

Community Open House

Brandon Generating Station Environmental Licence Review

Manitoba Hydro is hosting an open house to present results from environmental studies conducted on the ongoing operations of Generating Unit 5 at the Brandon Thermal Generating Station. The studies will be submitted to Manitoba Conservation who are conducting a review of the Environment Act Licence that was issued in 1993.

Manitoba Hydro plans to continue operation of Unit 5 until approximately 2020. The current operating licence requires that a review be undertaken to assess future operations beyond 2006. Detailed environmental studies have been undertaken to assess air emission, aquatic, and land effects, including a human health and environmental risk assessment.

You are invited to learn more about these studies, speak with people from the project team, and provide comments that will be included in the Environmental Impact Statement provided to Manitoba Conservation.

Manitoba Hydro will also be offering tours of the Brandon Generating Station for those interested. For safety reasons, attendance on the tour will be restricted to those 12 years of age and older.

Information on the Brandon Generating Station licence review is also available on Manitoba Hydro's website at www.hydro.mb.ca.

Date and Location:

Date: Wednesday, November 15, 2006
Time: 4:00 pm – 8:00 pm
Place: Manitoba Hydro Thermal Generating Station
3305 Victoria Avenue East
Brandon, Manitoba

Everyone Welcome!

For further information contact:

George MacKay
Plant Manager
Brandon Generating Station
578-3113



2006 COST ESTIMATE

CLIENT: Manitoba Hydro
DIVISION: Public Affairs
DESCRIPTION: Brandon Open House - Nov. 15
POSITION: Well fwd news - right hand page

ESTIMATE DATE: 05-Dec-06
REQUISITION: AC33637
 4700001023

Publication	Issue Date	Size <small>col x lines agates</small>	(Dimensions)	Rate	1x Cost	# Iss.	Net Total	PO #	e-mail
Newspapers:									
Brandon Sun	Sat. Nov. 04, 2006	4 x 88	=4 9/16"w x 6.25"d	0.83 N	292.16	1	292.16	71743	ads@brandonsun.com
	Fri. Nov. 10, 2006	4 x 88		0.69 N	242.88	1	242.88	71743	cc:ksmith@brandonsun.com
Brandon Community News	Sun. Nov.05, 2006	4 x 88	=4 9/16"w x 6.25"d	0.42 N	147.84	2	295.68	71744	ads@brandonsun.com
	Sun. Nov. 12, 2006	4 x 88							cc:ksmith@brandonsun.com
Brandon Wheat City Journal	Thur. Nov. 02, 2006	3 x 88	=5"w x 6.25"d	1.02 G	196.84	2	393.69	71745	monica@mcna.com
	Thur. Nov. 09, 2006								
SUB TOTAL:							1,224.41		

Creative Status: MB Hydro -

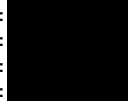
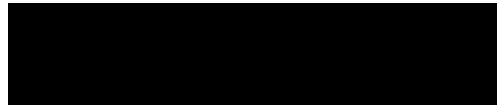
Material Deadline: Mon. Oct. 30.

Station	Air Dates	Schedule	Rate	# Days	# Occs	Net Total	PO #	e-mail
96 - Classic Rock	CKX-FM	Sat/Sun/Tue Nov. 11, 12, 14	2 occs/day: 6am-8pm		N 3	6		
880 - Country	CKLQ-AM	Nov. 11, 12, 14	2 occs/day: 6am-8pm		G 3	6		
SUB TOTAL:								

Creative Status: Script provided - station produced

Material Deadline: Mon. Oct. 30

Media Placement:
Brokerage Fee:
GST:
TOTAL:



WELCOME

OPEN HOUSE PURPOSE

- ◆ To describe Brandon G. S. Unit 5
- ◆ To present results of environmental studies
- ◆ To provide a forum to receive your comments

**WE WOULD BE PLEASED TO TALK WITH
YOU AND ANSWER ANY QUESTIONS**



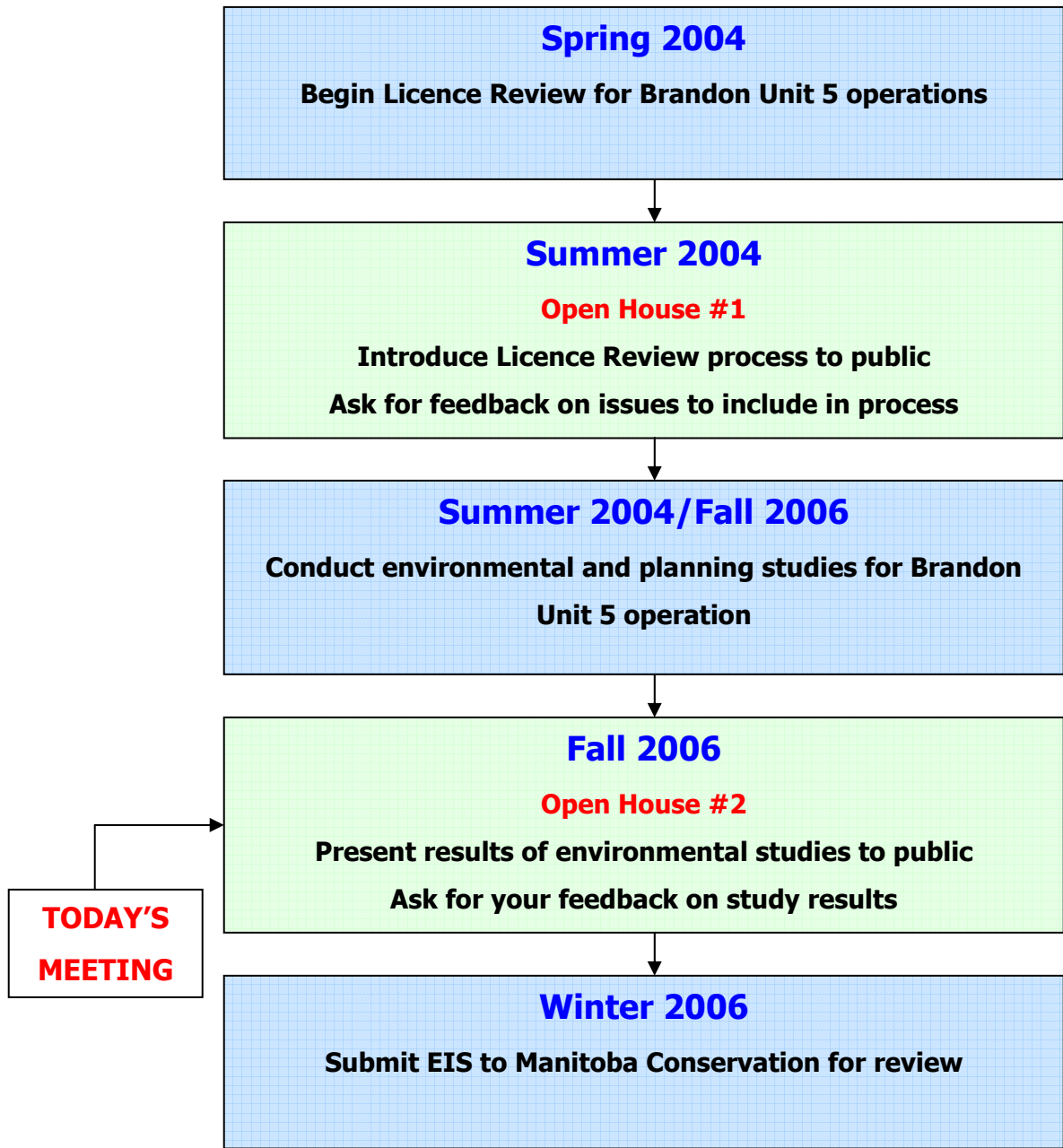
PUBLIC CONSULTATION

- ◆ Public consultation is an important part of the Licence Review process
- ◆ This Open House is our opportunity to share the results of environmental studies conducted for the Licence Review
- ◆ This includes providing you the opportunity to comment on the studies
- ◆ Your comments will be included in our submission to Manitoba Conservation
- ◆ There are 3 avenues for you to provide comments:
 - Fill out a comment sheet
 - Contact one of the members of the Licence Review team (see comment sheet for contact information)
 - Contact Manitoba Conservation directly

WHY A LICENCE REVIEW?

