Numbers may not add due to rounding.

Table 1
Capital Project Listing - Regulated Hydroelectric
Projects >$10M Total Project Cost[1]

Line No.	Project Name	Project Summary Ref. No.	Category	Changes from EB-2007-0905	Start Date	Final In-Service Date	Total Project Cost ($M)	In-Service 2010 ($M)	In-Service 2011 ($M)	In-Service 2012 ($M)	2007 Actual ($M)	2008 Actual ($M)	2009 Actual ($M)	2010 Budget ($M)	2011 Plan ($M)	2012 Plan ($M)
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
	Project summaries for the following projects are included in this section of the application															
	Niagara Plant Group															
1	Niagara Tunnel Project	EXEC0007	Value Enhancing	Ongoing	2005	Dec-13	1,600.0	0.0	0.0	0.0	63.9	131.3	213.5	241.8	288.0	199.0
2	DeCew Falls I GS - Penstock and Saddle Replacement	DCW10019	Sustaining	New	2009	Apr-11	10.3	5.1	5.2	0.0	0.0	0.0	3.0	6.2	1.1	0.0
3	Sir Adam Beck I GS - Unit G9 Upgrade	SAB10047	Sustaining	Ongoing	2008	Dec-10	32.1	32.1	0.0	0.0	0.0	0.9	13.6	17.6	0.0	0.0
4	Sir Adam Beck I GS - Unit G10 Upgrade	SAB10050	Sustaining	Ongoing	2012	Dec-14	29.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4
5	Sir Adam Beck I GS - Unit G3 Upgrade	SAB10064	Sustaining	Ongoing	2011	Dec-12	29.4	0.0	0.0	29.4	0.0	0.0	0.0	2.0	12.5	15.0
6	Sir Adam Beck I GS - Rehabilitate Canal Lining (H-98-0053)	SAB10056	Sustaining	Deferred	2016		121.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Sir Adam Beck I GS - Unit G7 Frequency Conversion	SAB10032	Value Enhancing	Completed	2007	Jun-09	27.6	0.0	0.0	0.0	6.1	17.8	3.7	0.0	0.0	0.0
8	Sir Adam Beck Pump GS - Dyke Foundation Grouting	SABP0022	Sustaining	Deferred	2016		21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Saunders GS															
9	St. Lawrence Power Development Visitor Centre	HOSL0005	Sustaining	New	2008	Sep-10	12.0	12.0	0.0	0.0	0.0	0.5	7.2	4.7	0.0	0.0
10	Replace Generator Protection & Control Upgrades	SAUN0047	Sustaining	Ongoing	2009	Mar-12	21.1	1.1	17.0	3.0	0.0	0.0	3.9	8.3	8.1	0.5
11	Station Service Replacement	SAUN0080	Sustaining	New	2011	Dec-17	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9
12	Replace HVAC System	H-97-1854	Sustaining	Completed	2007	May-08	11.4	0.0	0.0	0.0	8.0	3.0	0.0	0.0	0.0	0.0
13	Total						1,926.6	50.3	22.2	32.4	78.0	153.5	244.9	280.6	309.9	217.7

Notes
1 Projects with expenditures during Test Period or in-service amounts during the Bridge Year.

Cap Pay

Energy Probe Interrogatory #024

Ref: Ex. D1-T1-S2

Issue Number: 4.2
Issue: Are the capital budgets and/or financial commitments for 2011 and 2012 for the regulated hydroelectric business appropriate and supported by business cases?

Interrogatory

Lines 19-21 on Page 11 of the exhibit makes the following statement: "The project will allow OPG to more effectively deliver its hydroelectric communications (e.g., water safety) while improving community support for continued operation of OPG's second largest hydroelectric generating station."

a) How many visitors to the centre does OPG expect annually?

b) Please explain how the project will assist with delivery of the water safety message.

c) Has OPG experienced a decline in community support for the Saunders plant? Please provide any documentation that demonstrates this decline.

Response

a) Exact visitor numbers are not available. However, OPG is expecting this venue to be quite busy based on: 1) the popularity of the former energy information center located on the sixth floor of the plant administration building, and 2) the response received from stakeholders.

b) The water safety message will be integrated with the story of how the generating station was built and the ongoing impact and importance of hydroelectric energy production in the province of Ontario.

c) The recent community issues centre around the fact that OPG does not pay municipal taxes to the City of Cornwall since the introduction of Gross Revenue Charges in 2001 (see Ex. F1-T4-S1). These issues are described in a speech made by John Murphy, Executive VP – Hydroelectric, to the City of Cornwall Chamber of Commerce in 2008, which is Attachment 1 to this response.

Filed: 2010-08-12
EB-2010-0008
L-06-024
Attachment 1

John Murphy
Executive Vice President: Hydro
Ontario Power Generation
Cornwall Ontario
February 11, 2008

NOTES FOR REMARKS

Introduction

Thank you for that introduction, John. Good afternoon, everyone. I appreciate the opportunity to meet with you and talk a bit about OPG. I have looked forward to this event for some time. I enjoy the Cornwall area and am looking forward to getting to know many of you better.

OPG and the Cornwall community share a long and productive history going back some 50 years and more. Over the next few minutes, I'd like to share with you my thoughts on our relationship and some of the ways we intend to enhance it going forward.

Overview of OPG

Before doing that, I want to first give a brief update of OPG and our operations. As you'll see, a lot has been happening that you may find interesting.

For those who may not be familiar with us, OPG was established as a commercial company in 1999. 100 per cent of the company's shares are owned by the Province of Ontario.

Our primary business is to generate electricity. Unlike our predecessor, Ontario Hydro, we are not responsible for generating virtually all of Ontario's electricity needs. We are one of several producers within Ontario's hybrid electricity market.

We are, however, the largest electricity producer in Ontario and generate about 70 per cent of the electricity consumed in the Province. We do this through our balanced and flexible portfolio of nuclear, fossil-fuelled, and hydroelectric generating stations. As you will hear from me today, we are proud of the role we fulfill in the market and the electricity we provide to Ontario.

Nuclear Operations

The nuclear side of our business consists of three nuclear stations in the Durham region east of Toronto. We operate 10 nuclear reactors at these facilities and are in the process of placing two others in safe storage. Our nuclear units represent about 30 per cent of our installed generating capacity. In 2007, they produced about 29 per cent of all the electricity consumed in Ontario.

Our Darlington nuclear station, which had an excellent year in terms of performance, produced nearly 18 per cent of Ontario's electricity in 2007. Darlington is recognized by its peers as one of the top performing nuclear stations in North America.

(4)

Filed: 2010-08-12
EB-2010-0008
L-06-024
Attachment 1

We are currently exploring the prospect of building potential new nuclear units at our Darlington site, to meet Ontario's growing electricity needs. If approved by our Shareholder, this will be a significant undertaking, creating major employment and other opportunities for many local communities in Ontario.

We are also exploring the possibility of refurbishing our Pickering B and Darlington nuclear stations as they approach the end of their performance lives. Since we're a commercial company, any decision to proceed with either of these refurbishments will be based on a solid business case.

Fossil Operations

OPG also operates five fossil-fuelled stations across Ontario, accounting for approximately 30 per cent of our capacity. These stations are used primarily to help meet periods of peak electricity demand each day and are especially valuable in meeting electricity needs when demand is at its highest – such as in the summer. Their ability to start up and shut down relatively quickly makes them ideal for this task. OPG takes pride in operating its fossil stations in an environmentally responsible manner. Today, they generate fewer smog-producing emissions than in the 1980s, while generating the same amount of electricity or more. We have also launched a biomass testing program at some of our fossil plants to help reduce carbon dioxide emissions.

Another of our fossil initiatives is the Portlands Energy Centre which we are constructing in downtown Toronto in partnership with TransCanada Energy. Portlands is a 550 MW combined cycle gas facility. The project is on budget and on time and will be producing its first power this summer. It will be fully operational in 2009.

Turning from gas to coal, OPG has been directed by our Shareholder to stop burning coal at its coal-fired stations by 2014. Between now and then, we will continue to operate them efficiently, productively and responsibly – with targeted investments to maintain their operational strength. This strategy has contributed to improved reliability at our fossil stations. In 2007, our fossil reliability was the best it's been since 2000.

Hydroelectric Operations

I now want to turn to what I consider the best part of generating fleet – our hydroelectric business. OPG owns and operates 64 hydroelectric stations and over 238 dams on 26 rivers across Ontario. These stations have an average age of 73 years – the youngest being 13 years and the oldest being 108 years old. Our Chats Falls station on the Ottawa River recently celebrated 75 years of service.

As you would expect, it's critical to keep these assets well maintained. And we do. Since 1992 our runner upgrade program has added over 425 MW to our hydroelectric capacity – including 12 MW in 2007.

Filed: 2010-08-12
EB-2010-0008
L-06-024
Attachment 1

Good maintenance and equipment reliability also contributed to the excellent availability of our hydro stations. In 2007, our hydro stations were available to produce electricity well over 90 per cent of the time when the water was there. That is the best availability rate we have had since 1984 and represents top quartile performance with the industry.

Overall, our hydro stations account for 31 per cent of OPG's capacity and in 2007 produced 21 per cent of all electricity consumed in Ontario.

Hydroelectric Expansion

Our hydroelectric stations are extremely valuable assets for the Province. The power they produce is clean, renewable, cost effective and reliable. This is no small advantage in a world deeply concerned about preserving clean air and mitigating climate change.

