proud of how far we have come, but remain aware that sustainable development is a work in progress—a journey, not a destination.

If you have ideas for better conveying our sustainable development programs and projects in the upcoming 2004/05 edition, or any other comments or suggestions for improvement, we would like to hear from you! Please write us at the address on the back cover.

R.B. Brennan, F.C.A.
President and Chief Executive Officer

SOCIAL RESPONSIBILITY

ECONOMIC DEVELOPMENT

ENVIRONMENT

Manitoba Hydro Sustainable Development Activities 2003/04

ENVIRONMENT

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EMS Benefits from Fresh Set of Eyes
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ECONOMIC DEVELOPMENT

Improving System Reliability
New Stations Would Boost Export Sales
Wind Power Purchase in the Works
Tracking for Better Resource Management
Design Standards Add Comfort/Save Energy
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T8s Healthy for Hospital Project
Fibre Optics Upgrade to Benefit North
Hydro Starts Recycling Lead
Manure Set to Yield Methane

SOCIAL RESPONSIBILITY

First Nation Set to Take Part in Keeyask
Making the Most of Energy and Resources
Reaching Manitoba Youth
Help for Northern Water Supply Systems
Wrestling with Technology at Summer Camp
Safeguarding Northern Heritage Resources
Dock Offers Safe Harbour
Moose Lake Fishermen Receive Award
Achieving a Diverse and Representative Workforce
Taking Aim on Safety
Campaign Warns of Carbon Monoxide Dangers
Safety Statistics
Curriculum Tailored to Northern Students
Weather Watchers Recognized
Sign of the Times

OUR VISION

To be recognized as the best utility in North America with respect to safety, rates, reliability, customer satisfaction and environmental management, and to be considerate of all people with whom we have contact.

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.

OUR SUSTAINABLE DEVELOPMENT PRINCIPLES

1 STEWARDSHIP OF THE ECONOMY AND THE ENVIRONMENT

Manitoba Hydro will recognize its responsibility as a caretaker of the economy and the environment for the benefit of present and future generations of Manitobans. Manitoba Hydro will 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.

2 SHARED RESPONSIBILITY

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

Manitoba Hydro will encourage the Corporation's employees to share their knowledge of the concepts and practical application of sustainable development.

3 INTEGRATION OF ENVIRONMENTAL AND ECONOMIC DECISIONS

Manitoba Hydro will 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, Manitoba Hydro will include environmental costs in economic and financial analysis.

4 ECONOMIC ENHANCEMENT

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

5 EFFICIENT USE OF RESOURCES

Manitoba Hydro will 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.

6 PREVENTION AND REMEDY

Manitoba Hydro will, 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.

Where practical, environmentally sound products will be purchased, taking into account the lifecycle of the products. Manitoba Hydro will address adverse environmental effects of Corporate activities that cannot be prevented by:

- first, endeavouring, wherever feasible, to restore the environment to predevelopment 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.

7 CONSERVATION

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

Manitoba Hydro will give preference, where practical, to projects and operating decisions that use

renewable resources or that extend the life of supplies of non-renewable resources.

8 WASTE MINIMIZATION

Manitoba Hydro will manage all wastes arising from Corporate activities by:

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

9 ACCESS TO ADEQUATE INFORMATION

Manitoba Hydro will 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.

10 PUBLIC PARTICIPATION

Manitoba Hydro will 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.

11 UNDERSTANDING AND RESPECT

Manitoba Hydro will strive to understand and respect differing social and economic views, values, traditions and aspirations when deciding upon or taking action.

Preference will be given to those alternatives which best fulfill Corporate objectives while minimizing infringement on the ability, rights, and interests of others to pursue their aspirations.

12 SCIENTIFIC AND TECHNOLOGICAL INNOVATION

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

13 GLOBAL RESPONSIBILITY

Manitoba Hydro will recognize there are no political and jurisdictional boundaries to our environment, and that there is ecological interdependence among provinces and nations.

Manitoba Hydro will 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.

A winter landscape featuring a snow-covered foreground with intricate ice patterns on a frozen body of water. The background is filled with a dense forest of evergreen trees under a clear sky. A yellow horizontal band is positioned across the upper portion of the image, containing the word "ENVIRONMENT" in white capital letters.

ENVIRONMENT



Nisichawayasihk Cree Nation Helps Develop Wuskwatim Proposal

If Wuskwatim Generating Station is built, it will cause less environmental impact than any of Manitoba Hydro's hydroelectric generating stations to date, in part through the involvement of the Nisichawayasihk Cree Nation (NCN).

In 2001, NCN and Hydro signed an Agreement in Principle which gave NCN an opportunity to acquire an equity interest and participate as a limited partner in the project.

The parties have since continued their planning activities in an attempt to have Wuskwatim assessed and licensed. NCN has taken part in engineering, environmental, and public consultation activities with Hydro to help develop the project proposal.

Wuskwatim includes a 200-megawatt generating station on the Burntwood River at Taskinigup Falls, the outlet of Wuskwatim Lake, about 35 kilometres south-east of the NCN community of Nelson House. The station will be connected to the provincial grid by 350 kilometres of transmission lines.

The proposed project includes construction of a 48-kilometre all-weather gravel access road to the construction site. NCN and Hydro are working to develop plans to manage access along the road.

Overall cost of the project is estimated at \$1 billion. Construction could start early in 2005, with an in-service date of 2010 or 2011.

NCN and Manitoba Hydro selected a low-head design for the station, limiting flooding to less than 0.5 square kilometres, the lowest of all Hydro's hydroelectric stations.

The proposed station is also designed to normally operate in a modified run-of-river mode. This means that whatever flows into Wuskwatim Lake in a 24-hour period will flow right out again, virtually eliminating fluctuating water levels on shorelines, resulting in minimal impact on traditional resources and resource harvesting upstream and downstream of the station.

Manitoba Hydro worked with NCN to determine the best locations of the access road to the proposed site, the construction camp, and transmission line rights-of-way, for minimal environmental, biophysical, socio-economic, and cultural impact on NCN.

Elders, resource users, and other members of NCN contributed substantial traditional knowledge to help assess and manage any impacts.

In spring 2004, Manitoba's Clean Environment Commission (CEC) held 32 days of public hearings on the environmental impact and justification of Wuskwatim. Before Wuskwatim can go ahead, the CEC must recommend proceeding with the licensing process, and provincial and federal requirements need to be met and licensing approvals obtained. The Partnership Development Agreement between Manitoba Hydro and NCN must also be finalized and approved by a vote of NCN members.

NCN has the option of being a partner in the generating station, with an interest of up to 33%.

In contrast to minimal environmental impact, construction of Wuskwatim is set to bring maximum socio-economic benefits to NCN.



Greenhouse Gas Emissions Update

In 2003, Manitoba Hydro's greenhouse gas (GHG) emissions totaled 0.86 megatonnes of carbon dioxide equivalent (CO₂e).

Emissions were up, compared with most years since 1990, because 2003 was marked by severe drought that forced us to run our thermal generating stations more than usual and import large blocks of power to make up for low river flows that limited hydraulic generation.

Most of Hydro's emissions are produced when fossil fuels are burned to generate electricity. These generation sources are also the most variable of our emissions sources, due to the effects of many factors, including river flows, major equipment outages, and market prices.

We burn coal at Brandon Generating Station Unit 5, while natural gas fuels two combustion turbines at Brandon and both boilers at the Selkirk Generating Station. In 2003, these stations contributed 92.7% of Manitoba Hydro's greenhouse gas emissions, up 7.1% from 2002. Given the seriousness of the drought, these emissions could have been much higher, but power imports were used to a large extent to satisfy our requirements. In fact, Manitoba Hydro was a net importer of electricity in 2003.

Other components of Manitoba Hydro's 2003 emissions include: our fleet vehicles (2.6%), natural gas distribution system (2.4%), diesel generation for remote communities (1.1%), and building operations (0.7%).

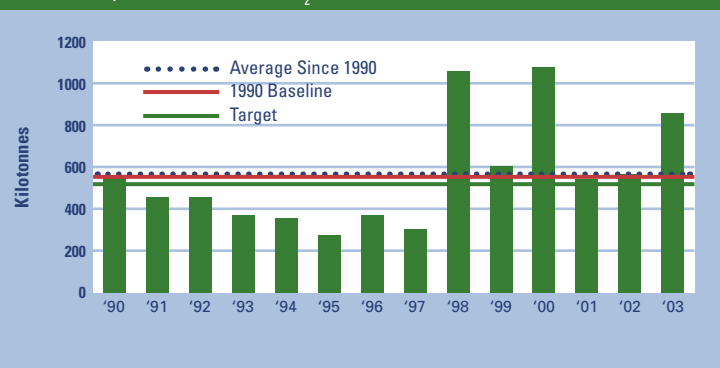
All of these components demonstrated small reductions in emissions relative to the previous year.

Manitoba Hydro has two constraints on its emissions: our voluntary constraint originally established in 1998 under Canada's national Voluntary Challenge and Registry (VCR) Program, and a constraint under our participation in the Chicago Climate Exchange (CCX).

We are in full compliance with our emission reduction targets and, in fact, have a surplus, under the CCX. Our voluntary constraint is much more stringent, committing Manitoba Hydro to keep its average net GHG emissions 6% below 1990 levels. This commitment was recognized by the Pembina Institute, in their last assessment of VCR reports, to be the best of all Canadian utilities.

In 1990, Manitoba Hydro produced 0.55 megatonnes of carbon dioxide equivalent (CO₂e). With respect to this rigorous commitment, our average emissions since 1990 are 1% above, rather than 6% below, our 1990 baseline level. Manitoba Hydro is currently seeking environmentally effective and economically attractive options to offset our emissions and meet our commitment.

Manitoba Hydro's Emissions of CO₂e — 1990 - 2003



REDUCING GLOBAL EMISSIONS

Meanwhile, we reduce GHG emissions globally by exporting our hydroelectricity.

Our exported power, produced largely from hydroelectric generating stations, displaces energy that would otherwise be produced by fossil-fueled generating stations outside the province.

In 2003, because of the length and severity of the drought, we were a net importer of electricity and could not reduce GHG emissions by exporting large amounts of our hydroelectricity. However, over the long term, we have been, and will continue to be, a large net exporter, helping to reduce GHG emissions globally.

Since 1990, our hydroelectricity has displaced production of 110.7 megatonnes of greenhouse gases.

Hydro Wins Award for Preventing Pollution

In 2003, the Canadian Council of Ministers of the Environment presented Manitoba Hydro with one of its 2002 Pollution Prevention Awards for converting the Selkirk Generating Station from coal to natural gas.