- ◆ Operation of Unit 5 is governed by Environment Act Licence 1703R issued by Manitoba Conservation
- ◆ The Licence Review:
 - Is a requirement of the Licence
 - Is a process directed by Manitoba Conservation
 - Will establish appropriate operating conditions and limits for the ongoing operation of Unit 5
- ◆ We will be submitting an Environmental Impact Statement (EIS) to Manitoba Conservation which will:
 - Contain the results of the environmental studies
 - Serve as a benchmark and source of reference for the future operation of Unit 5 until approximately 2020
 - Include your comments

LICENCE REVIEW PROCESS



WHO CONDUCTED THE ENVIRONMENTAL STUDIES?

◆ A consulting team of professional engineers, environmental scientists and biologists:

- SENE Consultants Limited

air emissions, noise, human health and ecological risk assessment



- North/South Consultants Inc.

aquatic assessment



- UMA Engineering Ltd.

land and groundwater assessment



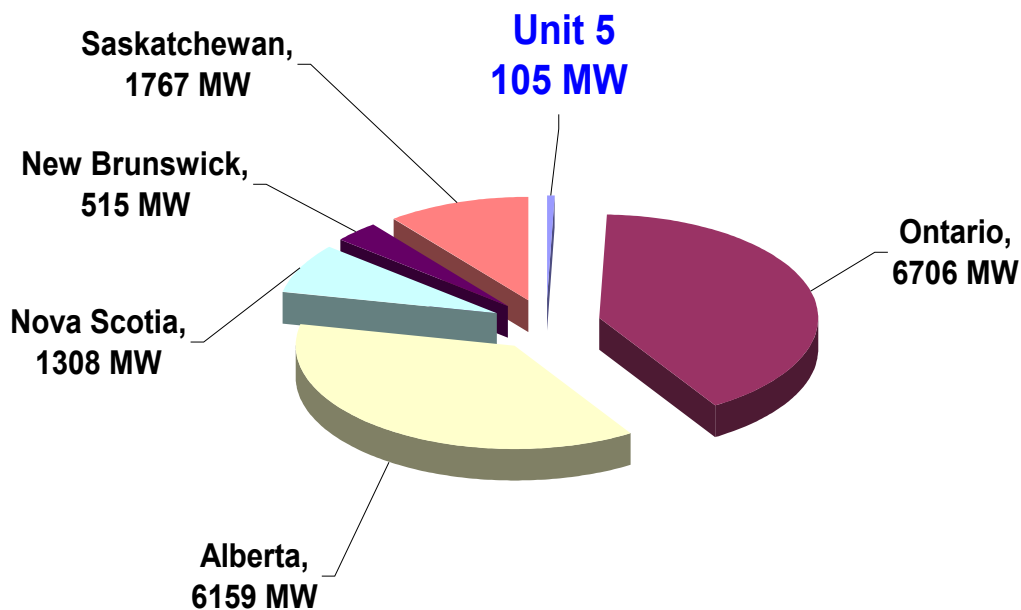
WHAT IS UNIT 5?

- ◆ Unit 5 is a thermal electric generating unit
- ◆ It generates electricity by heating water to produce steam that rotates a turbine
- ◆ A generator attached to the steam turbine converts the rotational energy into electricity
- ◆ Unit 5 burns low sulphur, low ash, high heat value coal as a fuel source to heat the water
 - Unit 5 has a maximum power output of 105 megawatts, enough power to supply approximately 100,000 homes
 - Unit 5 is one of five thermal generators on Manitoba Hydro's system and the only one that is coal-fired

UNIT 5

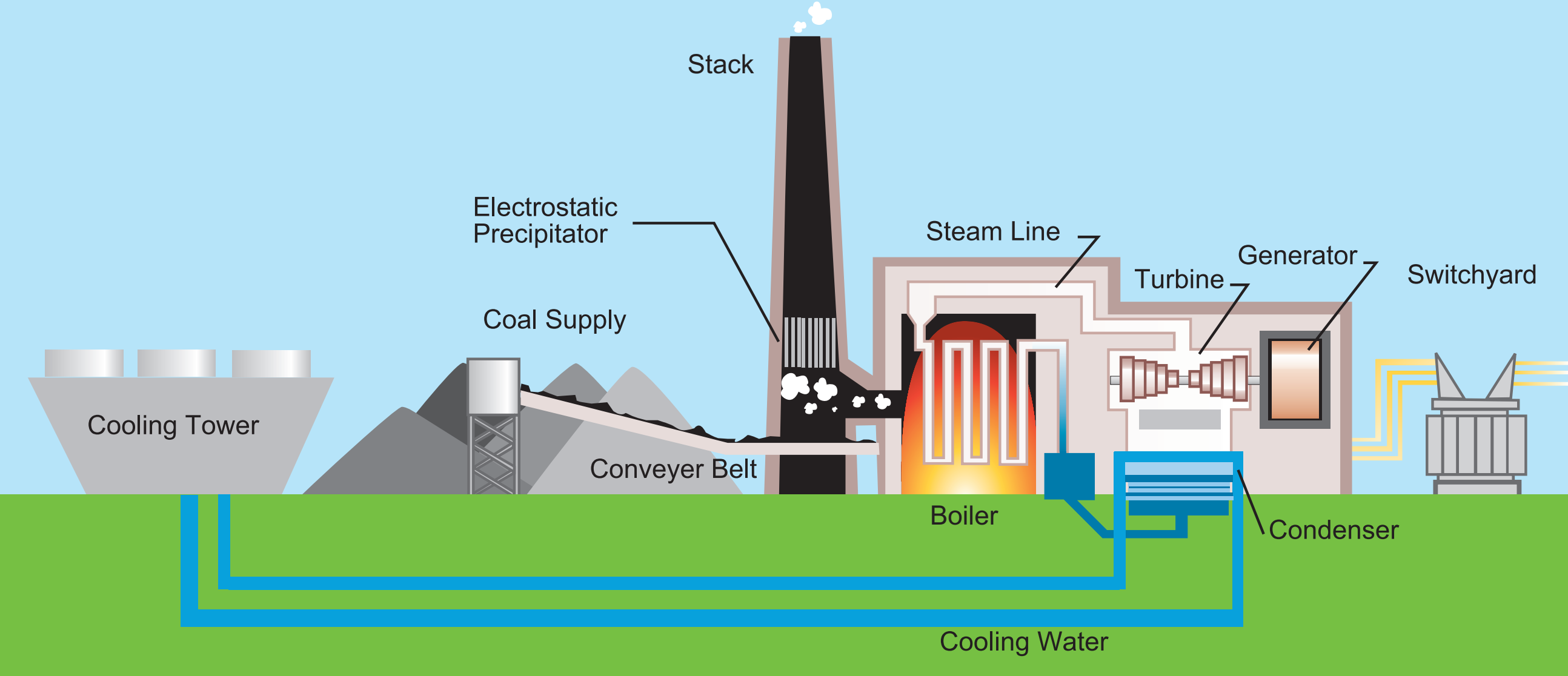
- ◆ Unit 5 is small, for example

Coal-Fired Generation in Canada (in Megawatts)



- ◆ The coal used in Unit 5 is selected for its favourable environmental characteristics
- ◆ Operating practices and pollution controls limit environmental effects

Coal-Fired Power Plant



Brandon Generating Station Site Plan



1. Unit 5: Commissioned in 1969, coal fired, operates under Environment Act Licence 1703R
2. Units 1-4: Commissioned in 1958, coal-fired, retired in 1996
3. Units 6-7: Commissioned in 2002, natural gas and fuel oil-fired, operates under Environment Act Licence (2497R)
4. Cooling Tower
5. Electrostatic Precipitator
6. Coal Pile and Conveyors
7. Ash Lagoon
8. Fuel Oil Tanks for Units 6-7
9. Switchyard

UMA

AECOM



North/South Consultants Inc.
Aquatic Environment Specialists

Manitoba
Hydro

LOCAL EMPLOYMENT AND **ECONOMIC BENEFIT**

- ◆ **Brandon G.S. employs over 80 people**
- ◆ **The majority of this workforce is directly associated with the operation of Unit 5**
- ◆ **About 5 people are employed by CP Rail as part of the coal transportation system**
- ◆ **Economic spin-offs from salaries, local material and equipment purchases are approx. \$5 - \$6 million/year**
- ◆ **Manitoba Hydro pays \$480,000/year to the City of Brandon in grants (in lieu of taxes)**
- ◆ **Support for community projects such as:**
 - **Brandon Emergency Support Team**
 - **Assiniboine riverbank rehabilitation**
 - **Bike path extension (Victoria Avenue East)**
 - **Career training for local college students**



Manitoba Hydro staff celebrate ISO 14001 registration for Environmental Management Systems