The Ontario government has recognized the importance of hydropower and has made it part of OPG's mandate to expand our hydroelectric presence in Ontario. We currently have two design-build projects whose construction we are overseeing.

One is the Niagara Tunnel, which is a 10.4 kilometre tunnel being excavated under the city of Niagara Falls. It will allow our Beck generating stations to increase their average annual energy output by 1.6 TWh – which is enough energy to power a city twice the size of Niagara Falls. Once constructed, the tunnel will remain in service for about 100 years before any maintenance is needed. I wish I could say that same thing about my car's operating performance!

Our other project is the 12.5 MW Lac Seul hydroelectric station in northwest Ontario, which we expect to have finished later this year.

In addition to these initiatives, we also have a number of proposed hydroelectric projects in various stages of development across Ontario. These include a major expansion project on the Lower Mattagami River that would add about 450 MW to our hydro capacity...as well as smaller potential projects on the Upper Mattagami, Abitibi, Montreal, and Little Jackfish Rivers and elsewhere.

In addition, this past December the Ontario Ministry of Energy directed a key agency – the Ontario Power Authority – to negotiate Energy Supply Agreements on many of these proposed projects. This will provide revenue certainty to OPG and will significantly facilitate their progress.

Our progress on many of these projects is dependent on reaching successful settlements – including equity participation agreements – with First Nations groups. OPG has an official First Nations policy approved by our Board of Directors. We also have a number of outreach initiatives underway within First Nations communities. In 2007, we settled two past grievances with First Nations groups and signed Agreements in Principle with three others to resolve outstanding issues. We are currently conducting a number of additional negotiations and discussions with other First Nations communities. We look forward to their positive outcome.

OPG and the Cornwall Community

As you can see, hydroelectric power and its ongoing development are very much on OPG's agenda. We are committed to hydropower and we are committed to communities that host our hydroelectric facilities and other assets. This includes the Cornwall community – where we've had a relationship, as I said, for more than 50 years.

And the foundation of our relationship – its bedrock, if you will – is the R.H. Saunders generating station right out there on the great St. Lawrence River.

Saunders is celebrating its 50th year of operation this year. It's the flagship station in our hydroelectric fleet. Along with our Beck generating stations near Niagara Falls, it is the most prestigious and storied of all our assets. It's also a symbol of our commitment to this community.

That commitment is strong. It's based on trust, accountability, openness and responsibility – a responsibility to do our part and to give back to the community by contributing to its quality of life and economic development.

Over the years, OPG has lived up to its responsibility. Here are a few examples of how we contribute:

- Since 1990, OPG and its predecessor company – Ontario Hydro – have invested about $140 million dollars in the Saunders generating station to maintain the plant's high level of reliability. We plan to continue to make investments that will improve the performance of the station. These investments often benefit local businesses and other elements of the community.

- Also at Saunders, we employ about 65 employees. Many live in the region, own homes and raise their families here. In doing so, they contribute around $4 million annually to the local economy through consumer spending

- In 2007, our Corporate Citizenship Program contributed $95,000 to help support nearly 50 local initiatives. These included the Cornwall Community Hospital; Future Arena Project; Liftoff 2008; the City of Cornwall Alert Network; Seaway Valley Crime Stoppers, the St. Lawrence River Institute; and the Eastern Ontario Children's Water Festival.

- Our most recent effort was a $25,000 donation made last month to the Cornwall Community Hospital Foundation to help fund a new ultrasound machine.

- OPG also helps support many cultural, environmental, health-related, and amateur sports initiatives across the community. In June of last year, we contributed substantially to the construction of a new beach house for the Village of Iroquois.

Filed: 2010-08-12
EB-2010-0008
L-06-024
Attachment 1

- On the safety front, around 3,000 students in Cornwall and the United Counties received information last year on water safety. This information was communicated through presentations in schools; at local fairs; at community events; and at venues like the Eastern Ontario Children's Water Festival.

- We also supported, through advertising, the new Akwesasne Lacrosse Stadium field.

- In keeping with our commitment to openness and transparency, we mailed out last December more than 140,000 copies of our Ottawa/St. Lawrence Plant Group newsletter – *Neighbours* – to residents throughout our host communities.

- Each year OPG also provides achievement awards to six area high schools to help graduating students. Two awards are given to each school and are individually valued at $500.

These are representative examples only. If I added up all the initiatives OPG has helped support in Cornwall over the past three years, they would total more than 100 – at a value of about $150,000. This is in addition to the numerous hours of volunteer work our employees willingly perform in the community.

These contributions are not hand-outs or charity. They are investments that we believe help contribute to the quality of life in the Cornwall area. You have given us your advice, your trust and the licence to operate in your community. As a good corporate citizen, it is only natural that we would want to invest in the community that has given us so much. This is a "win-win" situation. I believe it's helped solidify the bonds between OPG and Cornwall and contributed to a more positive and effective partnership between us.

Tax Issue

Even the best relationships, however, are sometimes subject to strain through misunderstanding – which brings me to the recent issue involving the Saunders generating station and payments in lieu of property taxes.

This issue dates back to 2001 when the Ontario Government, our Shareholder, passed legislation changing the tax treatment of hydroelectric facilities owned by OPG and other power producers.

Under that legislation, property taxes paid to municipalities and school boards by hydroelectric generators were eliminated. In their place, the legislation created a Gross Revenue Charge into which hydro producers like OPG made payments that we had previously made to municipalities. In return, the new legislation provided for full compensation of municipalities for the money they had received under the older system. This compensation is in the form of grants-in-lieu of property taxes and is paid by the provincial government.

Filed: 2010-08-12
EB-2010-0008
L-06-024
Attachment 1

Here's where the problem arises. **Since that time,** property values of hydroelectric stations – including Saunders – have been reassessed significantly higher by the Municipal Property Assessment Corporation (MPAC). These assessments are independent of the grants-in-lieu paid by the province.

The whole issue is a tax policy issue and falls under the authority of the Ontario Ministry of Finance. Despite this, it's been suggested that OPG is somehow the bad guy. That is simply not true. We are paying our fair share under the Gross Revenue Charge mechanism – as we have done since the legislation was changed in 2001. We will continue to pay our fair share of these taxes – as mandated by law – under the GRC.

In my opinion, your best course of action is to take this matter up with the Ontario government. This is not an OPG issue. It's an issue between the Cornwall area community and the Province. That is the level where the matter should be discussed and hopefully settled.

I'm glad to have the opportunity to address this issue. It does a disservice to our record of involvement in the community and to the positive relationship we have fostered with you over the years. I truly hope that as we go forward it will be resolved to everyone's satisfaction.

New Information Centre and Saunders 50th Anniversary Celebration
Having made that point, we will not allow this issue – or any issue – to overshadow our relationship with you, which is most important to us.

Our commitment to Cornwall will continue to be strong, active and ongoing.

It is in this spirit that OPG is establishing a major public information centre adjacent to the Saunders generating station. Among its functions, the Centre will be a setting for the Cornwall community to tell its story about its role in the development and success of Saunders over the past 50 years.

It will also act as a focal point to showcase the historical contribution hydroelectric power has made to Ontario – and continues to make, as a source of clean, renewable and affordable power. Few Ontarians today appreciate the full significance that hydroelectricity, Saunders and Cornwall have played in their history. This Information Centre will help address that, by giving us the opportunity to communicate the facts to a wide audience.

In addition, the Centre will provide valuable information on OPG's safety initiatives – including our public water safety program.

We also believe the new Centre will attract more tourists to the region and encourage them to extend their visits here – overnight and even longer.

To ensure that all stakeholders were represented and their views heard, we held several meetings late last year. Some of you were at those meetings. As a result, a strong consensus for the Centre has been achieved, and we are ready to move this important initiative forward. The project is now in the design stage, but we hope to start construction soon. We are targeting the Centre to be open to the public in 2010.

Parallel to this initiative, we will – as I mentioned – be celebrating in June of this year the 50th anniversary of the official opening of Saunders. It will be a premier event, worthy of the heritage of this great power facility and its performance as a safe, reliable and clean producer of electricity. Planning is well underway. It includes arrangements for an official ceremony, an open house, station tours and displays highlighting the history of the station.

On the evening of June 27, which is a Friday, there will be an event at St. Lawrence for employees, retirees and our stakeholders. As some of our most important stakeholders, you are all invited to attend and we look forward that.

The following day – Saturday, June 28, from 10AM to 3PM – there will be an Open House at Saunders for the general public. We hope to see to you there as well. During the open house, there will be an unveiling of a special commemorative plaque at 1PM. Full details of the entire celebration will be available shortly, so stay tuned.

We expect the event will generate considerable spin-off benefits for the community. We are very excited.

Conclusion

If I had to sum up in a few words what I just spent the last 20-30 minutes talking about it would simply be that OPG is an integral part of the Cornwall community. As part of this community, we believe we have a responsibility to you. This means many things.

It means operating our facilities safely, efficiently and in a manner that sustains the environment.

It means contributing to the community and supporting those institutions that help make the Cornwall area a better place to live – for everyone.

And it means having pride in the community – pride in our heritage; pride in who we are; and pride in what we can together accomplish going forward.

I believe OPG is fulfilling its responsibility in all these areas. We will continue to do so. The Cornwall area community can depend on OPG.

Thank you. I'd be happy to answer any questions.