Hydro won an honourable mention in the greenhouse gases reduction category, which applies to organizations that achieve significant reductions in GHG emissions through pollution prevention activities.

The \$30 million fuel-switching project virtually eliminated emissions of mercury, other metals, and sulphur dioxide, and significantly reduced emissions of particulate matter, carbon dioxide, and nitrogen oxides.

Hydro Second Biggest Buyer at First Greenhouse Gas Auction

On September 30, 2003, Hydro bought 18 000 tonnes of greenhouse gas "allowances" at the first Chicago Climate Exchange (CCX) auction.

The allowances compensate for our greenhouse gas emissions, which were higher than expected in 2003.

Manitoba Hydro is a founding member of CCX, the world's first multi-national and multi-sector market for reducing and trading greenhouse gas emissions globally.

Reducing Emissions From Our Natural Gas Pipelines

Manitoba Hydro uses a range of measures to reduce releases from its natural gas system.

Natural gas is about 95% methane, a greenhouse gas 21 times more effective in retaining heat in the atmosphere than carbon dioxide. Efforts to reduce emissions of natural gas support Canada's Climate Change Action Plan to meet our commitment under Kyoto.

Leak reduction measures include:

- monitoring the corrosion protection system that safeguards buried steel pipes
- conducting regular leak surveys
- conducting damage prevention programs
- improving station designs to reduce the probability of venting
- refining procedures to reduce the amount of gas vented during routine pipeline maintenance.

In 2003, emissions from Hydro's natural gas operations accounted for only 2.4% of total greenhouse gas emissions from the corporation's overall operations.



Safeguarding the Lake Sturgeon



Sturgeon Rearing Program, launched September 17, 2003, at the Grand Rapids Hatchery

The lake sturgeon is an ancient fish species that shares many rivers in Manitoba with hydroelectric generating stations. In recognition of this relationship, Manitoba Hydro staff serve on numerous boards and committees, and support projects that seek to halt the depletion of sturgeon in the province and help re-establish populations.

We fund the Grand Rapids Hatchery which produces sturgeon fingerlings for stocking waters affected by our hydroelectric developments. In 2003/04 over 14 000 sturgeon fingerlings were stocked in the Nelson River.

For the second year in a row, we sponsored research on sturgeon at the Deep River Science Academy where students compared the effects of rearing two groups of lake sturgeon, one on a diet of black fly larvae and the other on a traditional fish hatchery diet.

We sponsor ongoing academic studies that compare sturgeon populations in a river with little habitat alteration (the Pigeon River) to those in a river altered by generating stations (the Winnipeg River).

Staff serve on the Saskatchewan River Sturgeon Management Board, which has developed a 10-year management plan for recovery of lake sturgeon in the Saskatchewan River. The plan includes monitoring populations, stocking, enhancing habitat, and encouraging domestic fishermen to harvest sustainably.



Staff also serve on the Nelson River Sturgeon Co-Management Board. The board is trying to determine how many sturgeon are left, and educate fishermen on the importance of reducing catches and allowing sturgeon to spawn in spring.

We support operation of the Silas Ross Memorial Sturgeon Rearing Facility, located at Jenpeg Generating Station and operated by the Nelson River Sturgeon Management Board. In 2003 the facility received sturgeon fingerlings from Grand Rapids Hatchery for several weeks of final growth before stocking in the Nelson in fall.

The Saskatchewan and Nelson River boards have been restocking sturgeon into rivers, with the help of students across the North, since 1994.

“The day of the release is a big event,” says Roy Bukowsky, Environmental Protection Officer with Hydro.

“In 2003, schools from Cross Lake First Nation and Wabowden bused elementary students to Jenpeg, where they posed for photos with their newly adopted sturgeon, received adoption papers, and released their fingerlings into the river!”

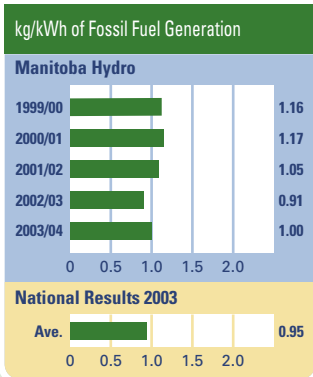
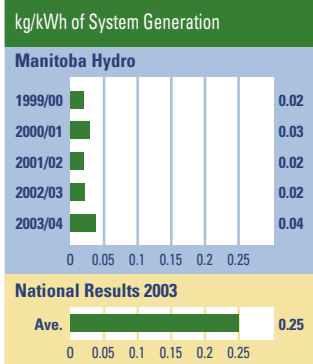
EMISSIONS FROM OUR FOSSIL FUEL-FIRED GENERATORS

Emissions of carbon dioxide, sulphur dioxide, and nitrogen dioxides in 2003/04 were roughly double our average for the previous 4 years.

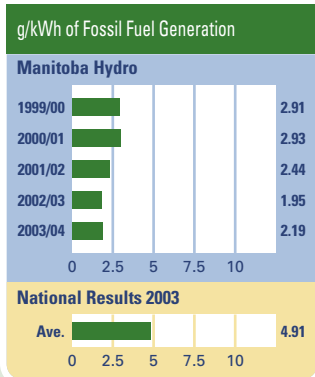
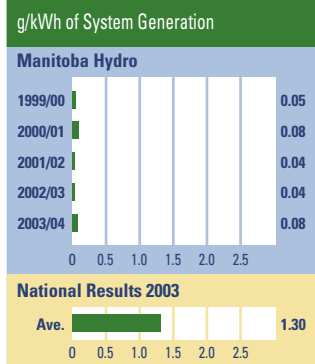
The increase reflected the need to run our thermal generating stations more than usual to compensate for lower output from our hydroelectric generating stations, which produced less electricity because of drought in 2003/04.

Emissions of carbon dioxide and nitrogen oxides were about the same as the national average, but sulphur dioxide emissions were less than half. Our coal-burning generators represent only 20% of our thermal generation. Further, we use a high-quality coal—Powder River coal from Montana—which produces less sulphur than lignite and has a higher heat content.

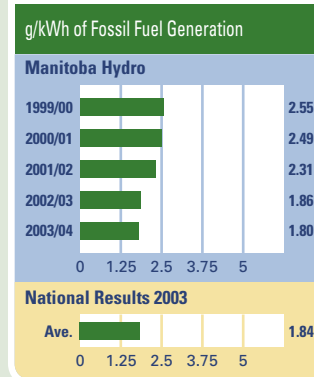
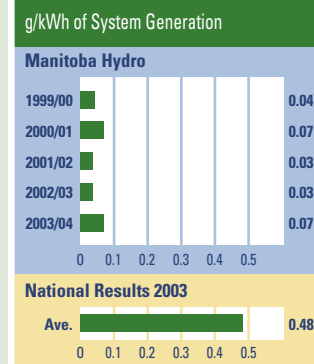
Carbon Dioxide Emissions



Sulphur Dioxide Emissions



Nitrogen Oxide Emissions





Helping Walleye at Grand Rapids

In spring 1992, walleye were observed using the spillway channel downstream of Grand Rapids Generating Station.

The presence of walleye in the spillway was thought to have been the result of releasing water from the reservoir along the spillway instead of entirely through the powerhouse where one of the station's turbines was down for repairs.

Because the community of Grand Rapids had seen a marked decline in the local walleye population since the 1960s when Grand Rapids Generating Station was built, the presence of walleye in the channel was taken by Hydro as an opportunity to help address the decline.

Between 1993 and 1996, Hydro, the Grand Rapids Fishermen's Cooperative, and the Grand Rapids First Nation, with assistance from North/South Consultants Inc., tried to attract walleye into the channel with spillway releases ranging from 500 to 20 500 cubic feet per second.

Contrary to the earlier success, monitoring showed that very few walleye used the spillway channel. It was clear that another approach—stocking walleye in the channel and enhancing habitat for them—would be required to establish a spawning population of walleye.

In 1997 Hydro developed a six-year agreement with the Grand Rapids Fishermen's Cooperative and Grand Rapids First Nation to conduct the Grand Rapids Walleye Spawning Enhancement Program.

North/South Consultants Inc. provided technical expertise and Manitoba Conservation agreed to provide walleye eggs and larvae for stocking. The expectation was that maturing adult walleye would begin returning to the channel and that the spawning cycle would become self-sustaining.

Walleye typically spawn at 4 to 5 years of age and generally return to the place they were hatched for spawning. Ideal conditions for spawning are water depths of 1 to 2 metres, a moderate current, and a gravel or rocky bottom.

During the first year of the program, dykes were built along the lower reaches of the spillway channel to contain water in a series of pools and riffles.

Over the 6-year program, nearly 41 million walleye larvae, 12 million green eggs, and 9 million eyed eggs were stocked in the spillway channel.

Given that insufficient time had elapsed to adequately assess whether the program was a success, a 4-year extension to the study began in 2003.

SPILL STATISTICS

The total number of reportable spills remained within the 5-year historic range in 2003/04, at 57, while the total number of priority spills was significantly lower, at 3.

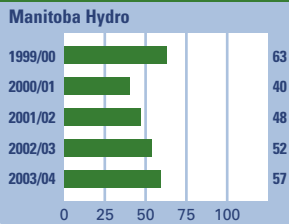
In all cases protocols were followed to clean up affected areas.

Reportable spills are those that must be reported to regulatory officials, for example, 100 litres or more of insulating oil or other petroleum materials, 45 parts per million or more of PCBs, 10 or more kilograms of ozone depleting substances, or more than 5 litres of waste oil.

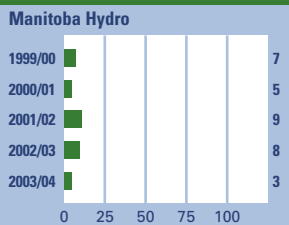
Priority spills are those that involve petroleum products or PCB contaminated substances in which the spill volume is greater than 500 litres, the spilled substance enters a water body, or news media report the event.

Spills containment systems are systematically installed at our facilities. In 2003/04, for example, an oil containment system was built at Dorsey Converter Station. In the first phase, berms, ditches, and retention ponds were built to contain any spilled oil on any surface water within the station property. In the second phase, piping was installed to drain all liquids from station transformer containment pits into a common "oil trap" building. In addition to its environmental benefits, the improved system offers fire protection.

Number of Reportable Spills



Number of Priority Spills



Water was spilled along the channel from April 18 to June 5. Some 200 000 green walleye eggs and 1 000 000 eyed walleye eggs were placed in an incubator in the spillway channel, and 11 million walleye fry were released.

Observations along the channel suggest that natural reproduction of walleye was minimal along the channel in 2003.