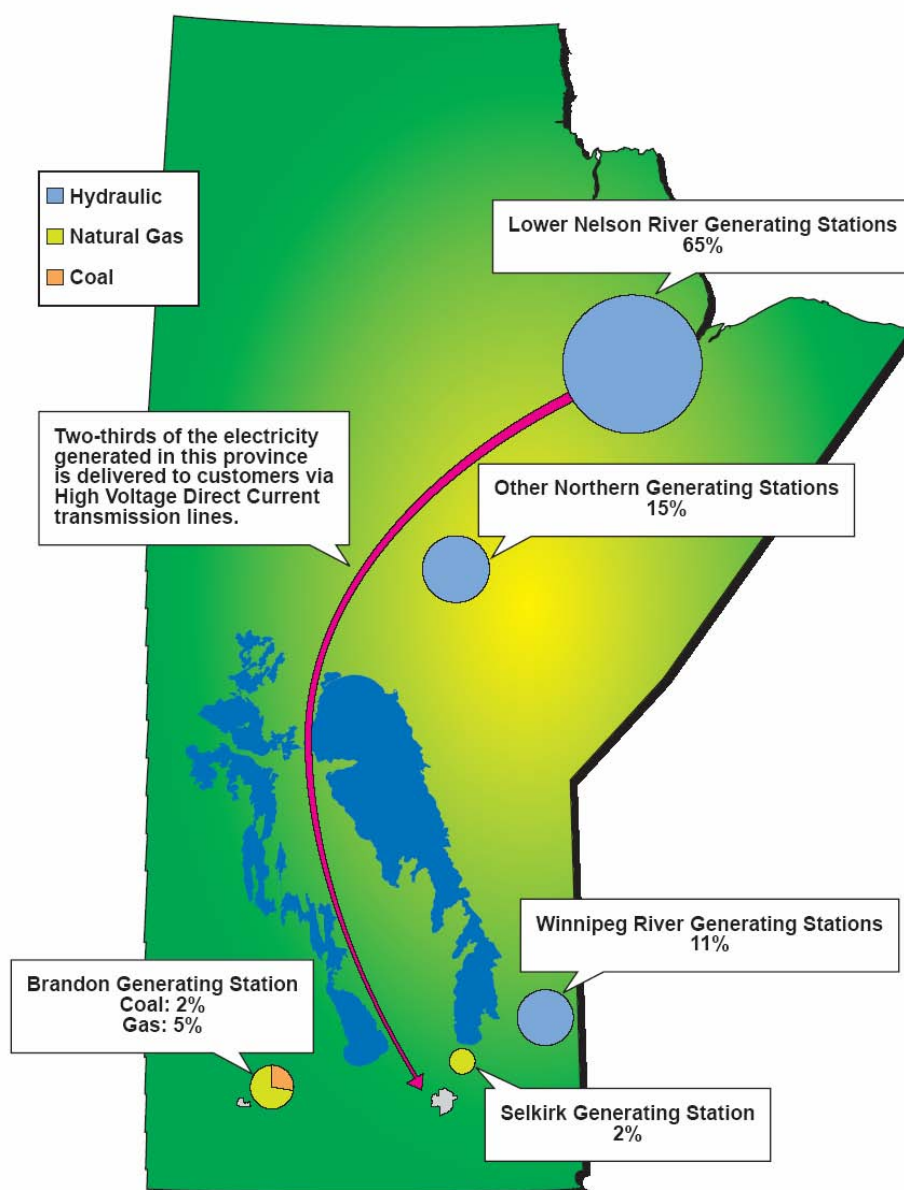


**Spill Response Training Exercise
Brandon Emergency Support Team (BEST)**

SYSTEM SUPPORT

- ◆ Unit 5 is a reliable source of power located closer to population centres than hydroelectric generation
- ◆ This is important during disruptions elsewhere on the system

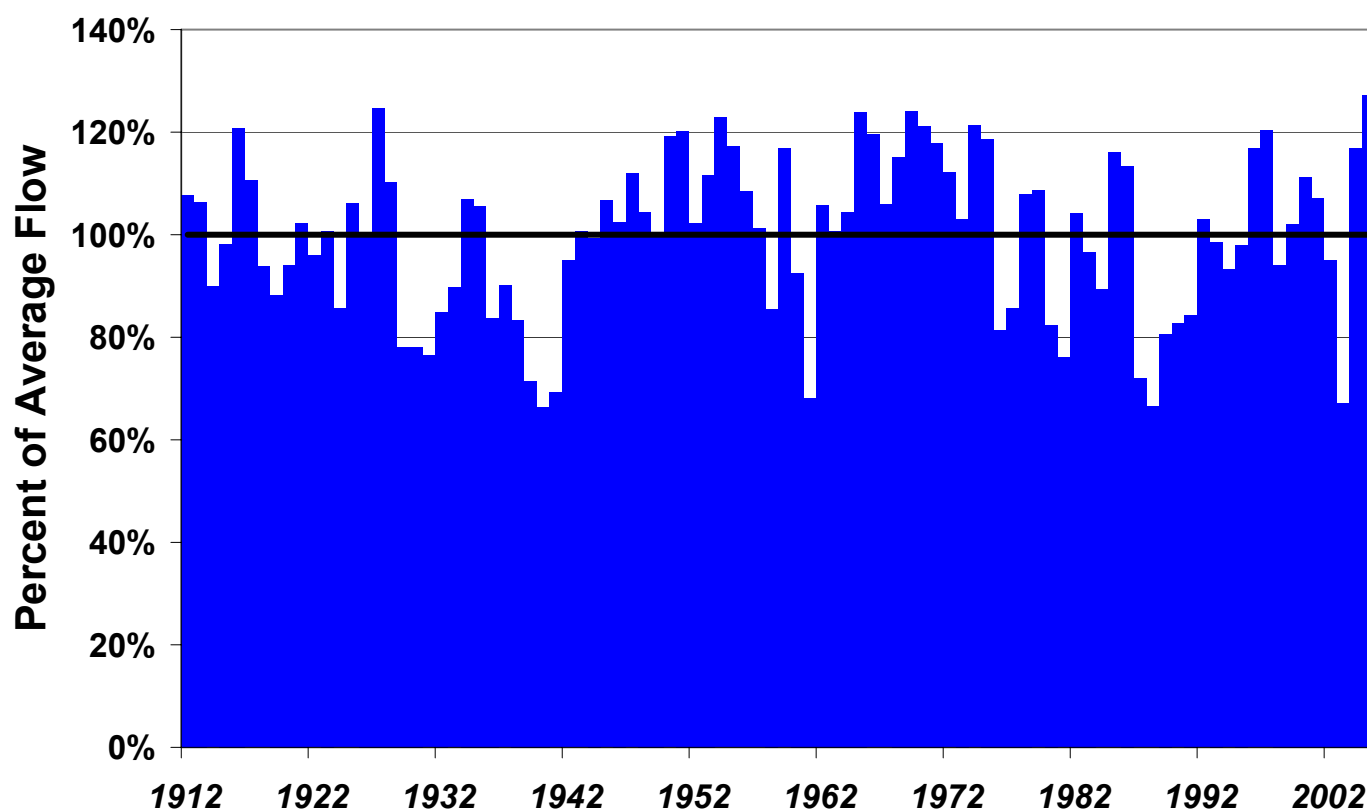
Manitoba Hydro's System



DROUGHT SUPPORT

- ◆ The hydroelectric system experiences highly variable water inflows from year to year
 - Unit 5 helps to fill in the valleys (i.e. the periods when inflows are poor)

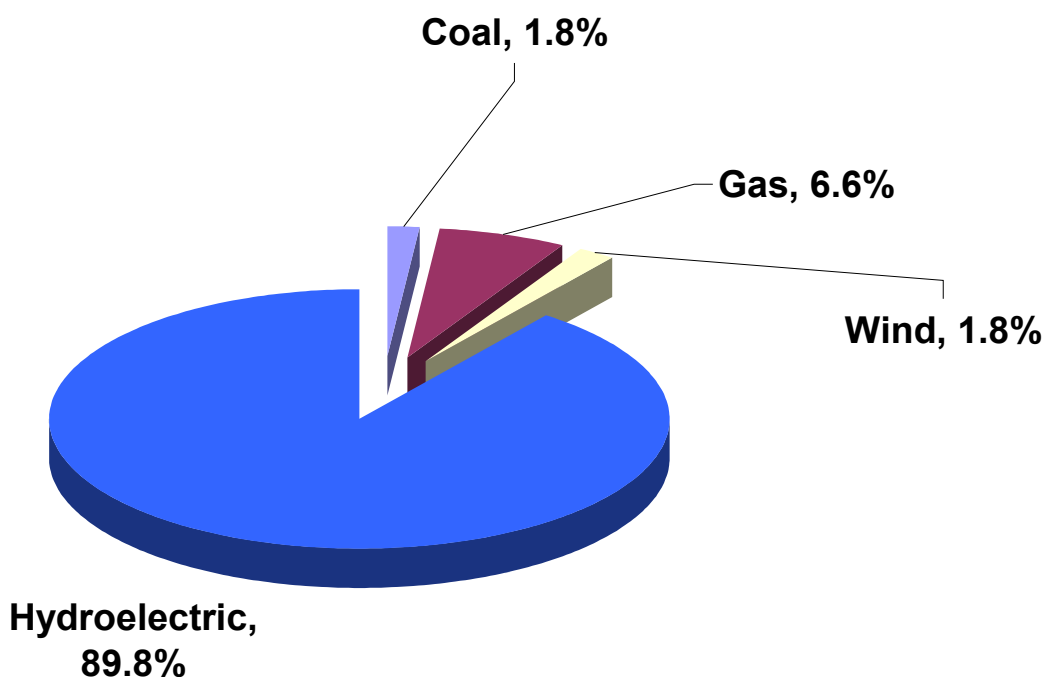
Manitoba Hydro System Inflow Variability