(10)

ONTARIO POWER GENERATION	Document Number: HOSL0005	Revision:	Page: 1 of 12
	BUSINESS CASE SUMMARY Cornwall Energy and Information Centre		

1. RECOMMENDATION

Recommend full release approval of $12.6M (which includes Definition Phase release of $526k spent to date) to construct a new Energy and Information Centre in the city of Cornwall adjacent to the R.H. Saunders Generating Station. The Centre will provide a venue for the delivery of information regarding OPG and its generating facilities and the history of the development and construction of the Seaway and how it affected the local communities. The Centre will also provide stakeholders with a venue to deliver information on their areas of interest. The Centre will also align with the Provincial Government's commitment to adopt a LEED (Leadership in Energy and Environmental Design) standard for all new government-owned buildings.

The sixth floor of R.H. Saunders originally housed an Energy and Information Centre. This has been closed since 1992 and has not been reopened to the public due to OPG and New York Power Authority post-9/11 security concerns.

Definition Phase approval was obtained in Q2, 2008 to conduct public stakeholder consultations, evaluate and select a Centre design and obtain proposals from pre-approved vendors. The start of construction of the Centre will be tied to the timing of the St. Lawrence Seaway and Power Project 50th anniversary celebrations in 2009 and will be completed in the summer of 2010.

Total Investment Cost: - $12,554k (Capital) which includes $526k spent to date

	LTD	2009	2010	Total
Definition Phase – Spent to Date	$526k			$526k
Execution Phase		$8,735k	$3,293k	$12,028k
Total Project	$526k	$8,735k	$3,293k	$12,554k

Expenditure Type: Capital
Investment Type: Sustaining
Release Type: OAR element 1.1

2. SIGNATURES

Submitted by:

12 March 2009

John Murphy
EVP Hydro
Date

Recommended by:

Mar 13/2009

Bruce Boland
SVP – Corporate Affairs
Date

Finance Approval:

Mar 13/09

Don Power
VP Corporate Investment Planning
Date

Line Approval:

Mar 16/09

Pierre Charlebois
EVP & COO
date

3. BACKGROUND & ISSUES

R.H. Saunders GS is a sixteen unit hydroelectric station spanning half the width of the St. Lawrence River to the international boundary at Cornwall, Ontario. All sixteen units were placed in service between July 1958 and December 1959. The station is classified as a "Flagship" in Hydroelectric's portfolio management system and is controlled locally. The station capacity (MCR) and average annual energy production are 1,045 MW and 6,869 GWh, respectively. Identical in layout, the sixteen unit Franklin D. Roosevelt Power Project, a New York Power Authority (NYPA) facility, extends from the international boundary to the U.S. shoreline.

The R.H. Saunders facility originally included an Energy and Information Centre on the sixth floor "Observation Deck" of the administration building of the powerhouse. This Centre was closed in 1992. OPG has held small scale station tours under strict control since the closure of the centre. However, reopening the original information centre is not an option due to OPG and NYPA post-9/11 security concerns.

In 2006, OPG made a commitment to local municipal leaders and provincial politicians/officials to consider reopening an off-site energy and information centre in Cornwall. An off-site information centre would not require stringent security measures and would be similar in concept to NYPA's new information centre. NYPA has also closed their information centre at the Franklin D. Roosevelt Power Project and have subsequently constructed a new off-site facility in view of their station.

Construction of the Centre will provide a venue near OPG's second largest hydroelectric generating station to tell the hydroelectric "story" and maintain/improve public acceptance of the station and its continued operation. It will also promote OPG's corporate brand and image with respect to all of OPG's generation types and would serve to educate students and the public about the operations and benefits of power generation, with the main focus on hydroelectric power.

An engineering consultant (Thompson Rosemount Group – TRG) was retained to perform Developmental Phase activities. These activities included stakeholder consultations and the development, evaluation and selection of a centre design, including detailed building specifications and the preparation of a Request for Proposal. TRG acquired the services of Holman Exhibits (interior/exhibit design consultant) to prepare the interior exhibits, models and displays. These displays were developed during the external stakeholder meeting process which provided the opportunity to seek input from the various stakeholder groups on the exhibits and associated documentation intended for the Energy and Information Centre.

A preliminary cost estimate of $10,127k was prepared by OPG's consultant in the summer of 2008 based upon a 10,000 square foot Energy and Information Centre and conventional building standards. However, it became apparent early in the stakeholder process that additional space would be required to accommodate OPG's and the stakeholders' requested exhibits. It was also decided that, if possible, that the information centre building design should align with the Provincial Government's commitment to adopt a LEED (Leadership in Energy and Environmental Design) standard for all new government-owned buildings. The LEED Building Rating System promotes a whole-building approach to sustainability in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. The Cornwall Energy and Information Centre would be the second LEED certified building in Cornwall.

As part of the Definition Phase, estimates for four design proposals were developed, two of which included LEED certified buildings. After review of the four designs and stakeholder consultations,

OPG's directed the engineering consultant to prepare detailed building specifications and a Request for Proposal for a 13,280 square foot building. The building specifications incorporate all the external stakeholders' and OPG's needs and would be constructed to meet a LEED Silver rating. These additional requirements result in a cost increase of $2,427k compared to the originally proposed 10,000 square foot non-LEED rated building (see Appendix D).

The final design and recommended alternative has been reviewed and unanimously agreed upon by both OPG and the external stakeholders including:

- the City of Cornwall;
- the United Counties of Stormont, Dundas and Glengarry;
- the Iroquois and South Dundas Chamber of Commerce;
- the Akwesasne First Nation;
- the Lost Villages Historical Society;
- the St. Lawrence Seaway Management Corporation;
- Cornwall and Seaway Valley Tourism;
- St. Lawrence College;
- the St. Lawrence River Institute of Environmental Sciences, and;
- the St Lawrence Parks Commission.

The construction start of the project is tied to the timing of the St. Lawrence Seaway and Power Project 50th anniversary celebrations.

4. ALTERNATIVES AND ECONOMIC ANALYSIS

An architectural/engineering firm and interior/exhibit design consultant were retained during the Definition Phase to prepare a Technical Specification and request proposals for the construction of the new Energy and Information Centre. The architectural/engineering firm participated in the development and evaluation of alternatives and recommended the preferred supplier.

Alternative 1: Construct a 10,000 square foot Non- LEED Rated Facility - Cost$10,127k, NPV ($14,815k)

- This alternative does not include additional square footage required to meet the project objectives for all internal and external stakeholders.
- No interactive features would be included thus limiting the effectiveness of selected exhibits.
- The building would not be as energy efficient as the LEED rated alternatives thus OPG would not be portrayed as a sustainable and environmental leader to the visiting public.

This alternative is not recommended due to the limited space provided to meet OPG and stakeholder exhibit requirements and would not be LEED rated.

Alternative 2: Construct a 13,280 sq. ft. LEED Rated Silver Facility – Cost $12,554k, NPV ($17,097k)

- The additional square footage required for this alternative, compared to Alternative 1 will accommodate all the stakeholder exhibits, as presented and affirmed during the external stakeholder consultation process.
- All proposed Hydro and other exhibits are included.
- Roadway and parking space including bus drop off area in close proximity of the facility for senior, school children etc. is included in this alternative (not in Alternative 1).
- The building would be more energy efficient than typical commercial standards and would demonstrate OPG's commitment to be a leader in energy conservation and the protection of the environment.
- Appendix D shows the details of additional costs for Alternative 2 compared to Alternative 1.

THIS IS THE RECOMMENDED ALTERNATIVE

Alternative 3: Construct a 13,280 sq. ft. LEED Rated Platinum Facility – Cost $17,457, NPV ($20,691k)

- Additional $5,000k in project cost compared to recommended alternative.
- The guidelines to achieve LEED Platinum certification are stringent. The Canadian Green Council conducts a post construction audit and there is a risk that the building may be ineligible for LEED certification if it does not comply with the guidelines.
- There would be minimal OM&A maintenance costs savings associated with sustaining a Platinum LEED designation for this facility as compared to the preferred alternative LEED Silver ratings.
- Even if the building initially does meet LEED Platinum guidelines, long term compliance may not be sustainable.

This alternative is unacceptable due to the significantly higher capital costs to achieve a LEED Platinum rating versus a Silver rating, and the additional risks associated with meeting and sustaining LEED Platinum standards.

Financial Analysis

	Alt. 1	Alt. 2	Alt. 3
Total Project Costs ($k)	$10,127	$12,554	$17,457
NPV (2009 PV ($k) 50 years	($14,815)	($17,097)	($20,691)

Other alternatives considered but rejected:

- **Do Nothing** - Inaction will result in the loss of an opportunity to enhance stakeholder relationships and provide an educational and public relations venue at OPG's second largest hydroelectric generating station.
- **Construct an 8000 square foot non-LEED rated building** – This building size would be too small to accommodate all required exhibits. As well, the educational models would need to be incorporated into other viewing areas and exhibit space, thus would greatly sacrifice the story lines to be portrayed. The building would be of conventional construction (ie, not LEED rated).

5. THE PROPOSAL

Results to be delivered

- Award of construction contract
- Construct a 13,280 square foot LEED Silver rated venue as per the technical specification and design alternate produced during the Definition Phase of the project.
- Fabricate and install all exhibits and displays as agreed upon during the stakeholder consultation process.
- See Appendix A for illustrations of building.