Annual monitoring so far shows that the overall abundance of walleye in the Grand Rapids area remains low. But some walleye are using the channel for spawning, and their use is expected to grow over the next few years as stocked fish reach maturity.

High-Tech Solution for Leaky Transformers

Manitoba Hydro now applies a novel approach to reducing oil leaks from high voltage direct current converter transformers.

By brushing a special sealant across the joints of transformers rather than replacing worn cork composite gaskets, Hydro expects to slash "leak stop" costs by approximately \$350 000 per transformer.

The approach, known as encapsulation, will also cut back on oil leaks to safeguard the environment. Some 7 000 000 litres of oil are contained within the 82 oil-filled converter transformers, service transformers, AC line transformers, and smoothing reactors at Hydro's three HVDC converter stations.

Over time, the gaskets used to seal the joints between different components of the oil filled apparatus start to deteriorate and leak.

Oil leaks are contained in special dyking systems for the transformers, but the leaks are still considered an environmental hazard, as identified in an audit conducted under Hydro's Environmental Management System.



Applying encapsulation sealant to joint surfaces on a transformer

The encapsulation program will cost an estimated \$2.2 million, instead of as much as \$6.2 million to \$25 million with re-gasketing.

In early 2003, a pilot project at Dorsey and Radisson converter Stations saw the encapsulation of two converter transformers that were leaking oil.

The project proved successful, with more than 90% of the joints being properly sealed. The sealant has withstood the rigors of temperature extremes, with no new leaks appearing to date.

Research Looks at Coastal Wetlands

In 2003/04, Manitoba Hydro continued to help support research on the coastal wetlands of Lakes Winnipeg, Manitoba, and Winnipegosis, which supply water for many of the corporation's hydroelectric generating stations.

The research seeks to gain a better understanding of the factors that can affect coastal wetlands around the province's major lakes.

To date it has yielded a detailed inventory and classification of major coastal wetlands in Manitoba, as well as insights on the effects of the common carp on aquatic plants, water quality, other fish, amphibians, and waterfowl.

It shows that Lake Winnipeg is undergoing negative water quality and biological changes caused primarily by the addition of nutrients from agricultural, industrial, and municipal wastes originating in the drainage basin. There is no scientific evidence to indicate that Manitoba Hydro's operations are contributing.

Most of the field work and data analysis are conducted by graduate students from the University of Manitoba, which is a part of the Lake Winnipeg Research Consortium, an organization formed in 1998 to facilitate multidisciplinary research on Lake Winnipeg.

Manitoba Hydro has contributed more than \$410 000 to Consortium efforts since 1998.



Teaching Peregrines to Live with Power Lines

In summer 2003, a Hydro crew built a 10-metre-high hack tower for breeding and raising peregrine falcons in an environment where it is hoped they can learn to adapt to, and survive, the hazards of hydro poles and power lines.

Peregrine falcons are listed as an endangered species in Manitoba.

The hack tower was built near La Barrière Provincial Park south of Winnipeg in an area surrounded by hydro poles and power lines.

Peregrines and other birds of prey can sometimes nest on hydro poles and towers and electrocute themselves.

Hydro's employees have tried safeguarding birds of prey by building safe nesting and perching platforms in a variety of locations with transmission lines, stations, and distribution poles.

The platforms have helped save many adult birds and chicks, but because of its training approach, the hack tower project could prove more effective.

The project is part of a 4-year falcon recovery program by Parkland Mews Falconry, supported by Manitoba Hydro and Manitoba Conservation.

Manitoba Hydro is helping with \$68 000 in research and development funding.

Researchers from the University of Manitoba install a conduit fence to exclude common carp from a marsh pond in spring 2004. The fence allows water and small fish to pass between the pipes but prevents larger carp from swimming through.

Reuse and Recycling at Hydro — 2003/04 Highlights

Material	Quantity	Handling
Non-Hazardous		
Used electrical apparatus	7 380	Single-phase transformers are refurbished and reused where cost-effective. Electrical apparatus that cannot be repaired is sold to scrap dealers for recycling.
Transformers (scrap)	654 152 kg	Drained scrap transformers are sold to scrap dealers for recycling of metals.
Scrap steel and bolts	241 506 kg	Surplus steel and bolts that cannot be reclaimed are sold to scrap dealers for recycling.
Scrap meters	27 861 kg	(8 670 kg hydro and 19 191 gas meters). Sold to scrap dealers for recycling.
Conductor	249 613 kg	Sold to scrap dealers for recycling or repaired and reused in system.
Copper	49 520 kg	Sold to scrap dealers for recycling.
Scrap aluminum	31 928 kg	Sold to scrap dealers for recycling. In 2003/04, 1 361 kg of sweat aluminum was recycled.
Brass	6 060 kg	Sold to a scrap dealer for recycling.
Fine office paper	55 tonnes	Recovered at Winnipeg sites or backhauled from some rural locations. A local contractor recycles white paper into newsprint and tissue products; and non-white paper into boxboard, cardboard, and insulation. Some rural sites are contracted to local recyclers.
Porcelain insulators	N/A	Sent to a recycler. Crushed and mixed with gravel to make concrete. Steel component sent to another recycler.
Asphalt & concrete	N/A	Asphalt & concrete recovered from trenching through roads and sidewalks is re-used by Manitoba Hydro as a road fill and dust inhibitor.
Toner cartridges	Approx. 1107	Some types are collected and refurbished by a contractor and returned for re-use.
Phone directories	Approx 7 tonnes	Collected by Manitoba Telecom Services; reprocessed for shingling, roofing paper, and egg trays.
Cardboard/other packaging	14 500 kg	Some are reused for shipping. Surplus cardboard is collected by outside contractor for reprocessing.
Wood pallets	1 617	Standard pallets are reused at Manitoba Hydro. Unusable ones are sold to scrap dealers.
Yard wastes	N/A	Grass clippings and tree/shrub cuttings from the corporation's grounds are composted and returned to condition flower beds.
Office newsprint	Approx 600 kg	Removed by a private contractor and added to virgin newsprint fiber from Head Office only.
Aluminum cans	Approx 800 kg	Removed by a volunteer and donated to a Selkirk non-profit collection agency for recycling.
Tires	Over 300	Long-wearing tires are used on vehicles to minimize tire changes. Used tires total more than 300 annually (about 5% of the corporate-wide total; see footnote). A local contractor collects the used tires and recycles them into floor mats and other products.
Salvaged scrap poles	179	Some salvaged poles are reused as is or cut to another common size and put back in stock. The remaining 284 poles of various sizes were sold as scrap. Bits and pieces of scrap timber and poles are routinely sent to Brady Landfill for chipping.
Street light luminaries	1 074	When damaged or obsolete street lights are replaced, they are returned to Manitoba Hydro for recycling, reuse, or disposal. To date, 192 450 have been reused in the system after repair.
Street light standards	36	Returned to service. Another 236 were sold for recycling.
Dismantled walls	N/A	Approximately three-quarters of these interior wooden partition walls are re-used internally.
Used/worn carpet	N/A	Returned to manufacturer for re-manufacturing into new carpet.
Metal leads	7 360 kg	Lead attached to pole top pins is removed and disposed of by a licensed collector.
CCSR cable	14 115 kg	Sold to scrap dealers for recycling.
Control cable	57 842 kg	Sold to scrap dealers for recycling.
Iron	417 kg	Sold to scrap dealers for recycling.
Bushings	263	Sold to scrap dealers for recycling.
Stator coils	7 870	Sold to scrap dealers for recycling.
Hazardous		
Aerosol containers	9 000 containers	Containers are punctured and the contents collected as mixed solvent and shipped to a hazardous waste facility. Containers are sent to a local scrap metal dealer for recycling.
Batteries—acid	331	Sold to scrap dealers for recycling.
Waste lubricating oil	219 278 litres	Used lubricating and hydraulic oils are recycled by a hazardous waste contractor.
Decontaminating insulating oil	1 250 770 litres	Since 1985 Manitoba Hydro has chemically destroyed PCBs in insulating oil using a registered process. Once PCBs are removed, oil is renewed and reused in oil-filled electrical apparatus.
Oil/diesel fuel filters	21 drums	Filters are sent to a local recycler. Filter casings are disposed of as scrap material.
Waste solvents	6 970 litres	Hazardous waste contractors collect waste solvents and blend them off-site with waste fuels, which are then used for fuel in asphalt plants and cement kilns.
Antifreeze	14 555 litres	Used antifreeze is collected and shipped to a hazardous waste facility.
Paints	1 640 litres	Some surplus paints are donated to a local charity. The remainder are incinerated as hazardous waste by a contractor.
Grease	3 075 litres	Disposed of through a waste contractor, incinerated, or mixed and burned.
Mercury	2 kg	Mercury used in various types of electrical equipment is usually recycled and re-used on-site. In some instances it is shipped off-site for recycling.
PCBX waste	20 500 litres	Waste from PCB treatment comprising Fuller's earth, caustic water, or polymer is disposed of through a waste contractor.
Bulbs-fluorescent	39 398 feet	Shipped off-site to lamp recycler for crushing. Aluminum, glass, phosphor powder, and mercury reused.
Bulbs-HID	17 634	(Mercury and sodium vapour). Shipped off-site to lamp recycler for crushing. Glass, brass, aluminum, lead, and mercury are reused by industry.
PCB transformers (<200 ppm)	228	Decontaminated to <45 ppm of PCBs and reused in our system or sold to scrap dealers.
PCB transformers (> 200 ppm)	72	Decontaminated to <45 ppm of PCBs and reused in our system or sold to scrap dealers.
Apparatus	N/A	After oil removed, apparatus sold to scrap dealers
Plastic	N/A	Plastic #2, HDPE, and #4 LDPE are shipped to a manufacturer of plastic wood products such as fence posts, decking, and parking lot abutments.

NOTE: N/A—Not available. This table covers recyclable materials handled and received in Winnipeg only. Several rural districts/regional offices utilize collectors and processors in their own areas.



Getting PCB Free

Manitoba Hydro is developing a plan to remove from service—and destroy—all current stocks of PCB-contaminated equipment.

PCBs (polychlorinated biphenyls) are synthetic chemical compounds of chlorine, carbon, and hydrogen.

They are still used in business and industry because of their fire-resistant, insulating, and chemical properties.

To date Hydro has replaced thousands of PCB capacitors. Most of them were at HVDC converter stations where capacitor “cans” in filter banks installed before 1979 were filled with 100% pure PCBs.

Some 10 700 capacitors still require replacement.

The project, which could cost an estimated \$38.4 million, will meet the requirements of the federal government regulation which is set to ban all high-level PCBs (>500 ppm) by December 31, 2007 and lower levels (50 - 500 ppm) by 2014.