FINANCIAL STABILITY

- ◆ A certain amount of thermal generation is a good complement to hydro resources
 - Natural gas and coal are the two fuels used at thermal generating stations
- ◆ The choice of fuels provides operational flexibility and financial stability

Manitoba Hydro Sources of Supply



UNIT 5

ENVIRONMENT ACT LICENCE

◆ The Environment Act Licence defines the operating conditions and limits for Unit 5

◆ Restrictions are in place on air emissions of:

- SO₂ (sulphur dioxide)
- NO_X (oxides of nitrogen)
- PM (particulate matter)
- Fugitive dust
- Noise



◆ Restrictions are in place on liquid effluent:

- pH (how acidic or basic the discharge is)
- TSS (Total Suspended Solids)
- Oil & Grease
- Copper and Chlorine

ENVIRONMENTAL STUDIES

- ◆ **The studies address the environmental effects resulting from:**
 - **Water Use**
 - **Wastewater Discharge**
 - **Land Use**
 - **Air Emissions**
 - **Noise Emissions**

- ◆ **A Human Health and Ecological Risk Assessment has also been conducted**

Brandon Unit 5 Environmental Emissions & Controls



LEGEND

1. Air Emissions from Unit 5
2. Electrostatic Precipitator: Removes > 98% of particulate air emissions
3. Liquid Effluent from Ash Lagoon: Water is used to sluice ash to the lagoon where it settles and the decant water is discharged to the Assiniboine River
4. pH Control of Ash Lagoon Effluent Discharge
5. Drainage Ditch
6. Fugitive Dust from Coal Pile & Ash Storage: Water is sprayed on the coal pile or activities stopped to reduce dust
7. Cooling Tower: Eliminates the discharge of heated water to the Assiniboine River
8. In-Plant Controls: Oil containment/mitigation equipment, coal dust collection system, on-site emergency response crew and equipment
9. Noise (not shown)

WATER USE

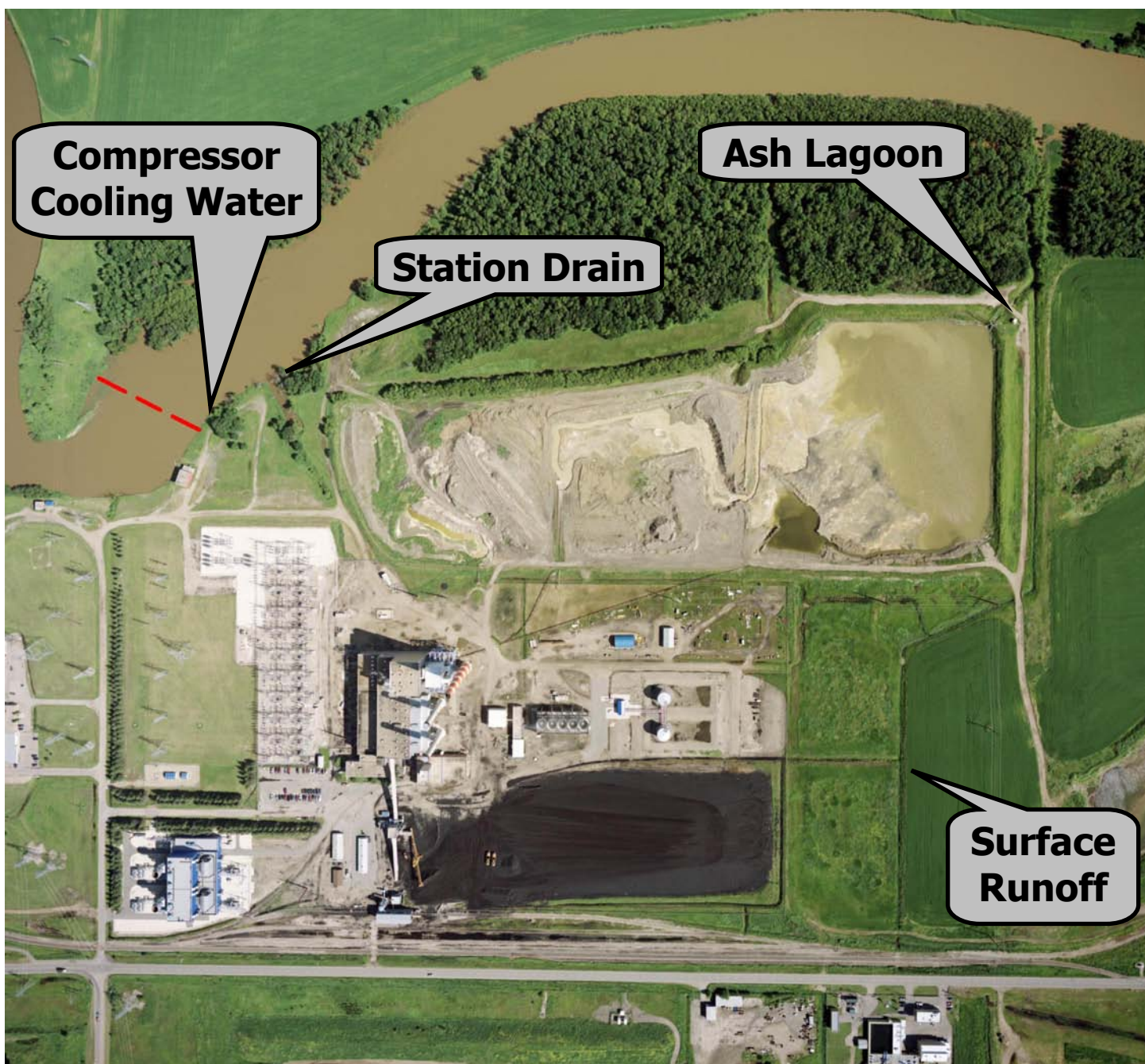
- ◆ Water is withdrawn from the Assiniboine River for several plant processes
- ◆ Construction of a cooling tower in the mid-1990s greatly reduced water withdrawal
- ◆ A fish screen was installed on the water intake in 2002



- ◆ Given the small proportion of river flow withdrawn and the screen on the water intake, there is no significant negative effect to aquatic life

WASTEWATER DISCHARGE

◆ Wastewater is discharged to the Assiniboine River from four sources:



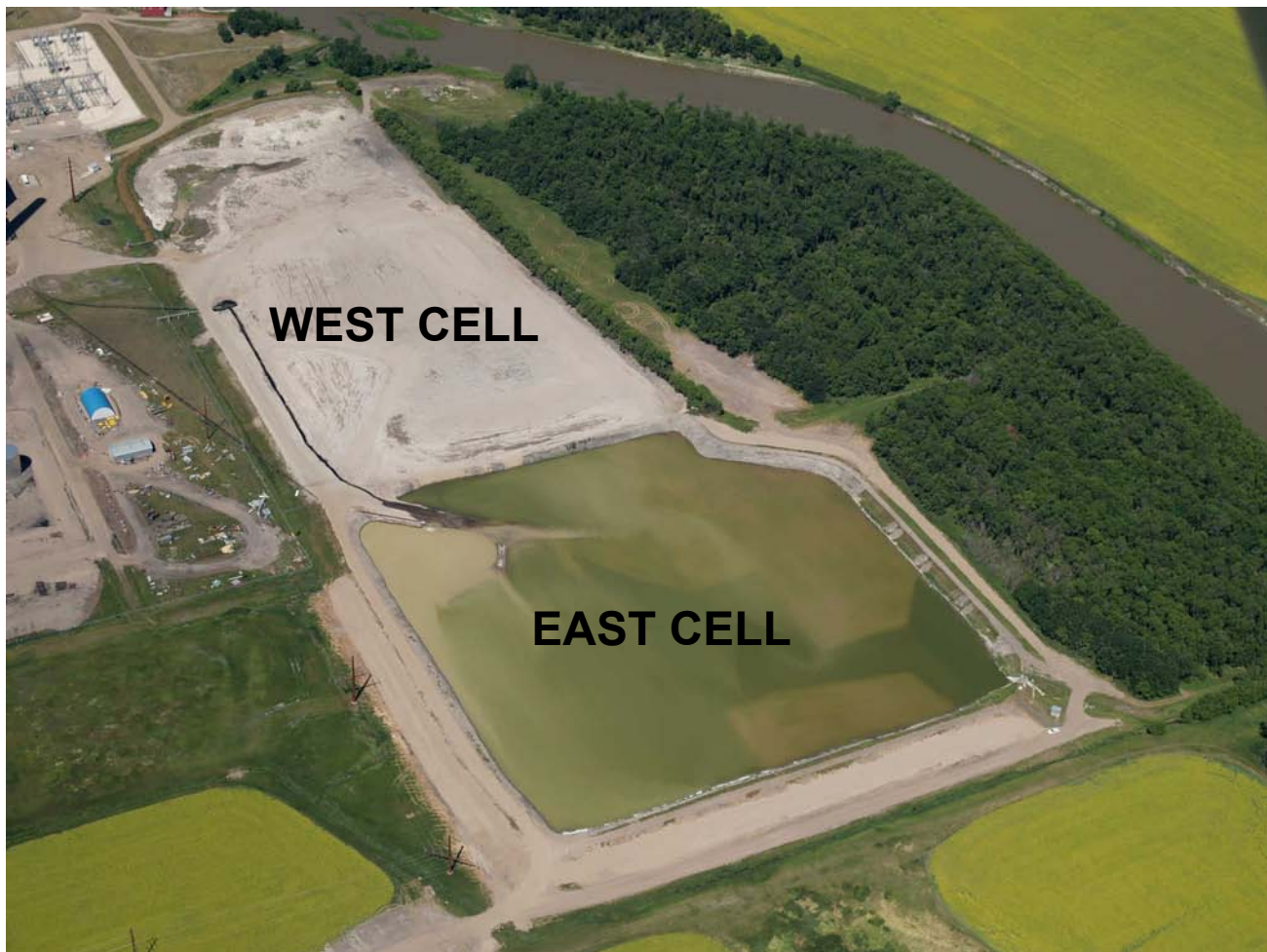
ASH LAGOON DISCHARGE

- ◆ **The largest volume of wastewater is from the ash lagoon**
- ◆ **The wastewater contains substances present in the raw river water and material from the coal ash that does not settle in the lagoon**
- ◆ **Laboratory tests using rainbow trout show that the wastewater is not toxic under normal operating conditions**
- ◆ **Comparisons of wastewater to environmental guidelines and the river water indicate that there is no significant negative effect on river water quality**

◆ **The wastewater does not have a significant negative effect on river water quality as it pertains to aquatic life or other uses (e.g., recreation)**

LAND

- ◆ Studies included an assessment of vegetation, groundwater, soils, wildlife and wildlife habitat
- ◆ Capping and seeding the west cell of the ash lagoon will return the land to a more natural state



- ◆ Continued operation of Unit 5 is not expected to result in any significant effects to these resources

GROUNDWATER

- ◆ The results of Manitoba Hydro's on-going groundwater monitoring program indicate that water quality has not been affected.
- ◆ Although higher levels of some of the trace elements have been recorded in some of the monitoring wells, adverse effects due to groundwater seepage to the river are not expected.



- ◆ Continued coal storage and ash management activities are not expected to adversely effect water quality.

AIR QUALITY

- ◆ **3 computer models (Approved by Manitoba Conservation) were used to predict the affect of Unit 5 operation on ambient air quality**
- ◆ **The models considered several scenarios:**
 - **Unit 5 stack emissions (at maximum load)**
 - **Unit 5 in combination with Units 6 & 7 stack emissions**
 - **Fugitive dust from coal and ash storage**
 - **Cooling tower emissions**
- ◆ **Two conditions were used for Unit 5 stack emissions:**
 - **stack measurements taken in 2005 with the current coal supply**
 - **predicted worst case stack emissions based on all acceptable coal supplies available**
- ◆ **The model results were compared to federal and provincial air quality standards, objectives and guidelines**

MODEL RESULTS

ACUTE (SHORT-TERM) EXPOSURE

- ◆ **Carbon monoxide (CO), and sulphur dioxide (SO₂) concentrations would not exceed Manitoba Maximum Acceptable Ambient Air Quality Objectives**
- ◆ **Nitrogen dioxide (NO₂) concentrations:**
 - **Realistically would not exceed the Manitoba Maximum Acceptable Ambient Air Quality Objective**
 - **Exceed the Objective 1 hour per year under the hypothetical case of 100% conversion of NO to NO₂**
- ◆ **Fine Particulate Matter (PM_{2.5}) concentrations:**
 - **Would not exceed Canada-Wide Standards**
- ◆ **Suspended Particulate Matter (SPM) concentrations:**
 - **Fugitive coal dust emissions may approach provincial maximum acceptable objectives, adding to exceedences near the station that already result from other sources**
- ◆ **Predicted concentrations of selected volatile organic compounds (VOCs) and trace inorganic elements are below any established provincial ambient air quality objectives**

MODEL RESULTS

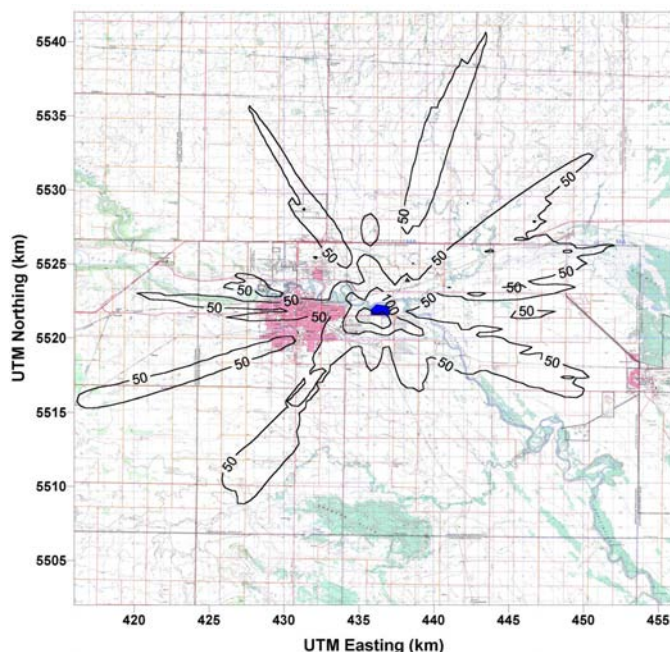
CHRONIC (LONG TERM) EXPOSURE

- ◆ **Annual average concentrations of common air pollutants (CO, NO₂, SO₂, SPM, PM₁₀ and PM_{2.5}):**
 - **Are insignificant relative to Provincial and Federal ambient air quality objectives and guidelines**
- ◆ **All predicted concentrations of trace organics are very low:**
 - **PAH – 1 million to 100 million times lower than in downtown Winnipeg**
 - **Dioxins/furans – 1 billion to 100 billion times lower than in downtown Winnipeg**
- ◆ **96-98% of mercury deposited in the Brandon area is from other sources in North America and overseas (Asia)**

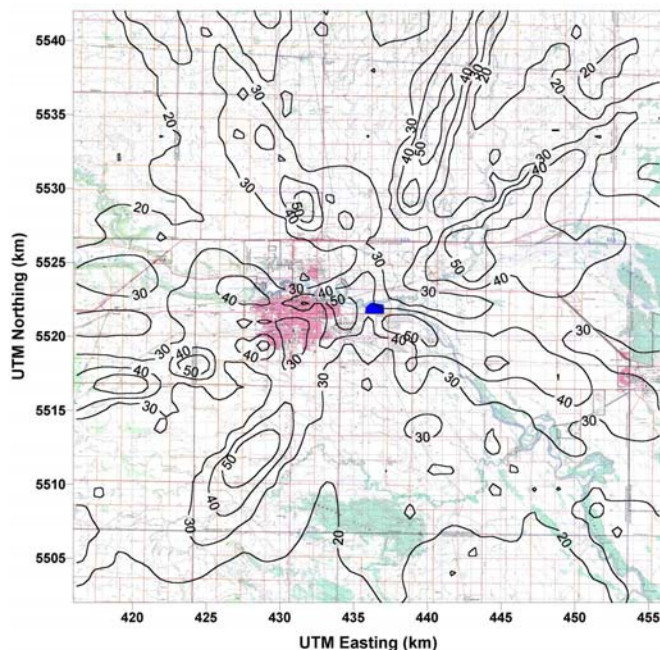
NO₂ – NITROGEN DIOXIDE

PREDICTED MAXIMUM 1-HOUR CONCENTRATIONS ($\mu\text{g}/\text{m}^3$)