Project Schedule

- Full BCS Release: Q1 2009
- Construction Award: Q2 2009
- Facility construction: Q3 2009 – Q3 2010
- Exhibit installations: Q2 2010
- Completion of construction and opening: Q3 2010

6. QUALITATIVE FACTORS

- The stakeholder consultation process investigated and confirmed:
  - the possibilities for outdoor exhibits and signage

(14)

  - the desirability of self-guided exhibits
  - a simulation exhibit of the R.H. Saunders powerhouse construction
  - the desirability of on-site internet-accessed information sources associated with the exhibits
  - the story lines associated with exhibits on electricity generation in Ontario, related environmental impacts, and the loss of land areas due to the construction and opening of the Seaway
- The building will have a design that will include but not be limited to:
  - Geothermal heating and cooling – ground source heat pump
  - rainwater collection for fire fighting purposes
  - collection of grey water to supply facility sanitary services
- The building will be situated to minimize disturbance of the natural environment. Where necessary, trees and vegetation will be relocated to areas surrounding the Centre and bike path
- The existing public bike path will be relocated to traverse the Centre site

7. RISKS

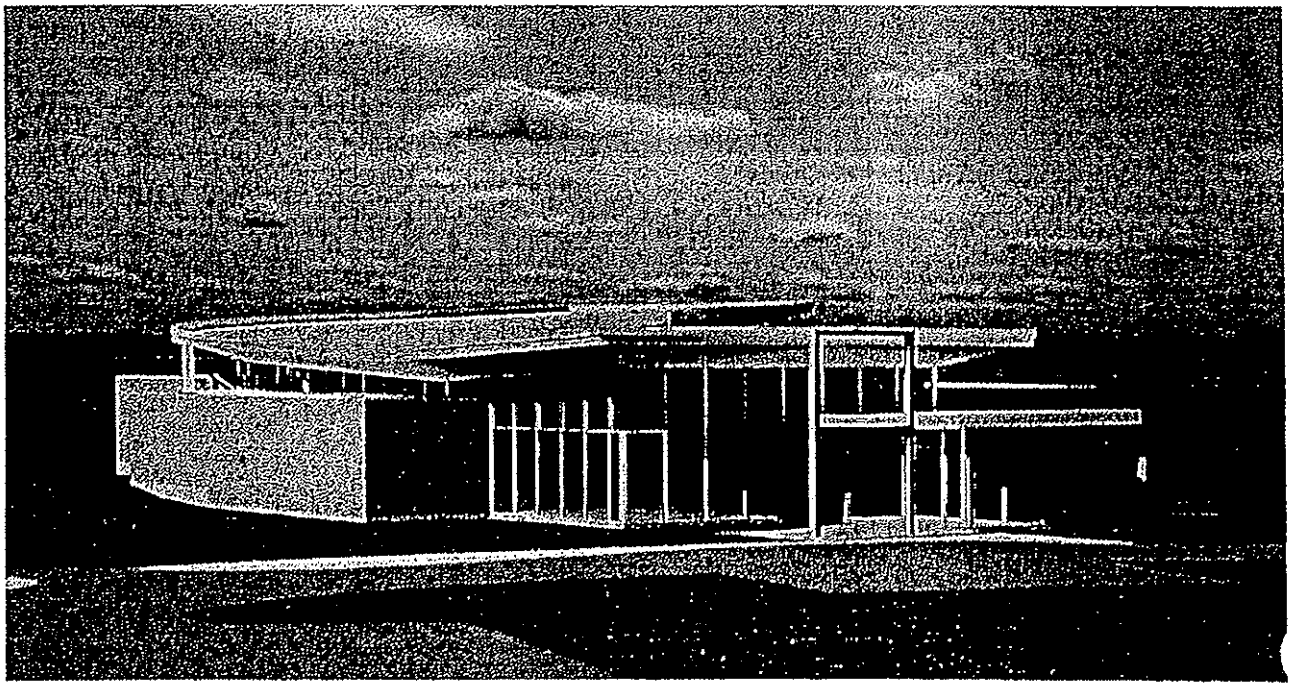
Risk Description	Impact	Initial Risk (before Mitigation) (H,M,L)	Mitigating Activity	Residual Risk (after Mitigation) (H,M,L)
Cost				
1. Cost overruns.	1. Cost exceeds release amount.	1. M	1. Costs associated with construction of the facility were obtained from four fixed price proposals. These proposals have been guaranteed until April 1, 2009.	1. L
2. Unknown exhibits costs.	2. Exceeding release amount.	2. L	2. Interior display costs provided by Holman Exhibits and were included in the construction fixed priced proposal.	2. L
Scope				
1. Preliminary design concepts rejected by advisory committee.	1. Increased project cost due to design changes.	1. L	1. The conceptual designs of both the building and exhibits were presented to OPG and external stakeholders. Both were accepted and the project scope was frozen prior to issuing the Request for Proposal. Superseding release will be required if additional scope items are included other than the deliverables listed in the Project Charter.	1. L
2. Building design change.	2. Technical specifications not complete resulting in cost overruns and construction extra costs. Exceeding release amount would require a Superseding BCS submitted for approval.	2. M	2. The Request for Proposal was based on a detailed technical spec and tendering documents. The project team will include an onsite Project Manager monitoring construction and reporting to OPG full time throughout the duration of the project.	2. L
Schedule				
1. Project delays due to time required to award construction contract.	1. Project delays and cash flows will be transferred to future years. Opening of the centre would be deferred missing the 2010 tourism season and visitor opportunities.	1. L	1. Detailed design and technical specification, including all drawings, were included in the Request for Proposal. Construction firms were pre-qualified prior to RFP issue.	1. L
Environmental				
1. Contaminated materials discovered during site excavation activities.	1. Exceeding release amount and project delays to remove and dispose of contaminated materials.	1. M	1. Geotechnical bore hole drilling and sub surface investigations determined the site is within acceptable Environmental Protection Act guidelines.	1. L
2. Facility would be located on an archeologically sensitive area.	2. Construction of the building would be deferred and an alternate site would be investigated.	2. L	2. Engineering consultant contacted Heritage of Ontario to review the project site. Studies confirmed the building site does not have any archaeological value. (The site resides on 40 feet of fill which was developed during the construction of the Seaway.)	2. L
Technical				
1. Insufficient scope of work for LEED certification.	1. LEED certification not approved.	1. M	1. Facility designed to LEED Silver standards. Design Engineer will be retained as OPG's Owners Representative to verify LEED requirements during construction.	1. L
2. Insufficient building size	2. Modifications to the exhibits areas. Stakeholder expectations not met.	2. L	1. Building size increased to accommodate all stakeholder requirements.	2. L

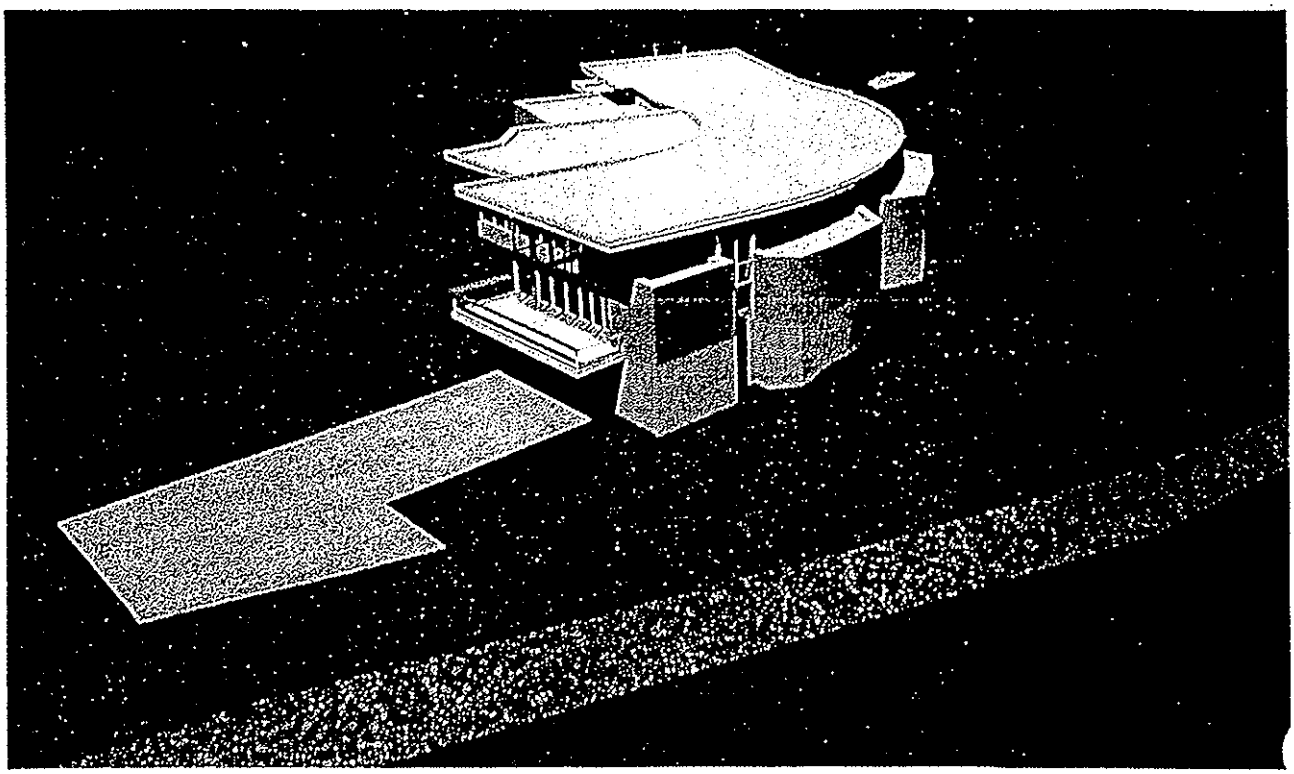
(16)