Fires in electrical equipment with PCBs can produce dioxins and furans, among the most toxic substances on earth.

Further, PCBs do not break down readily in the environment but continue to move through the food chain, through aquatic plants, fish, and birds and eventually to humans.

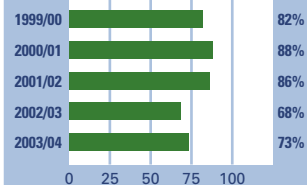
ASH AND OIL RECYCLING STATISTICS

In 2003/04, 1 954 tonnes of ash, a byproduct of coal burned at Brandon Thermal Generating Station, was used by contractors in the Brandon area as backfill for road bases. The amount of ash recycled depends on how busy the contractors are. The station produced 16 690 tonnes in 03/04, well up from previous years because of a severe drought that forced us to run Brandon and Selkirk more than usual.

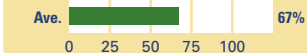
Several kinds of electrical equipment across Hydro’s system use oil as an insulant and coolant. During equipment maintenance, the oil is sometimes cleaned and returned to the equipment or replaced with new oil. Oil that is not re-used may be sold to other companies, who recycle the oil or burn it for heat.

Percentage of Electrical Insulating Oil Reused

Manitoba Hydro

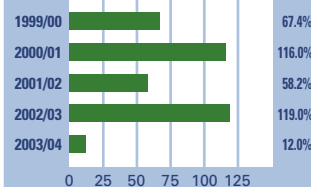


National Results 2003

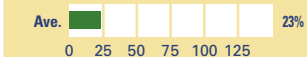


Percentage of Ash and Residue Utilized

Manitoba Hydro



National Results 2003



Environmental Management System Benefits from Fresh Set of Eyes

Environmental audits by an “outside” team in 2003/04 at locations across Manitoba Hydro’s system yielded a range of findings, including improper storage of flammable products, the potential for harmful products to escape containment through floor drains, some labeling and record-keeping problems, and the need for our senior environmental management review committee to increase their activity.

Staff began addressing these and other findings, with the goal of making improvements, in most cases by the end of the fiscal year.

Our senior environmental management review committee has also stepped up the number of meetings it holds annually.

The audits were completed by two- and three-person teams of environmental auditing specialists from the British Standards Association, a third party registrar responsible for examining our environmental management processes.

The teams represent a fresh set of eyes that can spot problems which Management can then correct to improve our Environmental Management System.

The presence of British Standards Association auditing teams at two different samplings of Hydro facilities during two separate visits in 2003/04 is part of Hydro’s registration to ISO 14001, the standard for

Environmental Management Systems. It also reflects our interest in ISO 9000, the standard for Quality Management Systems. Both are standards of the International Organization for Standardization, which supports numerous standards worldwide.

National organizations participate in the development, updating, and administration of these standards. In Canada, the Canadian Standards Association (CSA) plays this role.



Safe storage of hazardous materials at the Waverley Service Centre

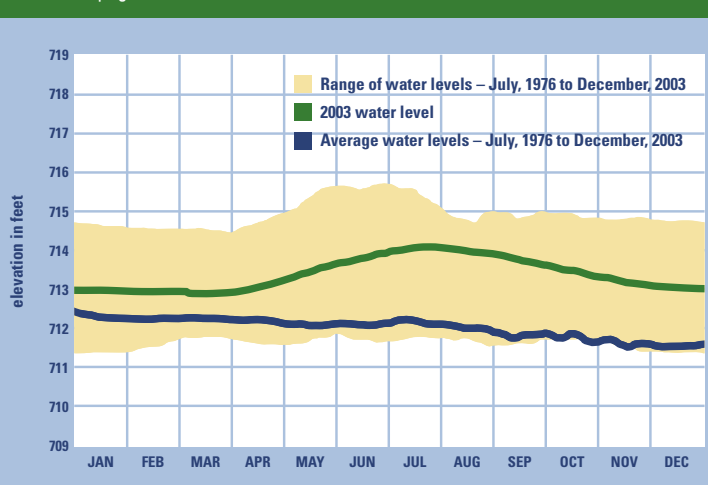
LAKE WINNIPEG REGULATION

Throughout 2003 the Saskatchewan River drainage basin experienced below average hydrologic conditions. Annual precipitation was 75% of average over most of the basin. By greatly reducing Grand Rapids outflows in the fall, water levels on Cedar Lake were returned to average by the end of the year despite near-record low inflows during that time.

Southern Indian Lake experienced below average water level conditions for most of the year. Near normal annual precipitation resulted in average flows on the upper Churchill River. Diversion flows from Notigi Control Structure were below average all year. Operations at Missi Falls were average all year.

Below average water levels were experienced on Lake Winnipeg as a result of the second lowest water supply conditions experienced since 1912. Late in the year, lake levels reached near record lows for the period since regulation began. Outflows from the lake were below average all year and were reduced to the licence minimum during the fall to limit the decline in lake level.

Lake Winnipeg Wind Eliminated Water Level



NewsBriefs

VISION FOR HYDRO'S NEW OFFICE BUILDING

Manitoba Hydro's new office building, set to open in downtown Winnipeg in 2007, is expected to be the most energy efficient office tower in North America.

Guided by that vision, the building will target a minimum of 60% savings in energy consumption, and a gold level LEED™ (Leadership in Energy and Environmental Design) certification.



HYDRO ON BOARD WITH GREEN KIDS

Green Kids, the only theatre group in Canada dedicated solely to environmental education for young people, is a non-profit charity that offers a junior schools' program throughout Manitoba in cooperation with the Manitoba Model Forest Organization.

Shows cover such topics as sustainable agriculture and forestry, natural foods, sources of power and fuel,

renewable forms of energy, sustainable development, and global climate change.

Manitoba Hydro has supported Green Kids since 1995, under its Environmental Partnership Fund which helps fund community based not-for-profit organizations seeking to undertake environmental projects with a strong educational focus. To date, the fund has supported more than 200 projects.

FOREST ENHANCEMENT PROJECT GREENS SCHOOL

Laura Secord Elementary in Winnipeg has turned part of its school grounds into an outdoor classroom with trees from Hydro's Forest Enhancement Program.

The trees offer shade around benches set in a semicircle behind the school to form a classroom for studying urban forestry and forest management.

The project is one of more than 500 completed since 1995 when the Forest Enhancement Program was launched. The program enhances and sustains the forest environment of communities and regions of Manitoba with the help of \$3.5 million in funding over a 10-year period.

HYDRO PUBLISHES VEGETATION MANAGEMENT PRACTICES

This publication describes vegetation management practices by Hydro staff responsible for tree and weed control in the operation and maintenance of transmission lines and transformer stations. The booklet, which includes an eight-step look at the vegetation control cycle, prescribes methods of controlling tree and weed growth, reflecting Hydro's environmental stewardship policies.

A photograph of a construction site for a high-rise building. Several workers wearing yellow hard hats are visible on a high level of the structure. The building's framework consists of dark steel beams and columns. A prominent yellow banner with white text is overlaid across the middle of the image. The background shows a clear sky and a distant horizon.

ECONOMIC DEVELOPMENT



Improving System Reliability

In October 2003, a group of aging mercury arc valves at Radisson Converter Station in northern Manitoba was replaced with new thyristor valves that will improve system reliability.

The work was part of an upgrade that will see the replacement of all mercury arc valves with thyristors at Hydro's converter stations by October 2004 at a cost of \$68 million.

The new valves will improve power quality, eliminate old and potentially unsafe equipment, and remove mercury, PCBs, and other environmentally undesirable substances from the system.

Mercury-arc and thyristor valves are a type of electrical switch that allows current to flow in only one direction. At Radisson and Henday Converter Stations, the valves change alternating current from generating stations along the Nelson to direct current for efficient

transmission over roughly 900 kilometres of high voltage direct current lines to the south.

At Dorsey, the valves turn direct current back to alternating current for distribution to the southern grid.

Old mercury arc valves are decommissioned, and their mercury drained and recycled. The valves are cleaned and shipped off as scrap.

The switch to thyristors, which generate one-twentieth the heat, prompted retrofits of cooling systems at Dorsey and Radisson in 2003.

Annual savings of 1 500 000 kilowatt-hours are expected at each station.

Cost of the cooling system retrofits was partially covered by Power Smart incentives through Hydro's Internal Retrofit Program, which helps Hydro's building managers construct or retrofit to Power Smart standards.

New Northern Stations Would Boost Export Sales

In 2003/04, Hydro continued to evaluate potential sites for hydroelectric generating stations in northern Manitoba, including Wuskwatim along the Burntwood River, and Gull and Conawapa on the Nelson River.

Development of one or more of these sites would enhance Hydro's ability to take advantage of the lucrative export market for electricity in Canada and the U.S.

One of Hydro's goals is to expand its share of the export market, and in the next decade substantial opportunities for new sales are expected to emerge.

Maximizing revenues from export sales is a key part of maintaining the low electricity rates enjoyed by Hydro's customers.

Meanwhile, no decisions have yet been made to proceed with construction of any of the three stations.

WUSKWATIM

An environmental impact statement on Wuskwatim Generating Station and its associated transmission lines was filed in April 2003. In the following months, additional information was filed with regulators and the public, particularly during public hearings which started March 2004.

On receipt of all approvals and ratification of a partnership arrangement with the Nisichawayasihk Cree Nation, a decision will be made on whether or not to build the project.

Wuskwatim would generate 200 megawatts. It would flood less than 0.5 square kilometres.

The earliest possible in-service date for Wuskwatim is late 2010.

KEEYASK

Environmental monitoring is underway for Keeyask, which would be located on the Nelson River, about 30 kilometres west of Gillam.

Keeyask would produce about 600 megawatts. It would flood an estimated 46 square kilometres of boreal taiga lands beyond the natural banks of the Nelson.

The earliest possible in-service date for Keeyask is 2012/13.

CONAWAPA

Some environmental monitoring is also underway for Conawapa, which would be the largest hydroelectric project ever built in northern Manitoba.

The station would generate 1380 megawatts of electricity at a site on the Lower Nelson, 28 kilometres downstream of Limestone Generating Station and 90 kilometres downstream of Gillam.

Conawapa would flood about 5 square kilometres of boreal taiga lands beyond the natural banks of the Nelson. The earliest possible in-service date for Conawapa is 2017.



Potential site of Conawapa Generating Station.

Wind Power Purchase in the Works

Manitoba Hydro is set to purchase wind power from the first non-utility generator in the province to sell electricity to Hydro.