100% NO to NO₂ Conversion



Janssen Method Conversion

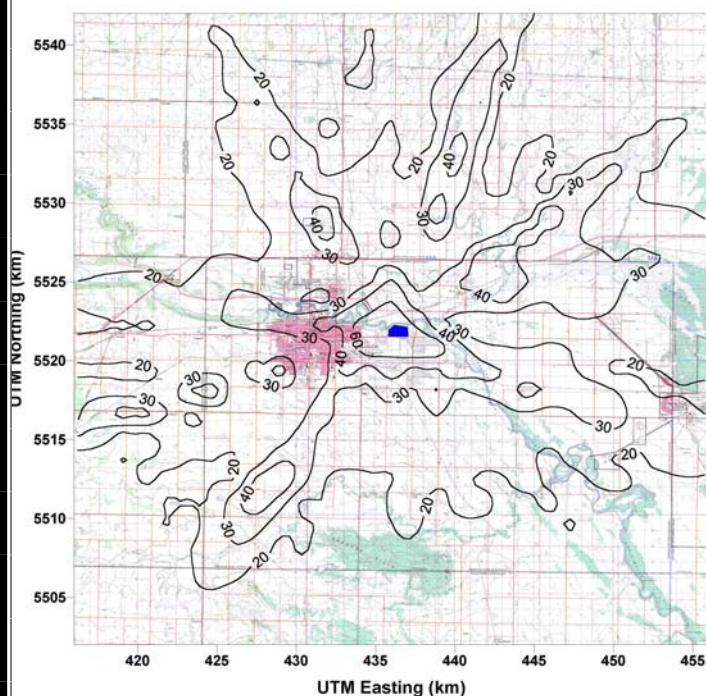


- ◆ **Would not exceed Air Quality Objectives for short term exposure**
- ◆ **Insignificant for long term exposure**
- ◆ **One exception is a hypothetical 1-hour per year exceedence of NO₂ at stack tip**

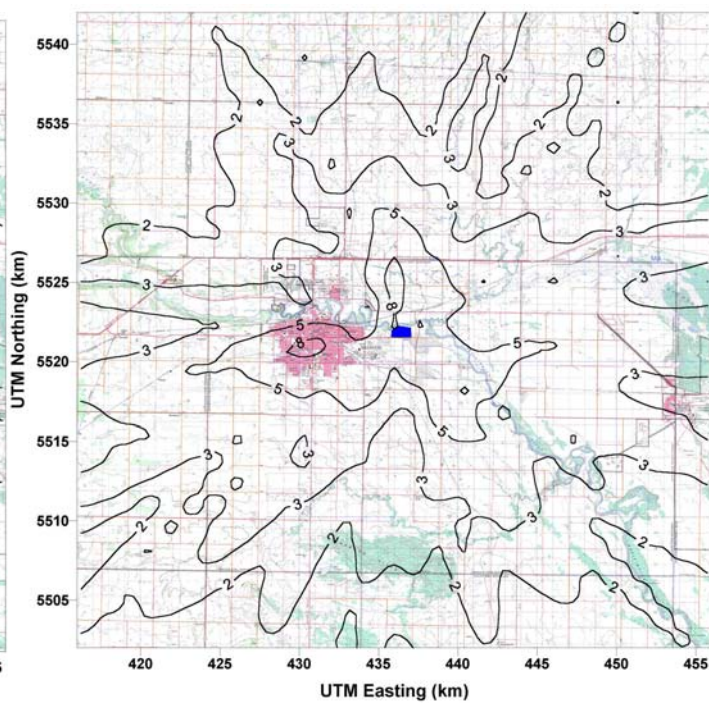
SO₂ – SULPHUR DIOXIDE

PREDICTED MAXIMUM CONCENTRATIONS ($\mu\text{g}/\text{m}^3$)

1-hour average



24-hour average



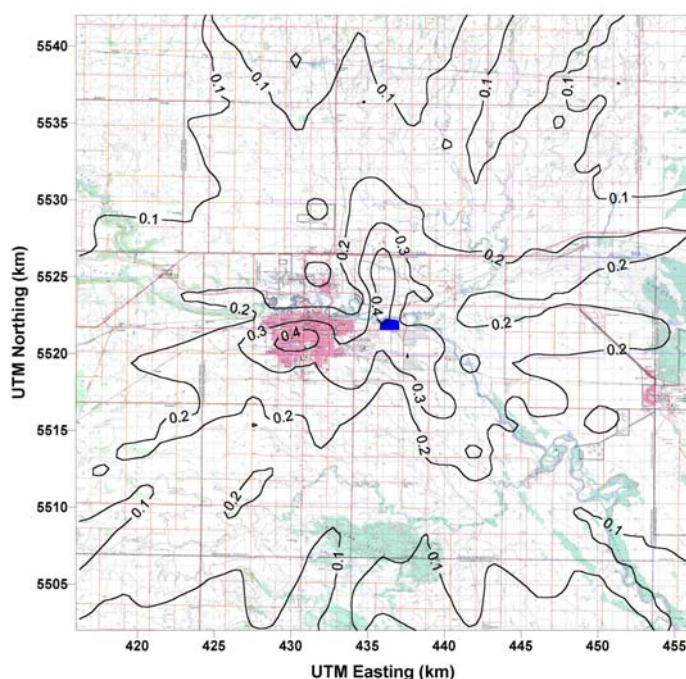
- ◆ Would not exceed Air Quality Objectives for short term exposure
- ◆ Insignificant for long term exposure

PM₁₀ & PM_{2.5}

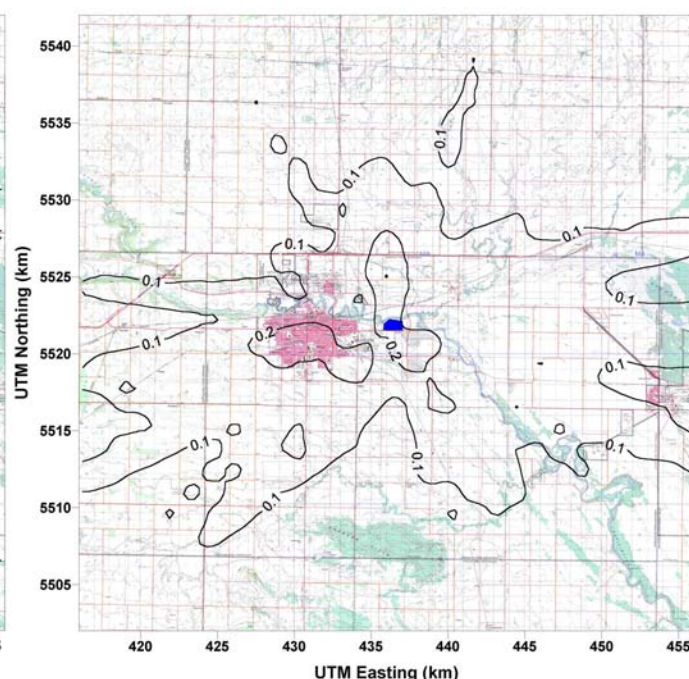
FINE PARTICULATE MATTER

PREDICTED MAXIMUM 24-HOUR CONCENTRATIONS ($\mu\text{g}/\text{m}^3$)

PM₁₀



PM_{2.5}



◆ Fine Particulate Matter (PM_{2.5}) concentrations:

- Would not exceed Canada-Wide Standards for short term exposure
- Insignificant for long term exposure