8. POST IMPLEMENTATION REVIEW (PIR) PLAN

- The completion of Execution Phase deliverables will be confirmed in a report by the Ottawa/St. Lawrence Plant Group Asset Management Department.
- Commissioning Authority - Thompson Rosemount Group - to issue the LEED Report and final documentation from the Canadian Green Council that the facility achieved a LEED Silver Rating

APPENDIX A:





(19)

ONTARIO POWER GENERATION	Document Number: HOSL0005	Revision:	Page: 10 of 12
	BUSINESS CASE SUMMARY Cornwall Energy and Information Centre		

APPENDIX B:

Project Title: Cornwall Energy and Information Centre

HYDROELECTRIC Summary of Estimate	Date	March 10, 2009
	Project #	HOSL0005

	LTD	2009	2010	TOTAL	%of TOTAL
Project Management/Engineering	$20k	$92k	$35k	$147k	1%
Consultant/Engineering	[redacted]				
Hydroelectric (PWU labour)		$88k	$52k	$140k	1%
Contractor (including EPSCA) and other Material Costs (Note 6)		[redacted]			
Interest	$4k	$285k	$322k	$611k	5%
Contingency		[redacted]			
TOTAL (GROSS)	$526k	$8,735k	$3,293k	$12,554k	100%

NOTES:

1 Schedule: Start Date: April 2009
In-service Date: Q3 2010

2 Interest and escalation rates are based on current allocation rates provided by Corporate Finance

3 Removal Costs: not applicable

4 Estimate includes Definition Phase Costs of: $526k

5 Fixed priced contract cost and estimated EPSCA charges: [redacted]

6 Additional material costs not included in the fixed price contract: $800k (e.g. signage package, theatre and interactive equipment, office furniture, phone/fax/copier.

7 Contingency is based on [redacted] of estimated project management, consultant, labour, and contractor costs.

Prepared by:	**Approved by:**
Bruce Burwell mm 10/09	Mar 10/09
Bruce Burwell Project Engineer/Officer	Project/Production Manager

(20)

APPENDIX C:

Financial Model – Assumptions

Following are the key assumptions used during the modeling of the Project:

Project Assumptions:

1. Cost estimate for the preferred alternative (Alt.2) was obtained using the RFP process. OPG received four fixed price proposals.
2. Design engineer provided Class "A" estimate, which includes escalation, for Alternatives 1&3
3. Alt. 1 - 10,000 square foot Non-LEED Rated Facility.
4. Alt. 2 - 13,280 square foot LEED Rated Silver Facility (preferred alternative)
5. Alt. 3 - 13,280 square foot LEED Rated Platinum Facility

Operating Cost Assumptions:

6. Estimated annual maintenance and operations costs for alternative 1 is $509K starting in 2011
7. Estimated annual maintenance and operations costs for alternative 2 is $532K starting in 2011
8. Estimated annual maintenance and operations costs for alternative 3 is $530K starting in 2011

APPENDIX D:

Additional Costs for Alternative 2 (Recommended) Compared to Alternative 1

Alternative 1 (10,000 sq.ft. Non-LEED rated facility) Total Costs:	$10,127k
Additional Sq. Footage	$900k
Exhibit Design Increase	$350k
Video Security System	$50k
Architectural and Engineering Increase	$120k
Additional Roadway, Parking and Bus area	$30k
LEED - Additional road work for site drainage and curb less shoulders	$50k
LEED – Additional LEED Management and engineering fees	$100k
LEED - LEED registration and application fees	$40k
LEED - LEED requirement for heat Island reduction – White roof	$70k
LEED - Tree planning and relocation for LEED shading credit	$20k
LEED - Upgrade glass thermal panels	$20k
LEED - Geothermal – ground source heating and cooling	$100k
LEED - Material upgrades (e.g. Polished concrete floors)	$250k
LEED - Additional construction management fees	$100k
LEED - Water efficiency system (e.g. - Grey water re-use)	$50k
LEED - Exhibit sustainable materials	$10k
Additional Interest	$108k
Additional Contingency	$59k
Alternative 2 (13,280 sq.ft. LEED rated facility) Total Costs:	$12,554k

Note: The total additional cost associated with a LEED rated building is $810k.

HE Prod Forecast (22)

CCC Interrogatory #023

Ref: Ex. E1-T1-S2, pages 2-7

Issue Number: 5.1
Issue: Is the proposed regulated hydroelectric production forecast appropriate?

Interrogatory

In each year since 2007 OPG's hydroelectric production forecast has been understated relative to the actual production. Has OPG considered revising it forecasting methodology in light of this? If not, why not? Why should parties have confidence that the forecast numbers for the test period are appropriate?

Response

As shown in Ex. E1-T1-S2, Table 1, production forecast model results compare very well with actual production results when actual flows were used as model input ("imputed generation"). Therefore, OPG is not considering a major revision to its forecasting methodology, but, as discussed below, it is continuing to investigate refinements to its flow forecasting tools. The model's performance in forecasting production based on actual flows should provide parties with confidence in its accuracy, and the existence of the Hydroelectric Water Conditions Variance account insulates both customers and OPG from any variation between forecast and actual water conditions.

The challenge in improving the production forecast is to accurately forecast the Niagara and St. Lawrence River flows. There is a great deal of uncertainty associated with predicting natural systems, and changes in weather patterns can change flow trends within a relatively short time frame. OPG continues to carry out statistical analysis regarding the accuracy and potential bias of the flow forecasts. This analysis does not suggest that there is any systematic bias in the forecasted water flows.

As described in Section 4.0 of Ex. E1-T1-S2, relatively dry conditions meant that river flows were below normal when the forecast plans were prepared for the years 2007, 2008, and 2009. Based on water conditions in the upper Great Lakes basin and normal precipitation, it was assumed that the trend of below normal flows would continue. However, above normal precipitation in the Lake Erie basin in the fall of 2006 resulted in flows recovering to above normal levels during the first part of 2007, before dropping again to below normal for the remainder of the year. Above normal precipitation occurred again during the winter of 2008 and flows recovered to and remained around normal levels for much of 2008 and 2009.

In contrast to the aforementioned years, the forecast production plan for 2010 is expected to exceed actual production results for 2010. Actual production during the first half of 2010 is 2

per cent lower than that forecast. Actual flows during the first half 2010 have been lower than forecast.

While not a fundamental change to the forecasting methodology, the Niagara Plant Group is currently assessing the performance of the Advanced Hydrologic Prediction System developed by the U.S. National Oceanic and Atmospheric Administration and adapted by the Great Lakes Environmental Research Laboratory specifically for the Niagara River, as an alternative flow forecasting tool to the traditionally used Hydrological Response Model for the Great Lakes. Once sufficient experience is acquired with the new system over a variety of hydrologic conditions to ascertain that similar or improved results are achieved, it is anticipated that this new system will be implemented. In addition, the Niagara Plant Group continues to assess and refine the minor adjustments that are applied to the flow forecast values to reflect seasonal variations and retardation effects.

Numbers may not add due to rounding.

Filed: 2010-05-26
EB-2010-0008
Exhibit E1
Tab 1
Schedule 2
Table 1

Table 1
Comparison of Production Forecast - Regulated Hydroelectric (TWh)

Line No.	Prescribed Facility	2007 Budget	(c)-(a) Change	2007 Actual	(e)-(c) Change	2008 Actual	(e)-(g) Change	2008 Budget
		(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	Niagara Plant Group	11.1	0.4	11.5	0.5	12.0	0.8	11.2
2	Saunders GS[1]	6.4	0.3	6.7	0.3	7.0	0.8	6.2
3	Total	17.5	0.7	18.2	0.8	19.0	1.6	17.4
	Other:							
4	CNP Generation[2]	(0.7)	0.0	(0.7)	(0.0)	(0.7)	0.0	(0.7)
5	Imputed Generation[3]			18.1		18.9		
6	Actual - Imputed Generation (line 3 - line 5)			0.1		0.1		
7	Forecast SBG Adjustment							

Line No.	Prescribed Facility	2008 Actual	(c)-(a) Change	2009 Actual	(c)-(e) Change	2009 Budget
		(a)	(b)	(c)	(d)	(e)
8	Niagara Plant Group	12.0	0.3	12.3	0.3	12.0
9	Saunders GS[1]	7.0	0.1	7.1	0.6	6.5
10	Total	19.0	0.4	19.4	0.9	18.5
	Other:					
11	CNP Generation[2]	(0.7)	0.4	(0.2)	0.0	(0.2)
12	Imputed Generation[3]	18.9		19.8		
13	Actual - Imputed Generation (line 10 - line 12)	0.1		(0.3)		
14	Forecast SBG Adjustment					

Line No.	Prescribed Facility	2009 Actual	(c)-(a) Change	2010 Budget	(e)-(c) Change	2011 Plan	(g)-(e) Change	2012 Plan
		(a)	(b)	(c)	(d)	(e)	(f)	(g)
15	Niagara Plant Group	12.3	0.1	12.4	(0.0)	12.4	(0.3)	12.1
16	Saunders GS[1]	7.1	(0.2)	6.9	0.1	7.0	(0.0)	7.0
17	Total	19.4	(0.1)	19.3	0.0	19.4	(0.3)	19.0
	Other:							
18	CNP Generation[2]	(0.2)	0.2	0.0	0.0	0.0	0.0	0.0
19	Imputed Generation[3]	19.8						
20	Actual - Imputed Generation (line 17 - line 19)	(0.3)						
21	Forecast SBG Adjustment			(0.2)		(0.5)		(0.8)

Notes:

1 Saunders values represent total station production (including energy delivered to HQ).
2 CNP (Canadian Niagara Power) Generation is included in the Niagara Plant Group total production.
3 Imputed Generation refers to the production value resulting from a re-running of the forecasting models using actual water flows, but maintaining all other input variables constant.