At fiscal year-end 2003/04, negotiations were finalized with Bison Wind Inc., a Winnipeg-based joint venture between Sequoia Energy Inc., a Canadian wind developer, and Global Renewable Energy Partners Inc.

Bison Wind sold the project to St. Leon Wind Energy LP, which plans to generate 99 megawatts of electricity from 63 wind-powered turbines deployed over a roughly 100-square-kilometre parcel of land outside St. Leon, by the end of 2005.

In early 2005, an 80-metre-high, 4-metre-diameter steel tower for the first turbine is scheduled to be raised into position, followed by the three blades. Tips of the blades will reach a height of 120 metres.

The foundation of the turbine is made of two concentric culverts, sandwiching a ring of reinforced concrete. The three blades, of wood and fiberglass, have a span of 42 metres—greater than the wing span of a 747.

In December 2003, Manitoba Hydro published an Open Access Interconnection Tariff, which provides for the interconnection of privately owned generators to the system. The first party to make use of the tariff will be St. Leon Wind Energy.

Hydro has been evaluating wind energy technology since the early 1990s, with a view to assessing the feasibility of adding wind power to its portfolio of energy supplies for serving the province.

Wind energy may complement hydroelectric generation, particularly in low water years, but it may also compete with hydro in high-water years at times when excess water is normally spilled at reservoirs.

In May 2003, Hydro finished installing 60-metre-high wind monitoring towers at seven locations across the province in a project designed to determine the best locations for generating clean, renewable electricity using wind turbines.

If wind potential proves viable from an economic, technical, and financial perspective, up to 250 megawatts of wind power could be developed at one or more of the seven sites as early as 2008/09.

Consistent, strong wind speed, at the appropriate tower height, is a critical element in assessing the suitability of sites for wind turbines. Other concerns include availability of transmission lines and good access for shipping large, heavy components to sites.



Modern turbines are designed to produce up to 5 megawatts of electricity. Turbines are typically 1.5 to 2 megawatts each, and are usually clustered in “wind farms” of 50 to 100 megawatts.

A 1-megawatt wind turbine produces enough electricity to supply about 125 electrically heated homes.

Tracking the Harvest for Better Resource Management

Hydro continued efforts to help residents of Nelson House keep track of domestic resources they harvest with a household calendar designed to be filled in with notes on what was harvested each day, how much, and where.

Community residents take daily note of resources they harvest while fishing, hunting, trapping, or gathering berries, craft and ceremonial items, firewood, and medicinal plants.

Notes from monthly sheets, collected by community workers, are entered into an electronic database to build



an inventory of traditional resource harvesting around Nelson House.

The growing inventory is expected to put the Nisichawayasihk Cree Nation in a better position to make good decisions on managing their local resources and gauging the impacts of future development.

The calendar recognizes that domestic resource harvesting is an important component of First Nation societies, cultures, and economies. Plans are to introduce the calendar at Fox Lake Cree Nation, for similar benefits.

Design Standards Add Comfort/Save Energy

Power Smart Design Standards, adopted by Manitoba Health and the Public Schools Finance Board for new and renovated buildings, continue to help

owners and engineering/architectural teams design buildings with lots of light, fresh air, and more productive working conditions.

Energy costs are also at least 25% lower than for buildings constructed to conventional energy efficiency standards.

The Power Smart Design Standards, released in April 2003, set out specs on a range of technologies, such as improved air-barrier systems, energy efficient lighting, Power Smart approved windows, air-to-air heat recovery, and well-insulated walls, attics, and floors.

The Gimli community Health Centre is the first hospital to qualify for designation as a Power Smart building.

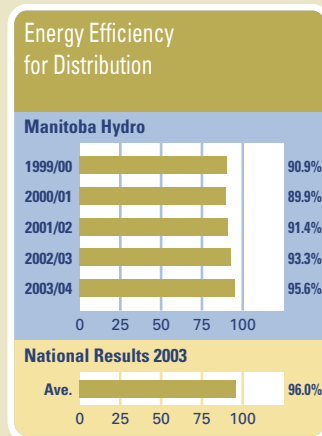
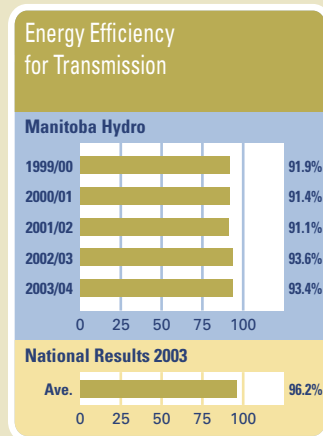
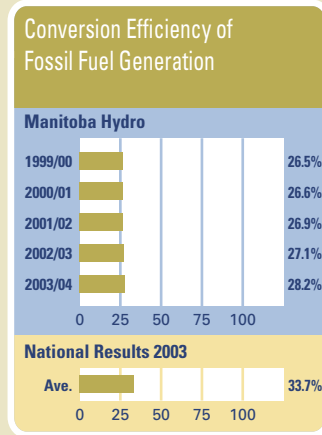
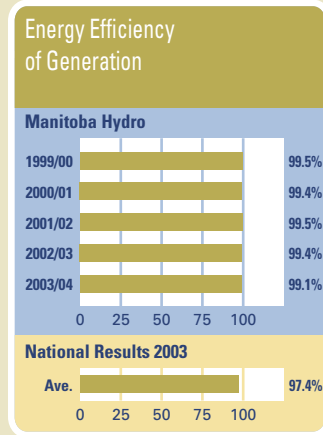
In schools, Power Smart lighting makes classrooms look brighter, colours more natural, and rooms larger. For a new 50 000-square-foot school, following the design standards would typically save \$8 000 to \$9 000 a year in energy costs.

RUNNING A TIGHT SHIP

Hydro's generation system is one of the most efficient in the country, at 99.1% in 03/04. The achievement is the result of a strong supply side management program of maintenance and overhauls that improve the efficiency and performance of our generating stations to reduce energy production costs and defer the need to build new facilities.

Because of our reliance on clean hydroelectric power, our fossil fuel generation plants usually operate intermittently, compared with the plants of other utilities that rely on virtually continuous fossil fuel generation to supply their base load. As a result, our fossil fuel plants are less efficient at converting fossil fuel energy into electrical energy, at 28.2% in 03/04. Still, because of drought, gas turbines at Brandon were in service for the full year, compared to 6 months in 2002, accounting for the slight increase in efficiency.

Much of the power from our northern generating stations is transmitted over roughly 900 kilometres to reach southern markets. The distance accounts for our slightly lower efficiency than the national average, which was 93.4% in



03/04. Our distribution systems are normally slightly less efficient than the national average, which was 95.6% in 03/04. The improve-

ment in efficiency over previous years reflects the upgrading of some distribution lines and installation of new ones.

Hydro Helps Form Training Consortium

If Wuskwatim, Keeyask, and Conawapa are built, they will be the biggest construction projects in Manitoba over the first two decades of this century.

Wuskwatim alone could generate more than \$200 million in on-site earnings for all workers on the project.

Keeyask and Conawapa would both be bigger than Wuskwatim, with proportionately larger workforces needed.

To help train Aboriginal people in the North to work on the projects, Hydro has joined forces with the federal and provincial governments to fund a multi-year, pre-project training initiative which is being delivered by several First Nations and Aboriginal organizations.

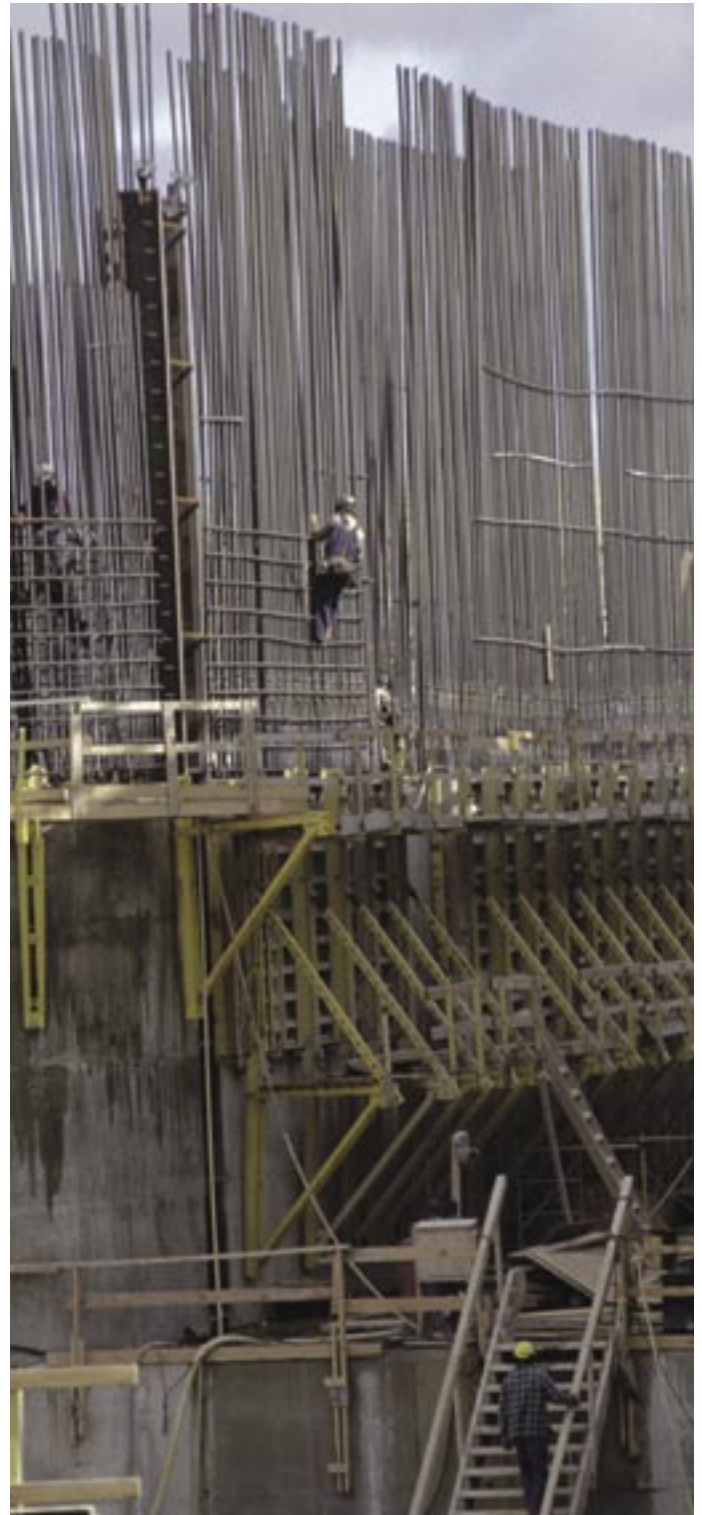
Pre-project training seeks to ensure that First Nations members and Métis in areas near the projects, particularly members of Manitoba Hydro's proposed First Nations partners in Wuskwatim and Keeyask, are in a position to take full advantage of the skilled trades and other jobs that will be available during construction.