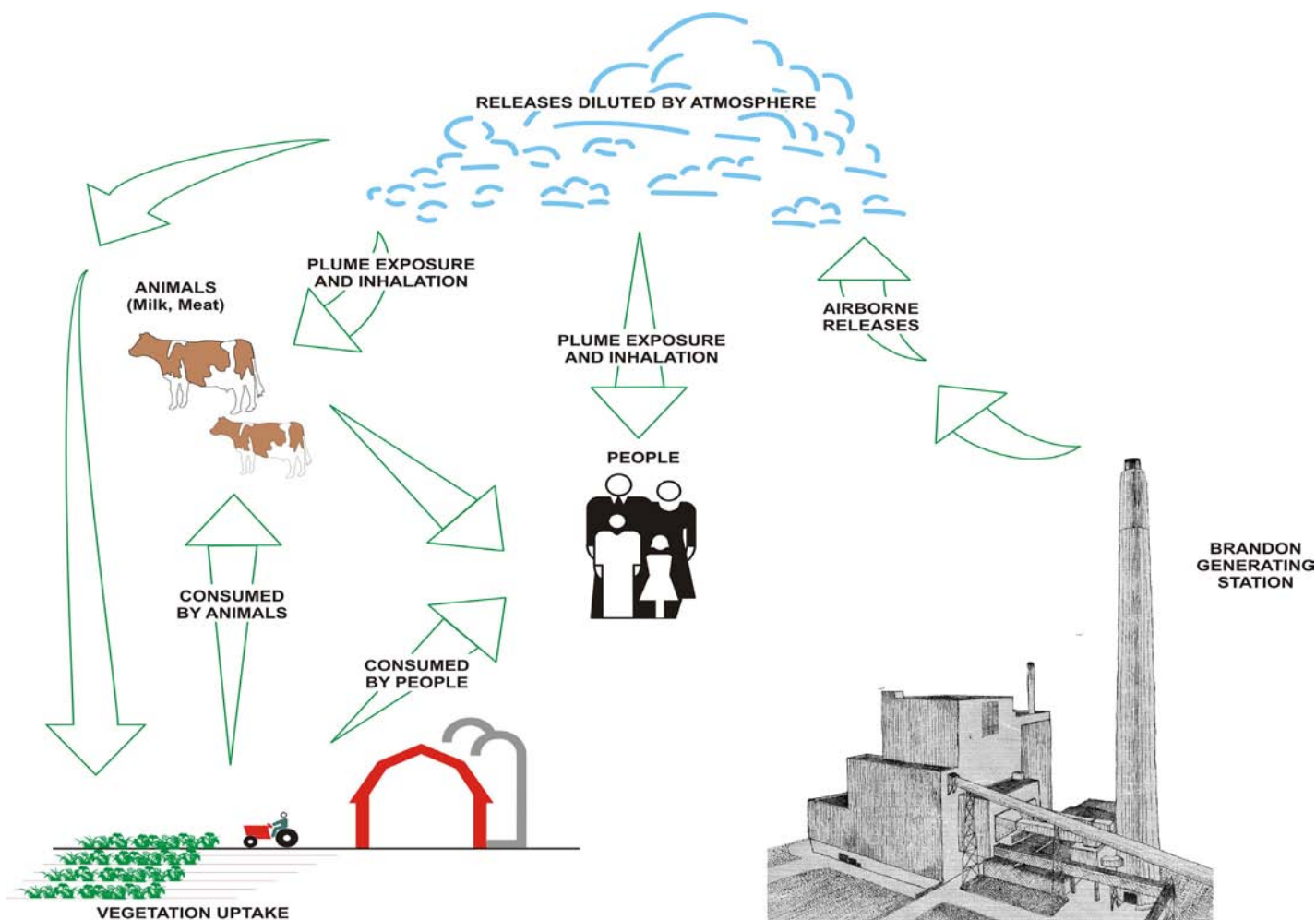
HUMAN HEALTH

RISK ASSESSMENT

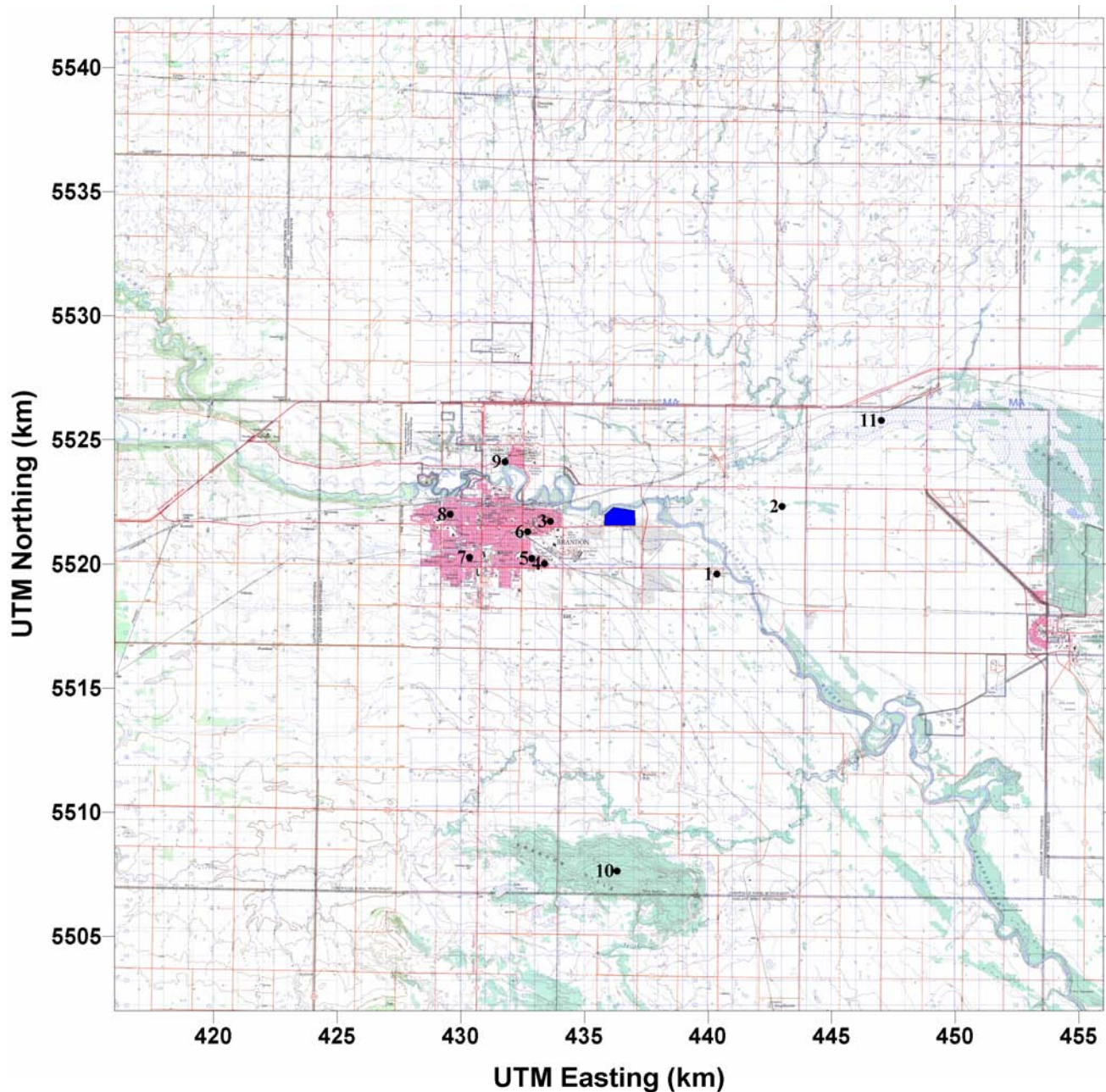
- ◆ The air quality model results were input to a human health risk model
- ◆ The cancer risk values for long-term exposure to trace metals, VOCs and PAHs are all at least 100 times lower than the acceptable risk level (one-in-one hundred thousand)
- ◆ In residential areas of Brandon, the predicted PM_{2.5} concentrations are below measurable levels (i.e. non-detectable)



◆ No measurable adverse health effects are expected in the community from the operation of the Brandon G.S.