Board Staff Interrogatory #036

Ref: Ex. E1-T1-S1, page 6, lines 2-4

Issue Number: 5.1
Issue: Is the proposed regulated hydroelectric production forecast appropriate?

Interrogatory

The SBG estimates are 0.2 TWh in 2010, 0.5 TWh in 2011 and 0.8 TWh in 2012.

a) How many hours of operation of the Niagara Plant Group would these energy levels equate to?

b) The SBG levels increase year-to-year. What mitigation actions has OPG considered to minimize SBG over the 2011-2012 period?

c) Is OPG expecting to be compensated by any other agency for its actual (if they occur) SBG levels in the 2010-12 period?

d) Does OPG plan to seek such compensation?

e) Does OPG consider SBG to be eligible for CMSC payments?

Response

a) In 2009, the median hourly output of the Niagara Plant Group (Sir Adam Beck and DeCew Falls Generating Station) was approximately 1,500 MW. The approximate equivalent number of hours of the Niagara Plant Group operation, based on 2009 median hourly output and the Surplus Baseload Generation ("SBG") estimates, are 130 hours in 2010, 330 hours in 2011 and 525 hours in 2012.

b) Generally, the accountability for mitigating SBG rests with the IESO, rather than with any given market participant. However, market participants can assist through various actions suggested by the IESO.[1] When SBG is anticipated, OPG establishes offer prices for the energy from the prescribed assets such that any reductions in output necessary are enacted based on market economics and taken into consideration constraints arising from:
   - Public and employee safety
   - Asset protection and technical considerations
   - Environmental considerations

[1] IESO Forecast Surplus Baseload Generation Report http://www.ieso.ca/imoweb/marketdata/sbg.asp

- Legal and regulatory requirements

c) No.

d) No.

e) No.

CME Interrogatory #024

Ref: Ex. E1-T1-S1, and E1-T1-S2

Issue Number: 5.1
Issue: Is the proposed regulated hydroelectric production forecast appropriate?

Interrogatory

At Exhibit E1, Tab 1, Schedule 1, page 5, OPG indicates that Surplus Baseload Generation ("SBG") is a condition that occurs when electricity production from hydroelectric baseload facilities is greater than Ontario demand. The evidence indicates that during 2009 SBG was more prevalent in Ontario than it has been for many years, and that SBG is forecast to continue through the test period. In connection with this evidence, please provide the following additional information:

(a) Please describe the conditions that have given rise to the much more prevalent SBG problem and, in particular, indicate the extent to which generation from renewable generation sources such as wind and solar and/or natural gas fired generation is a cause of the problem.

(b) What conditions would need to exist to enable wind and solar and/or natural gas fired generation to be curtailed in order to assure that little or no SBG occurs in any year so that all available hydroelectric generation capacity is used throughout the entire test period?

(c) How much lower would the test period revenue deficiency be if no SBG were forecast for the test period and all available hydroelectric capacity could be used throughout the entire test period?

Response

a) SBG occurs when baseload electricity supply exceeds Ontario demand. Generally speaking, SBG exhibits:

- a seasonal component, occurring most often in the spring and fall when generally moderate temperatures result in low demand and hydroelectric generation is high;
- a weekly component, occurring most often on weekends and holidays when electricity demand is low; and
- a daily component, occurring most often during overnight off-peak periods when electricity demand is low.

Witness Panel: Hydroelectric
Deferral and Variance Accounts, Payment Amounts and Regulatory Treatments

Relative to the forecast of supply and demand used in EB-2007-0905, the increased prevalence of SBG in 2009, during the periods above, was primarily due to:

- Low demand: During the spring to fall period, Ontario demand during the off-peak periods and exports were below forecast.
- High hydroelectric generation: High inflows in 2009 resulted in higher than expected hydroelectric supply during off-peak periods.
- High combined cycle gas turbine generation: Natural gas generation during off-peak periods exceeded forecast levels.
- High wind generation. At times, wind generation exceeded forecast.

At various times, combinations of the factors above resulted in baseload supply exceeding market demand during off-peak periods in the spring and fall of 2009.

b) As indicated in the response to the interrogatory in Ex. L-01-036 part b), the management of SBG, including potential curtailments in generation, is the accountability of the IESO. OPG is unaware of the specific commercial or operational conditions that would lead the IESO to curtail wind, solar and/or natural gas generators.

c) Under the scenario where there is no SBG during the test period, the hydroelectric revenue deficiency would decline by $32.5M, moving from a deficiency of $27.7M to a sufficiency of $4.8M. As stated in Ex. E1-T1-S1, section 2.5, significant SBG is forecast to continue through the test period and will impact production at the regulated hydroelectric facilities.

The derivation of this impact is shown in the attached version of Ex. I1-T1-S1, Table 4, which calculates the deficiency/sufficiency for this scenario.

between these periods is largely dependent on the difference between on-peak and off-peak prices. While there is some peaking capability at R.H. Saunders and the DeCew Falls Generating Stations, the great majority of peaking activity occurs at the Sir Adam Beck complex.

In real time, the cost of pumping in the off-peak periods (e.g., expected market prices for electricity, incremental/decremental gross revenue charges, non-energy load charges) is continually compared with the forecast value of the additional generation in the next on-peak period(s). Similarly, during on-peak periods, the value of generation is continually compared with the net cost of re-filling the PGS reservoir during the next off-peak period(s). The associated incremental effects of PGS operations on SAB output are also included in these assessments. In both instances, if the expected value of generation exceeds the expected cost of pumping, then the PGS is bid/offered into the market to operate. This economic assessment does not incorporate any consideration of either the regulated price or the hourly volume.

The use of market signals is important to all market participants (and ultimately ratepayers) as this facilitates the movement of energy from low value periods (typically off-peak) to high value periods (typically on-peak) thus reducing overall demand-weighted market prices and hence customer costs.

OPG estimates that between December 2008 and December 2009, usage of the PGS lowered demand-weighted market prices by approximately $1.14/MWh. This value incorporates both the decrease in on-peak prices due to added generation from the PGS and the associated increase in SAB 1 and 2 output, partially offset by an increase in off-peak prices due to additional PGS load and reduced SAB 1 and 2 output. This figure is an estimate because some information - such as the offer prices of other market participants' generation - is not available to OPG and must be estimated. This reduction in market prices demonstrates the value of moving energy from off-peak to on-peak periods.

In EB-2007-0905 at Ex. I1-T1-S1, OPG estimated that the hydroelectric incentive mechanism would provide it with, on a forecast basis, approximately $12M in incremental market revenues in 2009. Between January and December 2009, OPG's actual incremental market revenues have totaled $23.2M. The difference between actual and forecast incremental revenues is attributable to:

- More energy was shifted from off-peak hours to on-peak hours than was forecast. In 2009, actual hourly production in excess of the hourly volume at Niagara (where most time shifting occurs) was 986 GWh which was approximately 25 per cent higher than the forecast of 783 GWh.
- The difference between average on-peak and average off-peak market prices (referred to as the market price spread) was higher than forecast. While actual market prices were well below expectations - the average forecast price was almost $44/MWh versus an actual of $29.5/MWh, off-peak market prices fell at a greater rate than on-peak prices resulting in higher price spreads. The actual market price spread in 2009 was $14.8/MWh; $0.7/MWh higher than forecast.

For the test period, OPG anticipates that the incentive mechanism will result in incremental revenues of $13.3M in 2011 and $16.3M in 2012, as market price spreads are expected to fall relative to 2009. It should be noted that forecasting the value associated with peaking resources, including the PGS, is subject to great uncertainty as the PGS can operate in response to significant short-run differences in hourly prices that are both difficult to forecast and not adequately described by average price spreads.

3.2 Review of Impact of Hydroelectric Incentive Mechanism on Operating Decisions

During EB-2007-0905, OPG undertook to provide a review of the incentive mechanism's effect on operating decisions. The following sections provide the results of that review.

3.2.1 Representative Metrics

To demonstrate the effectiveness of the hydroelectric incentive mechanism, OPG has chosen two measures. Because of limited peaking capability at DeCew and R.H Saunders, these measures relate only to operations at SAB/PGS. The two measures are:

Chart 1

Estimated Benefits of Sir Adam Beck Complex Operations to Consumers

Estimated Benefits of Sir Adam Beck Complex Operations to Consumers[12]				
Number of Sir Adam Beck PGS Units Generating During the Peak Hours of the Day	Estimated Daily Reduction in HOEP		Estimated Average Annual Savings to Consumers	
	Average ($/MWh)	Standard Deviation ($/MWh)	Average ($M)	Standard Deviation ($M)
1	0.4	0.3	80	60
2	0.7	0.4	150	80
3	1.0	0.5	220	110
4	1.2	0.7	270	130

As previously indicated, because of the enhancement to the market price signal to time-shift water, the proposed incentive mechanism represents an improvement over the existing mechanism for the interim period as it facilitates the increased usage of the Sir Adam Beck PGS and more optimal use of the Sir Adam Beck complex provided that it is economic to do so.