The parties to the pre-project training initiative are the Nisichawayasihk Cree Nation, Tataskweyak Cree Nation, War Lake First Nation, York Factory First Nation, Fox Lake Cree Nation, the Manitoba Keewatinook Ininew Okimowin, and the Manitoba Métis Federation.

About 1000 northern aboriginal participants will be trained through the initiative, and up to 800 may be placed in hydroelectric construction-related jobs. Training has been in progress since 2001, and funding commitments have been provided for up to \$60 million.

The five First Nations, the Manitoba Keewatinook Ininew Okimowin, the Manitoba Métis Federation, Manitoba Hydro, and the Province of Manitoba have signed on to create a multi-stakeholder organization to administer training for the Wuskwatim and Keeyask Projects. This legal entity, the Wuskwatim and Keeyask Training Consortium Inc., is expected to be incorporated in mid-July 2004.

Local Aboriginal Northern Community Training centres will provide information on potential jobs and training for Northern Aboriginal people.



Rebar workers building a hydroelectric generating station.



Power Smart Cows Produce More Milk

Cliff Narfason installed Power Smart* lighting when he built his new dairy barn on the outskirts of Gimli nearly three years ago. The energy efficient lighting has been paying off ever since.

The T8 fluorescents have increased milk production from his herd of more than 50 cows, reduced lighting maintenance costs, and improved working conditions for staff. The cows are more productive under the new lights than they were in the old barn where the lights were dimmer and did not stay on as long.

Studies in Europe and the U.S. show that boosting light levels from the traditional 5 foot candles to roughly 15 - 20 foot candles in dairy barns, and keeping the lights on from 16 - 18 hours a day, can increase milk production 5 -16%.

Narfason's barn is one of about 20 that producers in Manitoba have built or retrofitted with Power Smart lighting to take advantage of greater milk production and enhanced working conditions through brighter lighting that stays on longer.

His staff appreciate the new lighting because it helps them do a better job. They can more easily detect problems, such as cuts on a cow's udder, in part because the T8 lighting has such good colour rendition.

Narfason says the cows cycle better, have improved fertility, and are more comfortable and at ease.

"They are contented with the new lighting, and so am I!"

Power Smart Residential Loan Helps Manitoba Homeowners

In 2003/04, the Home Comfort and Energy Savings Program topped the \$60 million mark in Power Smart Residential loans for Manitoba homeowners.

More than 17 000 Manitobans have now taken advantage of the financing to add home comfort while saving on their heating costs. Some 80% of the financing has helped cover the cost of installing improvements that reduce natural gas bills.



* Manitoba Hydro is a licensee of the Trademark and Official Mark.

The Home Comfort and Energy Savings program, launched in 2001 to help consumers cope with soaring natural gas prices, has stimulated economic activity in Manitoba's renovations industry. A network of more than 700 retailers and contractors promotes the program.

Power Smart New Home Program Launched



The Power Smart New Home Program, announced February 2004, offers incentives to help residential customers add energy efficient measures during construction of their new homes.

Developed in cooperation with the Manitoba Home Builders' Association and the Construction Association of Rural Manitoba, the program is expected to save new homeowners an average of \$350 on their annual home-heating costs.

Homeowners who build their homes to Power Smart standards are eligible to receive up to \$1 000 towards the purchase of a front-loading washing machine or a \$600 rebate on their electricity bills.

By 2011/12, the new program is expected to reduce electricity consumption by 8 megawatts and 22 gigawatt-hours, natural gas consumption by 3.6 million cubic metres, and greenhouse gas emissions by 62 000 tonnes.

EnerGuide In-Home Evaluations Point the Way to Savings

Manitoba Hydro's contract energy advisors completed 3 250 EnerGuide for Houses in-home energy evaluations of Manitoba homes in 2003/04.

An EnerGuide evaluation determines energy losses around the home, recommends energy improvements, and supplies an EnerGuide rating for the house.

Water conservation measures are discussed with homeowners as part of the evaluation.

Homeowners can take advantage of Hydro's Power Smart Residential Loan to help finance the cost of renovations.

A second evaluation, following energy improvements, yields a second EnerGuide rating that may qualify homeowners for a grant from the federal government's "Retrofit Incentive, a Grant for Homeowners."

From November 2003 to March 2004, 1 476 Manitobans received more than \$825 000 in grants, for an average of about \$550 per household.

How Our Rates Stack Up

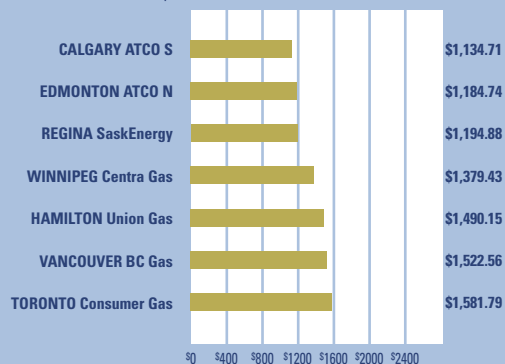
For the first time in 7 years for residential and small commercial customers, and the first for industrial customers in 12 years, Hydro applied to the Manitoba Public Utilities Board for increases in electricity rates averaging 3% effective April 1, 2004, and 2.5% effective April 1, 2005.

The modest rate increases were prompted by historically low water levels and persisting drought throughout the province. Even with the proposed rate increases, Manitoba Hydro's electricity rates are among the lowest of any major utility in North America.

During 2003/04, Centra's primary gas rates were adjusted four times on the natural gas quarter to reflect the forecasted market cost of primary gas. Centra received a 0.4% overall increase related to non-gas charges, the first change in non-gas costs since Hydro acquired Centra in 1999. As of December 31, 2003, our gas rates ranked fourth for the lowest residential rates among Canadian cities.

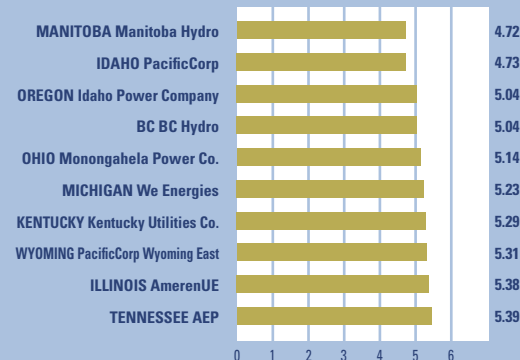
Annual Retail Gas Rates

Residential: 3550 Cubic Metres per Year



Ten Lowest Cost Electricity Utilities in North America

Cents/Kw.h





Power Smart Keeps Trains Rolling at CN

CN Rail has installed a Power Smart energy management system that keeps track switches at Winnipeg's Symington Yard free of snow and ice over the winter months.

By turning on fans that blow air on the switches only in inclement winter weather, the new system has slashed CN's blower system electricity bills by 50% for the blowers under control.

Keeping the yard's 400 switches free of snow and ice buildups has been a perennial and expensive chore dictated by the need to avoid train delays that can cost thousands of dollars a minute in late delivery penalties. The fans that keep track switches clear were once

turned on after the first snowfall of the season and ran continuously until snowmelt in spring—whether they were needed or not—consuming nearly \$750 000 in electricity.

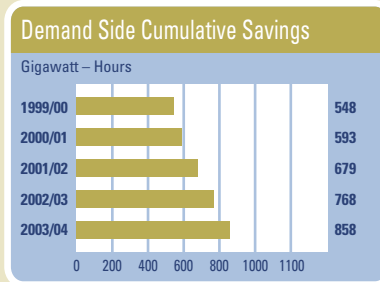
Payback on the more than 200 blowers now under control of the new system is two winter seasons.

CN is considering putting most of the remaining critical switches at Symington Yard on the system, for further savings.

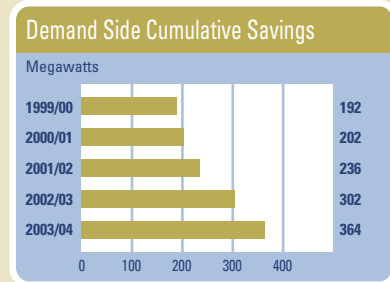
The blower control project recently won an honourable mention in Canada's Energy Efficiency Awards, earning recognition as an example of Canadian innovation and achievement in the field of energy efficiency.

CUSTOMERS KEEP SAVING WITH POWER SMART

In 2003/04, we offered our customers 20 Power Smart incentive and customer service programs, ranging from energy efficient lighting and heat pads for piglets, to parking lot controllers and the optimization of industrial fans, pumps, and other motive power systems. Power Smart programs, which began in 1992, lower electricity consumption, saving customers on their energy bills. Any surplus electricity can be exported for revenues that keep domestic prices



down and defer the capital expense of building new generation. In 2003/04, the Power Smart portfolio of incentive-based programs, customer service initiatives, and codes and standards efforts achieved cumulative energy savings of 858 gigawatt-hours and demand savings of 364 megawatts.



These Power Smart electrical savings reduced customer bills by \$22 million in 2003/04; cumulative savings for customers to date total more than \$150 million. The electrical savings also reduced greenhouse gas emissions by 699 000 tonnes of carbon dioxide equivalent in 2003/04.

NewsBriefs

T8s HEALTHY FOR HOSPITAL PROJECT

Energy efficient T8 fluorescents are set to brighten outlooks at the Health Sciences Centre's new Critical Services Redevelopment Project in Winnipeg.

The project, scheduled for completion in 2006, will feature T8 fluorescent lights in more than 3 500 high-performance fixtures throughout the facility, which will include state-of-the-art medical equipment and innovations in hospital care.

Installing T8s instead of conventional T12 fluorescents will save the hospital an estimated \$410 000 million over the 20-year lifetime of the lights, improve working conditions for staff, and enable medical personnel to assess patient condition

faster and more accurately, because of the improved colour rendering of T8s.

SYSTEM FIBRE OPTICS UPGRADE TO BENEFIT NORTH

In early 2004, Manitoba Hydro reached the halfway mark of a project to install 1 700 kilometres of fibre-optic cable from Rosser Transmission Station on Winnipeg's north perimeter to Limestone Generating Station on the Nelson River.

The project, estimated to cost \$75 million, will bring faster and better communications services to Hydro's system. It will also benefit the North by providing opportunities for internet access by northern communities along the route, such as Split Lake.