POTENTIAL PATHWAYS OF EXPOSURE FOR HUMAN RECEPTORS



RECEPTOR LOCATIONS

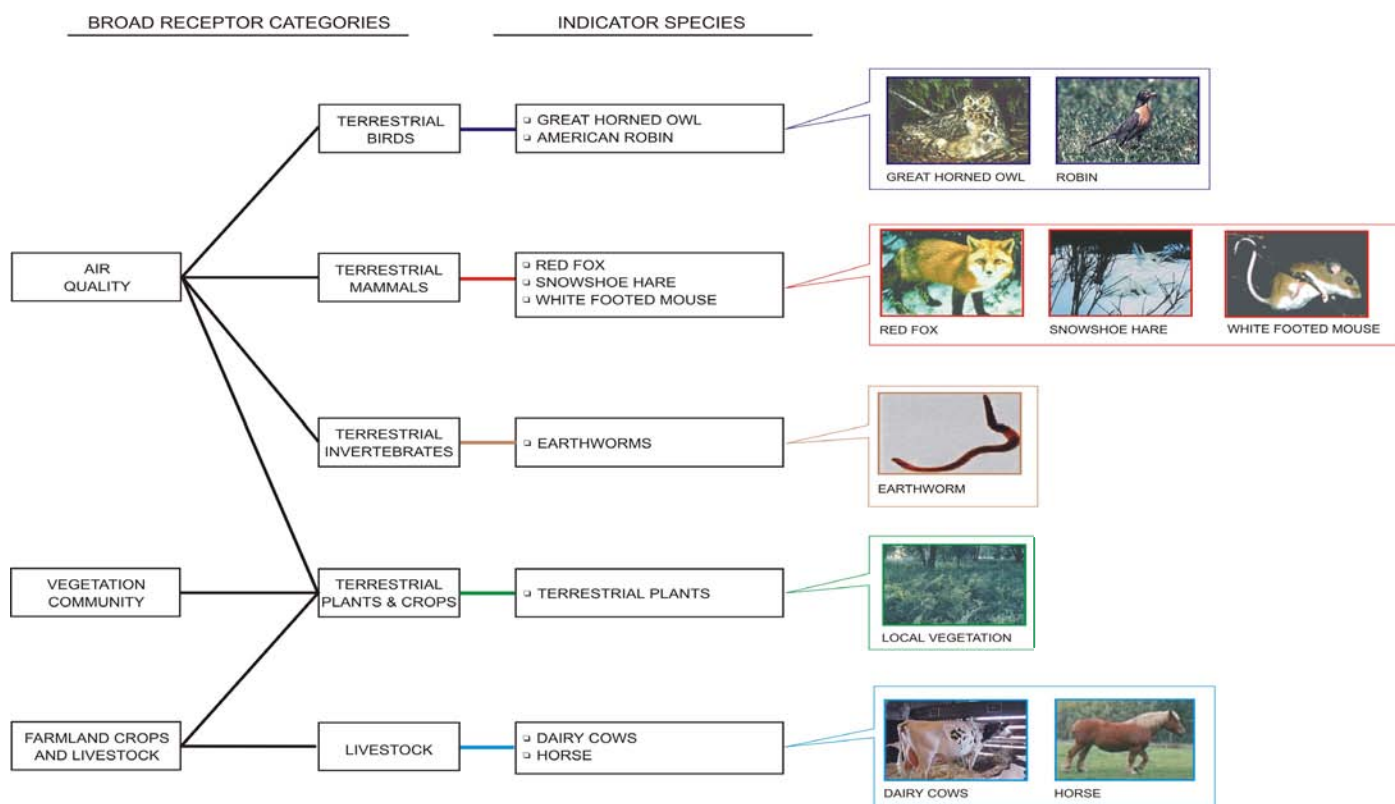


-  Brandon Generating Station
-  Discrete Receptor Location

ECOLOGICAL

RISK ASSESSMENT

- ◆ The air quality model results were input to an ecological risk model
- ◆ Includes vegetation as well as wild animals and livestock and covers a range of possible exposure scenarios



◆ No measurable adverse ecological effects are expected from the operation of the Brandon G.S.

SUMMARY

OF

AIR QUALITY CONCLUSIONS

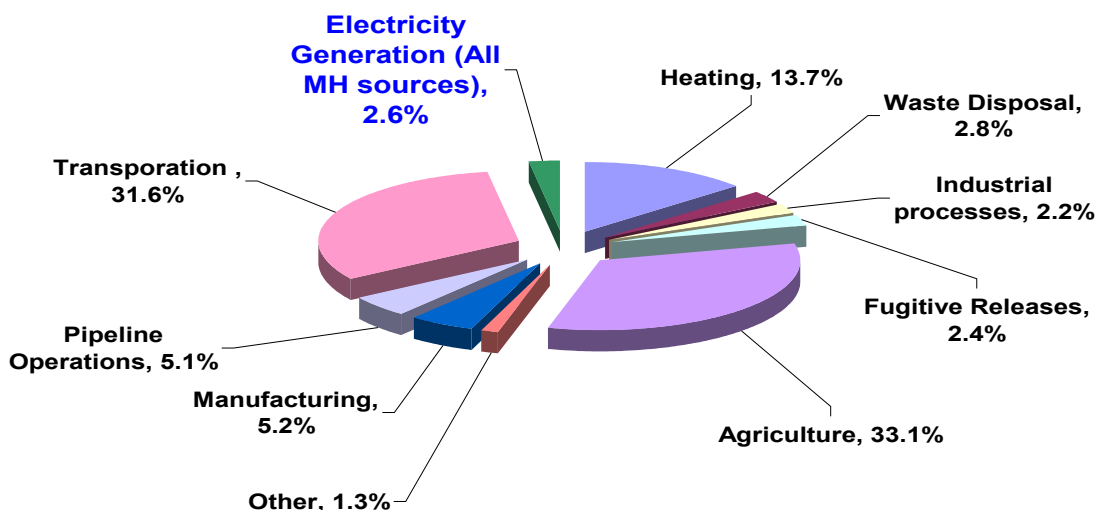
- ◆ **All air quality objectives are in compliance**
- ◆ **Observed high SPM and PM₁₀ levels in the area are due to other sources of emission (e.g., agricultural activity and open burning)**
- ◆ **No measurable adverse health effects are expected**
- ◆ **No measurable adverse ecological effects are expected**

GREENHOUSE GAS AND MERCURY MITIGATION PROGRAMS

- ◆ **Manitoba Hydro is committed to voluntarily reducing its net average corporate GHG emissions to 6% below 1990 levels over the 1991 to 2007 period**

1999 GHG Emissions in Manitoba, by Source

Source: Manitoba Government - Energy, Science and Technology
<http://www.gov.mb.ca/est/climatechange/ghg/>



- ◆ **Annual mercury emissions are capped at 20 kg**
- ◆ **In the future, as mandatory regulations for GHG and mercury emissions are implemented, Unit 5 emissions will be managed to ensure compliance**

NOISE

- ◆ Two noise studies were undertaken:
 - A background noise study
 - A modelling study to assess Brandon G.S. noise levels



- ◆ Sound levels do not influence the noise environment at the nearest residential locations
- ◆ Sound levels are predicted to be below those stipulated in the operating License

YOUR COMMENTS

- ◆ The study team needs your input to identify the potential issues of concern to local residents
- ◆ Do you have any questions concerning the operation of Brandon Unit 5
- ◆ Do you have specific concerns you would like us to address in this Licence Review

**PLEASE TAKE THE TIME TO FILL OUT THE
COMMENT SHEET PROVIDED**

THANK YOU
FOR ATTENDING!

**Don't forget to complete a comment
sheet before you leave**

BRANDON GENERATING **STATION TOUR**

YOU ARE INVITED TO TOUR BRANDON GENERATING STATION

- ◆ **For safety reasons, attendance on the tour will be restricted to those 12 years of age and older**
- ◆ **Please sign our tour sheet for the next available tour**

PUBLIC OPEN
HOUSE

MANITOBA HYDRO
BRANDON GENERATING
STATION UNIT 5

ENVIRONMENT ACT
LICENCE REVIEW

MANITOBA HYDRO
BRANDON GENERATING STATION UNIT 5
ENVIRONMENT ACT LICENCE REVIEW

November 15, 2006

Thank you for attending this community open house.

1. Was this information useful in understanding the Licence Review?

2. Do you have specific concerns that were not addressed in the environmental studies completed as part of the Licence Review?

3. If you have a question or comment , please provide details and your contact information so that we can respond.

(Optional)

Name: _____

Address: _____

Phone: _____

Email: _____

Instructions: The completed form can be submitted in the following ways:

Drop off at this Open House, or at the Brandon G.S during business hours; fax to (204) 475-3646 (UMA) or 726-5847 (Brandon G.S.); or mail to UMA Engineering, 1479 Buffalo Place, Wpg., MB., R3T 1L7.



MANITOBA HYDRO
BRANDON GENERATING STATION UNIT 5
ENVIRONMENT ACT LICENCE REVIEW

November 15, 2006

Thank you for attending this community open house.

1. Was this information useful in understanding the Licence Review?

Yes

2. Do you have specific concerns that were not addressed in the environmental studies completed as part of the Licence Review?

No

3. If you have a question or comment , please provide details and your contact information so that we can respond.

Open House was an excellent information session. Posters & tours very informative

(Optional) Name: _____
Address: _____
Phone: _____
Email: _____

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North/South Consultants Inc.
Aquatic Environment Specialists

THANK YOU.



Manitoba Hydro

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BRANDON GENERATING STATION UNIT 5
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what a great tour !!
No QUESTIONS

(Optional) **Name:**____
 Address:____
 Phone:____
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