OPG has forecast its incremental revenues associated with the proposed incentive mechanism. Incremental revenues are the result of time-shifting water into hours of the day with naturally higher prices (due to higher demand), and increasing production for these hours beyond the proposed incentive mechanism volume, thereby earning market prices on the difference between actual output and the proposed incentive mechanism volume. There is considerable uncertainty in forecasting the incentive revenues and the costs because they are dependent on several factors including market prices.

The expected annual value of gross incentive revenues is estimated to be approximately $12M above and beyond the proposed revenue requirement. The distribution of results from

[12] These values were derived using multiple market simulations based on forecast market prices for 2008 and profiles that include six Sir Adam Beck PGS units pumping at night and the specified number of Sir Adam Beck PGS units dispatched and providing energy during the day. The analysis further assumes that Sir Adam Beck PGS generates the specified number of units continuously for the peak hours of the day, 365 days of the year.

OPG's modeling of this mechanism includes at a five percent confidence level an incremental incentive of $5M (low estimate) and a ninety-five percent confidence level an incremental incentive of $19M (high estimate). These values were derived using forecast market prices for 2009 with an expected average of approximately $44/MWh, a five percent confidence level of $34/MWh (low estimate) and a ninety-five percent confidence level of $57/MWh (high estimate). The expected value of $12M was arrived at using multiple market simulations based on the statistical forecasts of production and market prices. Changes in the market price forecast will directly impact the incentive revenues and the costs associated with time-shifting production.

The costs associated with these time-shifting activities include pump energy consumption, pump non-energy charges, efficiency losses and GRC adjustments. OPG proposes that the actual costs incremental to those included in the regulated hydroelectric revenue requirement will be recovered through revenues associated with the proposed hydroelectric incentive mechanism.

OPG also incurs additional risks associated with operating in the market and relying on market prices which will further reduce the value of this incentive (section 5.3 describes these risks).

Further to the above, if the spread between an on-peak and off-peak market price is large enough, there may be an economic opportunity to increase the utilization of the Sir Adam Beck PGS by pumping more water; and/or to "super-peak" the Sir Adam Beck II units by operating at maximum gate.[13] Operating in this manner gives rise to greater costs, which will need to be recovered, but provides savings for market consumers by further reducing the average market price. As the maximum attainable potential of "super-peaking" the regulated assets is highly dependent on real-time market prices and operational conditions during the specific day, the estimated benefit of "super-peaking" could not be forecast with any accuracy.

[13] Operating a unit at maximum gate means that the units will operate at a lower efficiency point thereby consuming more water per kWh of electricity production but will generate higher energy production for that particular hour. This is often referred to as "super-peaking" operation.

AMPCO Interrogatory #019

Ref: Ex. E1-T1-S1, page 5

Issue Number: 5.1
Issue: Is the proposed regulated hydroelectric production forecast appropriate?

Interrogatory

OPG observes that "[d]during 2009, SBG [surplus baseload generation] was more prevalent in Ontario than it has been for many years." Please quantify the SBG impact on OPG for 2008 and 2009, in both energy and financial terms.

Response

Surplus Baseload Generation ("SBG") was negligible in 2008. OPG estimates that in 2009, for the company as a whole, SBG-related production losses were 0.6 TWh. Of this number, OPG estimates that approximately 0.19 TWh is attributable to the regulated hydroelectric facilities.

OPG has no estimates available of the financial impact of SBG during 2009. Because SBG impacts both the regulated and unregulated facilities, and due to the variability of market prices and the dynamic nature of the electricity markets (i.e., many interdependent variables), such quantification would be difficult to perform.

Board Staff Interrogatory #036

Ref: Ex. E1-T1-S1, page 6, lines 2-4

Issue Number: 5.1
Issue: Is the proposed regulated hydroelectric production forecast appropriate?

Interrogatory

The SBG estimates are 0.2 TWh in 2010, 0.5 TWh in 2011 and 0.8 TWh in 2012.

a) How many hours of operation of the Niagara Plant Group would these energy levels equate to?

b) The SBG levels increase year-to-year. What mitigation actions has OPG considered to minimize SBG over the 2011-2012 period?

c) Is OPG expecting to be compensated by any other agency for its actual (if they occur) SBG levels in the 2010-12 period?

d) Does OPG plan to seek such compensation?

e) Does OPG consider SBG to be eligible for CMSC payments?

Response

a) In 2009, the median hourly output of the Niagara Plant Group (Sir Adam Beck and DeCew Falls Generating Station) was approximately 1,500 MW. The approximate equivalent number of hours of the Niagara Plant Group operation, based on 2009 median hourly output and the Surplus Baseload Generation ("SBG") estimates, are 130 hours in 2010, 330 hours in 2011 and 525 hours in 2012.

b) Generally, the accountability for mitigating SBG rests with the IESO, rather than with any given market participant. However, market participants can assist through various actions suggested by the IESO.[1] When SBG is anticipated, OPG establishes offer prices for the energy from the prescribed assets such that any reductions in output necessary are enacted based on market economics and taken into consideration constraints arising from:
   - Public and employee safety
   - Asset protection and technical considerations
   - Environmental considerations

[1] IESO Forecast Surplus Baseload Generation Report http://www.ieso.ca/imoweb/marketdata/sbg.asp

Witness Panel: Hydroelectric

- Legal and regulatory requirements

c) No.

d) No.

e) No.

Numbers may not add due to rounding.

Table 1
Centrally Held Costs ($M)
OPG

Line No.	Corporate Costs	2007 Actual	2008 Actual	2009 Actual	2010 Budget	2011 Plan	2012 Plan
		(a)	(b)	(c)	(d)	(e)	(f)
1	Pension/OPEB Related Costs	178.8	116.7	(27.7)	118.5	145.4	213.1
2	OPG-Wide Insurance	19.1	16.3	17.0	16.9	17.4	18.0
3	Nuclear Insurance	7.6	7.8	7.3	8.6	11.3	13.4
4	Performance Incentives	40.8	45.3	40.3	45.8	46.2	46.7
5	IESO Non-Energy Charges	20.5	22.4	75.5	54.7	62.8	69.2
6	SR&ED Investment Tax Credits	0.0	(30.0)	(22.1)	(10.0)	(10.0)	(10.0)
7	Other	31.1	25.0	31.4	26.4	28.1	(1.4)
8	Total	297.9	203.5	121.7	260.9	301.2	349.0

IESO Non-Energy
36

Board Staff Interrogatory #088

Ref: Ex. F4-T4-S1, page 4

Issue Number: 6.9
Issue: Are the "Centralized Support and Administrative Costs" (which include Corporate Support and Administrative Service Groups, Centrally Held Costs and Hydroelectric Common Services) and the allocation of the same to the regulated hydroelectric business and nuclear business appropriate?

Interrogatory

The application discusses a significant increase in IESO Non-Energy Charges, primarily due to the substantial increase in the Global Adjustment.

a) For the period 2007-2012, please provide a table summarizing IESO Non-Energy costs and kWh consumed (used to calculate the IESO Non-Energy costs) for each OPG facility.

b) Please explain how OPG is charged for the IESO Non-Energy charges when OPG provides energy to its own facilities (i.e., rather than consuming from the market). For example, when the OPG facility is producing more than it is consuming.

c) Given the Global Adjustment is not expected to decline going forward, has OPG undertaken initiatives to reduce its energy consumption (i.e., energy efficiency initiatives)? If so, please explain those initiatives and the associated results. If not, please explain why.

Response

a) Table 1 below outlines the IESO Non-Energy charges for the period from 2007 – 2012. For 2007 – 2009 actual charges are presented. For 2010 – 2012 forecast charges are presented at a business unit level as OPG does not forecast IESO Non-Energy charges or withdrawals on an individual facility basis.

Table 1 Actual (2007-09) and Forecast (2010-12) IESO Non-Energy Charges ($M)						
	2007	2008	2009	2010	2011	2012
Darlington	1.8	1.6	8.5			
Pickering A	2.8	3.7	9.7			
Pickering B	5.2	5.3	17.9			
Total Nuclear	9.8	10.6	36.1	26.3	30.3	33.5
Saunders	0.0	0.0	0.0			
Sir Adam Beck 1	(0.7)[1]	0.3	1.5			
Sir Adam Beck 2	0.1	0.2	0.1			
Sir Adam Beck PGS	3.2	3.4	10.5			
DeCew	0.8	0.5	0.5			
Total Hydro	3.4	4.3	12.7	10.1	11.6	12.8

Table 2 below outlines energy withdrawals in MWh for the period from 2007 – 2012. (2007 – 2009 are actual withdrawals and 2010 – 2012 are forecast withdrawals.)

Table 2 Actual (2007 - 09) and Forecast (2010 – 2012) Energy Withdrawals (MWh)						
	2007	2008	2009	2010	2011	2012
Darlington	155,583.160	123,854.713	176,872.126			
Pickering A	202,791.890	262,972.581	224,798.129			
Pickering B	430,679.659	387,846.789	434,972.587			
Total Nuclear	789,054.709	774,674.083	836,642.842	807,164	807,164	807,164
Saunders	16.494	20.372	6.238			
Sir Adam Beck 1	24,094.095	23,349.137	33,666.085			
Sir Adam Beck 2	7,121.945	8,310.157	3,590.763			
Sir Adam Beck PGS	268,720.694	269,171.235	246,814.589			
DeCew	2,143.934	1,377.555	983.038			
Total Hydro	302,097.162	302,228.456	285,060.713	300,658	300,658	300,658

IESO Non-Energy charges are based on the withdrawal quantities (energy consumption) shown in Table 2 above except for transmission-related charges, which are based on monthly peak demand.

b) Energy flowing into or from each generating station is metered at each of the station's delivery points to the IESO controlled grid. The metered quantities are recorded for each five-minute period. In each five-minute period, for each delivery point, a net flow is calculated and if that net flow is from the grid to the station, it is a withdrawal amount which attracts Non-Energy charges. If the net flow at any delivery point is from the station to the grid, it is an injection amount and does not attract Non-Energy charges.