HYDRO STARTS RECYCLING LEAD

Manitoba Hydro has started recycling the lead in pole top pins.

The pins, which derive their name from their position at the top of power poles, have threaded ends made of lead. The ends are capped with screw-on porcelain insulators that carry the conductor.

Replacement pole top pins use fiberglass instead of lead, which is considered an environmental hazard.

Hydro has also started recycling porcelain insulators, which are crushed and mixed with gravel to make concrete.

In 2003/04, Hydro recycled almost 1.5 million kilograms of materials which sold for nearly \$500 000.

MANURE SET TO YIELD METHANE

In 2003, researchers at a swine finishing barn outside Teulon, Manitoba, began testing a low-temperature process for treating swine manure to produce biogas—a type of low-grade fuel that contains methane.

The project, supported in part by Hydro, could set the stage for a practical, low-cost methane production system that reduces odours from swine operations, lowers greenhouse gas emissions, fuels space and water-heating systems, and even generates electricity for on-site use or connection to Manitoba Hydro's provincial grid.





SOCIAL RESPONSIBILITY

Location of proposed Keeyask Hydroelectric Generating Station

War Lake First Nation Set to Take Part in Proposed Keeyask Generating Station Project

War Lake First Nation now has an opportunity to share in ownership of the proposed 620-megawatt hydroelectric generating station at Gull Rapids, referred to as Keeyask by the Cree First Nations.

War Lake can also help develop the proposal for the project, to ensure it is environmentally acceptable and contributes to the economic independence of First Nations people.

The arrangements were formalized in an Agreement in Principle between War Lake First Nation and Manitoba Hydro, signed in July 2003.

War Lake First Nation, with a band membership of 244, is on the Mooseocoot Reserve at Ilford, Manitoba. It is located on the Hudson Bay rail line 45 kilometres from the proposed site for Keeyask Generating Station.

In October 2000, another Agreement in Principle set out the basis for a similar cooperative partnership between Manitoba Hydro and Tataskweyak Cree Nation (TCN) located at Split Lake, Manitoba, some 60 kilometres upstream of the proposed site for Keeyask.

In addition to Tataskweyak and War Lake, Manitoba Hydro continues to hold discussions with two other Manitoba Cree Nations—Fox Lake and York Factory—on their involvement in developing the project.

No decision has been made to proceed with Gull, which would be located on the Nelson River between Split Lake and Gillam.

However, the agreements broaden and strengthen the role of local First Nations people in new hydroelectric development, and are an important step for continuing joint planning, environmental studies, and potential business arrangements for Gull.

The earliest possible in-service date for Keeyask is 2012/13.

Making the Most of Energy and Resources

The Fort Whyte Climate Change Education Centre, a 1 700 square-foot state-of-the-art facility, sits on the shores of beautiful Cargill Lake, now part of the Fort Whyte Centre property.

Manitoba Hydro is a keynote sponsor of the project. Officially named the “Siobhan Richardson Field Station,”



the facility shows visitors how to make the most of our energy and natural resources.

Student classes are introduced to the Centre’s operating systems—electrical, heating, water, and waste management. They are given an energy budget and expected to work together to achieve integrated environmental, social, and economic decisions during their one- or two-day stay.

Students and visitors can also try their hand at specially developed research modules on such topics as eco-system dynamics, population resources use demographics, water quality, forestry, snow ecology, climatology, and of course, the issues and implications of climate change.

Manitoba Hydro continues to help support Fort Whyte Centre, now recognized as one of Canada’s leading environmental educational facilities.





Manitoba Envirothon Team at a field test site

Reaching Manitoba Youth with the Sustainable Development Message

Envirothon is an Olympic style competition for high school students to test their knowledge of the environment.

In 2003, 19 schools from urban and rural centres across the province took part in the event, competing for the opportunity to represent the province at the International Envirothon Competition in northern California.

Envirothon seeks to increase students' awareness of the natural balance of five aspects of the environment: forests, soils, aquatics, wildlife, and a special environmental issue.

In 2003, teams answered a timed question, took a field test, and made presentations on wildfire management, the theme of the year.

Team Northwest, from Swan River, took first place in 2003, and represented Manitoba at the Canon Envirothon in Maryland in July.

The Envirothon competition in Manitoba is sponsored by Manitoba Hydro and the Manitoba Forestry Association.

It is considered one of the most successful projects in reaching youth with the sustainable development message.

Help for Northern Water Supply Systems

Over the next 20 years, Hydro will contribute \$40.5 million toward maintenance and upgrades of potable water systems, and the construction of new systems, in the five First Nations communities of the Northern Flood Agreement (NFA).

The five communities are Cross Lake First Nation, Nelson House (now Nisichawayasihk Cree Nation), Split Lake (now Tataskweyak Cree Nation), York Factory First Nation, and Norway House Cree Nation.

The funding arrangement was set out in a Letter of Understanding announced November 2003 to settle Claim 138 under the NFA.

Hydro will contribute the \$40.5 million through the federal government, which is responsible for providing potable water to the NFA First Nations.

The NFA First Nations have already received \$24 million in anticipation of a settlement of Claim 138.

The federal government will also spend \$24 million over the next 5 years for sewer and water infrastructure projects, and further invest \$2 million in training to ensure that members of the communities enhance their expertise in operating and maintaining their upgraded and new systems.

Hydro and the federal government's contribution result in a total settlement package of \$90.5 million.

Hydro is to reimburse the federal government to the extent of 50% of its expenditures in providing potable water to any Reserve.

The expenditures must be attributable to the adverse effects of Hydro's projects.



Tataskweyak Cree Nation, one of five First Nation communities to benefit from settlement of Claim 138 under the Northern Flood Agreement

Wrestling with Technology at Summer Camp

"Building the Circle" summer camp is a four-year developmental and learning program designed to help 10 Aboriginal girls gain the self-confidence and empowerment they need to enter careers in engineering, technology, or the trades.

The camp, which started in 2002, is held during six weeks in summer for Aboriginal girls from communities across Manitoba.

Along with their mentors from Manitoba Hydro, the girls meet Aboriginal and non-Aboriginal women working in technical careers at Corporate sites, build technical projects such as mini-turbines and sumo robots, and work at Hydro in their chosen field of interest.

Eric See-Toh, an electrical engineer who served as a mentor at the camp in summer 2003, said, "It is so gratifying to hear the girls express an interest in pursuing careers in technology."



Working on a project at "Building the Circle" summer camp at Manitoba Hydro.



Safeguarding Northern Heritage Resources

Archaeologists examine a post-1900 trapper's cabin at Taskinigup Falls



During a heritage resources impact assessment of the proposed Wuskwatim project, a team of archaeologists made several finds, including the foundations of a cabin, a waymarker, a possible granite projectile point, and scattered stones near the Wuskwatim Falls portage.

Proposed handling of these finds is representative of efforts to eliminate or minimize the impact on heritage resources of building and operating Wuskwatim, which would be built within the traditional lands of the Nisichawayasihk Cree Nation (NCN) where a rich archaeological record attests to a long history of land use and occupancy.

The foundations of what is thought to be a post-1900 trapper's cabin at Taskinigup Falls were found in an area that would be flooded by the project. A major portion of the site was excavated during the impact assessment, and heritage resources in and around the structure were collected and analyzed. Given the potential for additional features under the thick moss layer, the site will be studied further before construction starts.

What is thought to be a granite projectile point was found with a quartz scraper and other tools along an eroded shoreline of the Burntwood River west of Taskinigup Falls.

The point carried side notches, suggesting a Late Pre-European contact date for the site, or 2 200 to 360 years before present. The point was recovered in an area previously impacted by the Churchill River diversion. Since construction at Wuskwatim will destroy these sites, the archaeologists have meticulously recorded

every detail of their context and the sites can be reconstructed at another location, if required. NCN will form a cultural resource management committee that will decide how to have these and other heritage resources interpreted and displayed.

The stones at Wuskwatim Falls, found below organic soils, were considered to be of some antiquity. Their configuration and orientation ruled them out as a hearth for a campsite or burial. The archaeologists concluded they were a toppled stone marker along the Wuskwatim Falls portage.

During cultural interviews, none of the elders from NCN knew about the marker. Since the find was carefully documented and photographed during the impact assessment, no mitigation was recommended at the site, which will be flooded if Wuskwatim is built.

The major focus of the impact assessment was Taskinigup Falls, the site of the dam, as well as the proposed channel excavation at Wuskwatim Falls, along the banks of the Burntwood below the 234-metre contour, and within the proposed construction camp. Other areas carefully assessed included locations for borrow pits, for roads needed to haul gravel, and Mile 17 Access road, a 48-km road which would serve the construction camp site.

Predictive modeling was one of several methods used to locate areas of moderate-to-high heritage resource potential for study. According to predictive modeling, habitation sites are usually 5 to 50 metres from the water's edge, with a slope of less than 5° and a vista

of between 60° and 90°. In contrast, areas far from major watercourses are generally used to harvest game and plants, and to quarry for materials to make stone tools.

Burial sites were not found during five field seasons, but the archaeologists continue to search for such sites on the advice of NCN Elders.

The study area was divided into six “reaches,” beginning at Early Morning Rapids and ending at Jack Pine Rapids, for archaeological site comparison and interpretation. The area in which field work was conducted included only the actual dam and facilities, the access road, and borrow pits.

The first stage of field survey was a general pedestrian survey, where crew members walked along shores and through the bush, scanning the ground for exposed signs of human habitation, such as stone and metal tools, native ceramics, glazed earthenware china, and stone or earthen foundations. Following this, transects were established along which shovel tests were set at 5-metre intervals for a distance of 100 m from the shoreline. In areas that were positive for signs of former human habitation, the shovel tests were expanded to a 1 x 1 metre square. All artifacts found were measured and photographed before they were removed, placed in Ziploc bags with their coordinates and date noted, then taken to the laboratory for processing. In the lab the artifacts were cleaned, measured, compared, and scanned. All data was recorded in Excel spreadsheets and catalogue cards prepared for each artifact. Once this was completed, the artifacts were returned to NCN for their cultural custody.

No heritage resources were recorded at borrow pits, the access road, construction camp site, sewage lagoon, or the water intake for the dam. However, construction workers at these locations will be made aware that heritage resources may be present, and an archaeologist will be on call during construction in the event that cultural material is discovered.

The legend of the water lynx, Misipisew, is an ancient and vital cultural link between the NCN community and the surrounding landscape, particularly Taskinigup Falls.

One approach to recognizing this link is to change the name of Mile 17 Access Road to Misipisew Access road.

Dock Offers Safe Harbour



Summer 2003 saw construction of a replacement dock at the Leaf Rapids Fish Plant, which serves the communities of Brochet, South Indian Lake, Granville Lake, Nelson House, Pukatawagan, Co-Op Point, and Kinoosao.

The old dock was destroyed in fall 2002 by a storm and wave action on the Churchill River.

The replacement dock offers a safe harbor for vessels during loading and unloading at the fish plant, and a refuge in times of storms. It is also key in the efficient distribution of products from the fish plant.

The new dock was funded under the Keewatinohk Sipiia “Northern Rivers” Partnership Fund, which is designed to help northern residents strengthen their cultural connection to northern waterways used by Manitoba Hydro.

Support is available for projects that enhance the connection people have to the land and their safety and working conditions when undertaking traditional pursuits on regulated water bodies.

To date, the Northern Rivers Fund, now in its fifth year, has supported more than 66 projects.



Moose Lake Fishermen Receive Spirit of the Earth Award

In fall 2003, members of the Moose Lake Fishermen’s Association brought back a boat full of sticks salvaged from diamond willows along the shores of Cedar Lake.



The wood, submerged for years, had been cured to a deep ebony with distinctive diamond markings.

The Association began producing colourful walking sticks, furniture, and other woodcraft items from the sticks.

The project was one of 12 recipients of the 2004 Spirit of the Earth Awards, which are presented to individuals and organizations that have made a significant contribution to the stewardship of Manitoba’s environment.

Manitoba Hydro’s Spirit of the Earth Awards Program seeks to foster environmental awareness while recognizing the history and culture of Aboriginal people.

Launched in 2002, the awards program recognizes individuals, groups, or organizations whose environmental activity has been planned or implemented by Aboriginal people, or non-Aboriginal people working in partnership with Aboriginal communities.

ACHIEVING A DIVERSE AND REPRESENTATIVE WORKFORCE

At Manitoba Hydro, we value the background, experience, perspectives, and talents of each individual employee.

We strive to create a workplace that reflects the diverse populations of the communities we serve, through our employment equity initiatives.

Our commitment to employment equity is embodied in our Corporate Strategic Plan which includes targets for a range of designated groups and occupations, including those charted below.

WOMEN IN THE WORKFORCE

Since 1999/00, the growth rate for Women in the Workforce has averaged 0.6% per year, setting the stage for reaching 26% employment by 2006/07.

MEMBERS OF VISIBLE MINORITIES

Since 1999/00, the growth rate for Members of Visible Minorities has averaged about 0.1% per year, which is close to meeting the corporate target of 4.0% by 2007. Close attention is being paid to recruiting members of visible minority groups.

PERSONS WITH DISABILITIES

For Persons with Disabilities, the growth rate in employment since 1999/00 has averaged about 0.35% per year. The most significant change in this demographic occurred when Hydro acquired another utility company's staff, which had a higher percentage of employees with a disability.

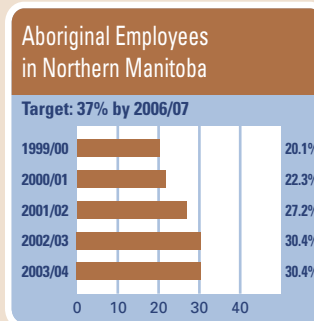
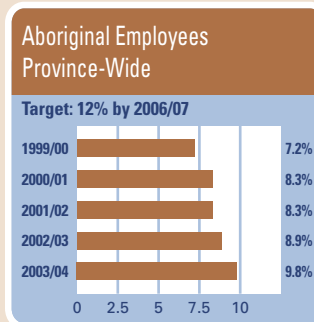
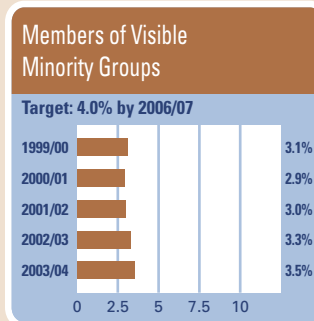
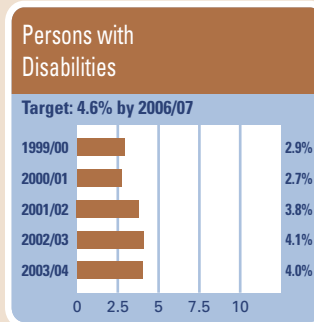
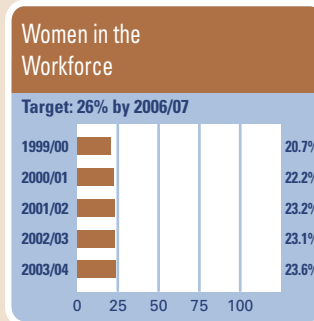
Current demographic trends indicate that Hydro will not achieve its goal of 4.6% by March 2007 without special interventions aimed at attracting and retaining persons with a disability.

ABORIGINAL EMPLOYEES PROVINCE-WIDE

Since 1999/00, the growth rate for Aboriginal Employees Province-Wide averaged 0.6% per year, setting the stage for reaching or surpassing the goal of 12% employment by 2006/07.

ABORIGINAL EMPLOYEES IN NORTHERN MANITOBA

Since 1999/00, the growth rate for Aboriginal Employees in Northern Manitoba has averaged 2.6% per year. The largest changes in demographics occurred between 2001 and 2003, setting the stage for reaching or surpassing the goal of 37% employment by 2006/07.



Taking Aim On Safety

Manitoba Hydro's Behaviour Based Safety program encourages staff to fill out observation sheets that focus on their own and their colleagues' work environments.

By raising awareness of the work environment, the observation sheets help staff recognize unsafe actions, for a safer working life.



Hydro staff use a range of "triggers," such as the Behaviour Based Safety awareness horse at the main gate of Dorsey Converter Station outside Winnipeg, to remind themselves to complete their observation sheets.

Campaign Warns of Carbon Monoxide Dangers

Manitoba Hydro continued with an extensive carbon monoxide safety campaign in 2003/04.

The campaign was an information-only promotion building on the successful rebate campaign used last year.

The campaign, "Put Your Family First," increased awareness of the dangers of carbon monoxide poisoning, and described ways that Manitobans could keep their homes and families safe.

Since the program was launched in 2001, there have been no public fatalities in Manitoba related to carbon monoxide poisoning.

In 2003/04, Manitoba Hydro and Local 2034 of the International Brotherhood of Electrical Workers, continued to jointly sponsor a billboard safety program.

This year's billboards featured: Call Before You Dig, Dangerous Combo—Water and Electricity Don't Mix, Emergency Preparedness, Substation Safety, and Watch for Overhead Lines.

SAFETY STATISTICS

Safety is Manitoba Hydro's most important goal and priority. Work processes and actions must conform to the highest standards. Safety must be practiced and improved continuously.

TARGETS:

- High risk accidents: 0
- Accident frequency rate: <0.80 accidents per 200 000 hours worked
- Accident severity rate: <16 days lost per 200 000 hours worked
- Public contacts: 25% injury reduction

In 2003/04, there were 14 high risk accidents. High risk accidents include all reported injuries (not necessarily resulting in lost time) due to electrical contact, falls from heights greater than 3 metres, and vehicle accidents, all of which have significant probability of a fatal or permanent injury.

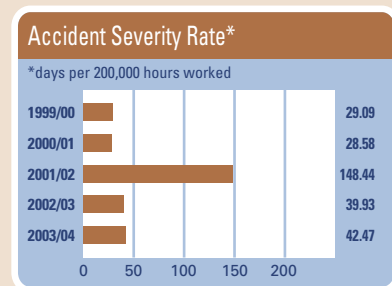
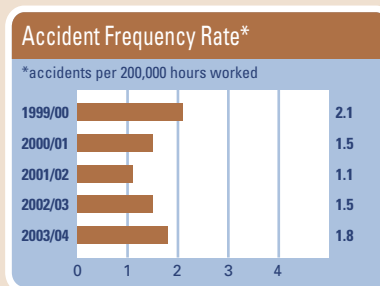
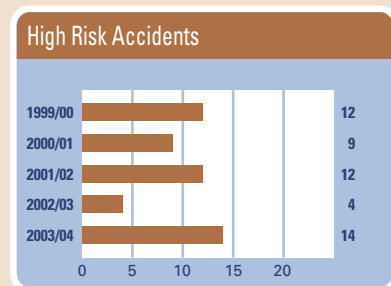
The accident frequency rate indicates the number of accidents for every 200 000 hours worked. The rate was 1.8 in 2003/04, more than double the target for this category.

The accident severity rate indicates the number of work days lost to accidents for every 200 000 hours worked. The rate was 42.47 in 2003/04, significantly above the target for this category.

A behaviour based safety program is expected to improve our performance in all three categories.

The number of accidental contacts that the public has with our system is also tracked. These range from vehicles striking poles to contractors digging up lines. There were 279 such incidents during 2003/04, 10 of which resulted in injuries.

As part of our public safety programs, new initiatives are being developed to encourage people to call the utility before digging, to alert farmers about overhead dangers, and to inform new drivers about proper procedures if their vehicle comes in contact with our system.



NewsBriefs

CURRICULUM TAILORED TO NORTHERN STUDENTS

In 2003, an Environmental/Energy Education Curriculum was introduced to the senior grades at Chemawawin High School, Easterville, near Grand Rapids Generating Station in northern Manitoba.

The curriculum, developed by Hydro staff with help from Chief Easter of Easterville, helps students better understand the operation of Grand Rapids hydroelectric generating station and the role it plays in Hydro's system. It also introduces students to job openings at Hydro.

The curriculum was so successful it was set up as an annual School Initiated Credit

Program at Grand Rapids High School in 2004. It will offer students 120 hours a year of combined on-the-job training from personnel at Grand Rapids Generating Station, as well as classroom training on energy and the environment.

Participating Grade 12 graduating students are expected to have sufficient grounding to become eligible to enter full Apprenticeship Training Programs at Hydro.

WEATHER WATCHERS RECOGNIZED

In June, four staff at Jenpeg Generating Station were presented with an award from Environment Canada for serving as volunteer climate observers.

Every day for the past 30 years, the staff have taken readings of temperature and precipitation, recorded their observations on the weather at the station, and forwarded the information to Environment Canada to help create a record of Canada's climate.

SIGN OF THE TIMES

In December 2003, Hydro began setting up "Idle Free Zone" signs at 50 Hydro locations around the province with high customer and employee traffic.

The signs, which urge drivers to shut off their engines if they plan to idle more than 10 seconds, are being installed as part of Hydro's efforts to reduce greenhouse gas emissions from corporate and customer vehicles.





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- visit: www.hydro.mb.ca
- telephone: 204-474-3311
- fax: 204-475-0069

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