[1] 2007 Sir Adam Beck 1 Non-Energy load charges include a $0.7M IESO credit received in May 2007.

Facilities may have several delivery points, and some, all, or none may be recording withdrawals within a particular five-minute period. Those delivery points that have withdrawals attract Non-Energy load charges even if there are offsetting injections at the station's other delivery points.

A generator within a station produces energy, and directs some of that energy to the loads within the station, and the remainder to the generator's delivery point. The load fed directly from the station's generator does not attract Non-Energy charges because there is no energy withdrawal from the grid. Therefore, the withdrawal quantities shown in Table 2 represent the station loads supplied from the IESO-controlled grid.

c) OPG has undertaken actions that reduce its consumption of energy for many years. These actions include specifying the energy efficiency requirements for new buildings, retrofitting existing buildings, procuring energy efficient equipment (such as computers), and upgrading the efficiency of turbine runners and transformers.

The increase in the Global Adjustment is one factor, among many other economic and environmental considerations, which supports OPG's continued commitment to energy efficiency. OPG's Energy Efficiency efforts are discussed on pages 13-14 of OPG's 2009 Sustainable Development Report. For a copy of this report, please see:

http://www.opg.com/pdf/Sustainable%20Development%20Reports/Sustainable%20Development%20Report%202009.pdf

to wait for further development of US regulations to improve alignment.

b) The Ontario Government is also taking steps to implement a GHG Cap and Trade regime. In 2009, the province passed regulations enabling the development of Cap and Trade and requiring facilities that emit ≥ 10,000 Mg to monitor, measure and report 2010 emissions in 2011. OPG continues to recommend that Ontario work with the Federal Government to secure an effective national system.

4. In response to a Canadian Nuclear Safety Commission (CNSC) expectation that Pickering Nuclear implement effective fish impingement and entrainment mitigation measures, OPG installed a full coverage net barrier around the intake groyne. The installation met the scheduled completion date. During 2010, an evaluation of effectiveness of the barrier net in the context of overall station impingement is planned with the objective of demonstrating the ability of the mitigation measure in achieving the specified reduction targets.

5. In June 2009, the Ministry of Environment (MOE) posted a report "Report and Advice on the Ontario Drinking Water Quality Standard for Tritium". The report recommends an annual average of 20 Bequerels per litre (Bq/l) which would be the most stringent in the world. Currently, the World Health Organization has an annual average of 10,000 Bq/l, and the Canadian Guideline is 7000 Bq/l. Historical annual averages at drinking water supply plants in Durham Region (the location of OPG's Darlington and Pickering sites) are <20 Bq/l.

6. In the third and fourth quarter of 2009, the MOE Sector Compliance Branch reviewed performance at Pickering and Darlington generating stations. Preliminary indications are that the MOE will identify administrative deficiencies with the environmental programs.

7. Issues with sensitivity of chlorine measuring equipment and system material condition pose a risk of exceeding limits. Mitigation measures, including manual grab sampling and frequent surveillance, have been put in place until equipment upgrades are installed. These measures have been successful in avoiding exceedances.

8. Due to a maximum outfall temperature (specified in its Certificate of Approval (C of A)) exceeding limits in 2007, Pickering B has an amended C of A that is in effect until the end of 2010. Pickering B continues to experience elevated temperatures during algae runs. The barrier net is expected to reduce the risk of temperature exceedances.

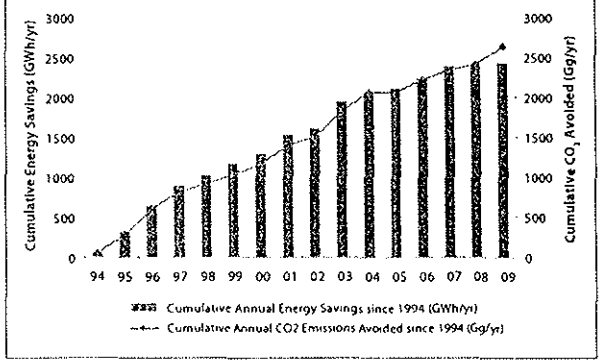
Energy Efficiency

OPG remains committed to programs that reduce its consumption of energy. Programs include specifying energy efficiency of new buildings, retrofitting existing buildings, procuring energy efficient equipment (such as computers), and upgrading the efficiency of turbine runners and transformers.

In 1994, OPG's predecessor company, Ontario Hydro, committed to an energy efficiency program, and 15 years later the program remains highly successful. Indeed, from 1994 – 2009, OPG's annualized energy savings have increased by 2,434 GWh, resulting in annual savings of $109.5 million (at an average of 4.5 cents/kWh paid to OPG) and emission savings of 2.63 million tonnes of CO_2 (Figure 2).

In 2009, OPG achieved new internal energy efficiency savings of 29.6 GWh/yr. This saving was primarily attributable to efficiencies in hydroelectric and real estate operations.

Figure 2: OPG Cumulative Energy and CO_2 Emission Savings 1994 - 2009



Energy efficiency results are reported on project completion. At year end 2009, within the hydroelectric division, 7 projects were completed including turbine runner upgrades at Cameron Falls GS, Ragged Rapids GS, Des Joachims GS, McVittie GS, frequency conversion at Sir Adam Beck GS, and transformer replacement at Harmon GS.

www.opg.com /safety/energy efficiency

"A number of conservation initiatives recently implemented at OPG's Corporate Office (700 University Avenue) contributed to a reduction in energy and water consumption. These initiatives include the improvements to the thermal storage tanks and installation of variable frequency drives for the on-floor comfort terminal fans to reduce electricity consumption, and the connection of cooling equipment to a separate closed loop dry cooler system, and installation of motion sensors in washrooms to reduce water use."

Within Real Estate services at OPG Head Office, resource efficiency initiatives resulted in the following improvements;

- Electricity consumption was 36,153 MWh, down 4.24% from 2008.
- Water consumption was 205,682 m^3, down 14.76% from 2008.
- Steam use was 20,436 m^3, down 10.9% from 2008.

Air

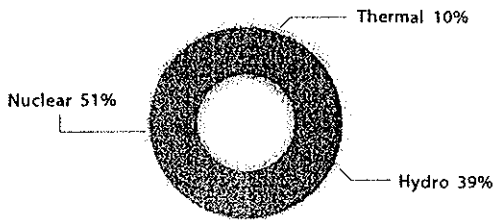
Generation Mix

In 2009, approximately 90 per cent of OPG's electricity production was derived from hydro and nuclear sources that were virtually free of air emissions causing smog, acid rain and global warming (see Figure 3).

The remaining production came from Thermal's five fossil-fuelled stations. Four of these stations use coal as their primary source of energy and one is dual-fuelled by oil and natural gas. An advantage of thermal stations, relative to nuclear and hydro facilities, is their capacity to respond to short term changes in peak demand for power.

OPG's thermal plants supply electricity demand that is not first met by other Ontario supply sources such as nuclear, hydro and Ontario's growing portfolio of alternative generation. They provide the flexibility to meet changes in demand that occur by the minute, day and year. They also provide the necessary backup required for intermittent sources like wind and solar. This flexibility means that electricity production from these plants and air emissions varies.

Figure 3: OPG Generation Mix (2009) 92,497 GWh



conservation and demand management projects, and any offsetting market revenues. Generators include OPG's nuclear and regulated hydroelectric facilities, non-utility generators under contract with the OEFC, and those under contract with the OPA (including generation under the Feed in Tariff initiative).

A significant quantity of new supply has been placed in-service over the last few years with even more expected to be deployed over the next several years. As the cost of this new generation is almost always in excess of prevailing market prices, the Global Adjustment has been increasing due to both the increasing quantity of new generation and declining market prices. Both of these factors were experienced in 2009. In 2007 the cost of the Global Adjustment was approximately $4/MWh; by 2008 the cost had risen to approximately $6/MWh, and to approximately $31/MWh in 2009. Because of the increasing size and impact of this non-energy cost item, OPG began to forecast the Global Adjustment explicitly for the 2008 budget. Forecast Global Adjustment expenditures are based on forecasts of capacity additions, expected production and production costs/prices as well as the impact and cost of conservation and demand management initiatives.

The various constituents that make up the IESO non-energy charge can be difficult to accurately forecast. As a result, the aggregate total of these charges is extremely difficult to accurately forecast. Accordingly, OPG is seeking approval of a new variance account to protect both itself and ratepayers from over or under collection of IESO non-energy charges. See Ex. H1-T3-S1, section 4.1 for additional details.

7.0 SCIENTIFIC RESEARCH AND EXPERIMENTAL DEVELOPMENT ("SR&ED") INVESTMENT TAX CREDITS

Canadian taxpayers that incur qualifying expenditures related to SR&ED activities, as defined by the *Income Tax Act* (Canada), can claim a non-refundable investment tax credit ("ITC") equal to 20 per cent of these qualifying expenditures on their income tax returns. SR&ED ITCs are recognized for accounting purposes as a reduction of OM&A expenses in accordance with GAAP. SR&ED expenditures and ITCs, including the determination of actual and forecast amounts of SR&ED ITCs recognized for accounting purposes and the timing of