

Reply to the Attention of	Laura Brazil
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Our File No.	211923
Date	November 28, 2014

Ontario Energy Board
P.O. Box 2319
2300 Yonge Street
Suite 2700
Toronto, Ontario M4P 1E4

Attention: Board Secretary

**Re: Greenfield South Power Corporation
Application for CPCN
EB-2014-0299**

Please find enclosed Greenfield South Power Corporation's Responses to Interrogatories of Union Gas Limited and Ontario Power Authority dated November 28, 2014, which are submitted further to Procedural Order No. 2 dated November 7, 2014.

A CD containing the excel spreadsheets that comprise Appendix 36 will be enclosed in the hardcopy delivered to your offices.

Yours truly,



Laura Brazil

/kk
Attach.

Copy to: Mike Richmond (McMillan LLP)

ONTARIO ENERGY BOARD

IN THE MATTER of the *Ontario Energy Board Act, 1998*, S.C. 1998, c. 15 (Schd. B);

AND IN THE MATTER OF an application by Greenfield South Power Corporation for a certificate of public convenience and necessity, pursuant to section 8 of the *Municipal Franchises Act*, R.S.O. 1990, c. M. 55.

GREENFIELD SOUTH POWER CORPORATION RESPONSES TO INTERROGATORIES

OEB-1

References: Evidence prepared by John Todd, President, Elenchus Research Associates, Inc. on behalf of Greenfield South Power Corporation, November 5, 2014, page 12, Table 4: Summary of Comparative Greenfield Costs; Union's Intervenor Evidence, page 16 table: Summary of Comparative Greenfield South Gas Services

Preamble: Both Greenfield and Union filed in their evidence a comparison of costs of 3 options to provide gas to the GEPP. The conclusions reached by both Union and Greenfield are different. Greenfield's analysis presents the Vector service option as most cost effective while Union's analysis presents Union's Rate T2 Interruptible, including storage costs to provide balancing services, as most cost effective.

Questions:

a)	Please create a new summary table which includes transportation and storage costs using Union's table on page 16 as a model.
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GSPC Response:

Please find below the following two tables: (i) summary table 4A showing transportation and storage costs, and (ii) summary table 4B showing transportation, storage and interruption costs.

Table 4A

Row	Service	Year 0 Capital Cost & Contribution (2015)	Annual Costs (20 years)		Present Value (2015)
			Transportation	Storage	
A	Vector FT-H and OVS	\$1,625,000	\$575,510	\$500,000	\$13,289,543
B	Union Rate T2 Interr.	\$250,000	\$1,483,000	\$500,000	\$19,525,667
C	Union Rate T2 Firm	\$250,000	\$2,612,000	\$500,000	\$31,770,341
D	Row B – Row A	(\$1,375,000)	\$907,490		\$6,236,124
E	Row C – Row A	(\$1,375,000)	\$2,036,490		\$18,480,798

Table 4B

Row	Service	Year 0 Capital Cost & Contribution (2015)	Annual Costs (20 years)			Present Value (2015)
			Transportation	Storage	Cost of Interruption	
A	Vector FT-H and OVS	\$1,625,000	\$575,510	\$500,000	\$0	\$13,289,543
B	Union Rate T2 Interruptible	\$250,000	\$1,483,000	\$500,000	\$540,000	\$25,382,287
C	Union Rate T2 Firm	\$250,000	\$2,612,000	\$500,000	\$0	\$31,770,341
D	Row B – Row A	(\$1,375,000)	\$1,447,490			\$12,092,744
E	Row C – Row A	(\$1,375,000)	\$2,036,490			\$18,480,798

b)	How does the new table (from above) compare to the table provided by Union. Discuss and explain any variances?
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GSPC Response:

Specific differences:

(1) The annual transportation costs for Vector T2 Firm service are shown above as \$2,612,000. Union's table showed \$2,602,000. Union appears to have omitted the \$10,000 O&M costs, which have been added to the Vector and the Union T2 Interruptible rate and therefore must similarly be added to the Union T2 Firm rate in order to generate a valid comparison.

(2) The table provided in Union's evidence reflected a cost of storage as follows:

- \$1,400,000 per year payable to storage service providers, when delivery service is provided by Vector; and
- \$342,336 per year payable to storage service providers, when delivery service is provided by Union.

Both of the figures provided by Union for storage costs are wrong.

Union's figure of \$1,400,000 for storage when using Vector assumed a storage requirement equal to the entire gas consumption of the GEPP if the GEPP were operating at maximum capacity 20 hrs per day, 7 days per week (i.e. 46,400 GJ/day). In fact, GSPC has determined that it can operate as necessary with approximately 16,459 GJ/day of storage deliverability. This volume is proportionately equivalent to the storage deliverability contracted by Greenfield Energy Centre and St. Clair Energy Centre. Each of the three generators have or propose to have approximately 50 GJ/MW/day of storage deliverability. The figures in Union's table reflect 155 GJ/MW/day of storage deliverability, with is neither reasonable nor common in the sector. GSPC's new tables above reflects an annual cost of storage of \$500,000, for 16,459 GJ/day, or 55 GJ/MW/day, of storage deliverability.

Further, in order to ensure equivalent flexibility, Greenfield would procure the same storage capacity whether gas is delivered by Vector or by Union, and therefore the \$500,000 figure has been included as the storage cost for all three scenarios.

(3) Union's table reflected a cost of \$0 for the capital costs necessary to install the lateral line to move gas from the Union connection point to the GEPP. Union concedes that the facilities required will be similar to the GEPP Natural Gas Utilization System, minus the metering facility. We have included a \$250,000 cost for this line, which the same amount that is included for the Vector option.

(4) All of the original tables reflected up front capital cost as being in "Year 1". This has now been corrected in all cases to reflect the capital costs being incurred in "Year 0".

(5) Table 4B has been provided to also reflect the estimated costs of gas service interruption on T2 Interruptible. These costs were described in page 8 of the Elenchus Report but not incorporated into the original Table 4 prepared by Elenchus.

Overall differences:

The NPV cost of the Union T2 Firm and Union T2 Interruptible services are slightly higher than in Union's table as a result of the \$500,000 cost of storage. The NPV cost of Union T2 Interruptible services are significantly higher in Table 4B than in Union's table because Table 4B reflects the cost of interruption.

The NPV cost of the Vector service is about \$11 million lower than Union had stated, because Union had quoted for 46,400 GJ/day of storage as opposed to the 16,459 GJ/day of storage that will in fact be procured.

As a result, Table 4A demonstrates that Union interruptible service is still over \$6,000,000 more costly than Vector firm, and that Union firm is still over \$18,000,000 more costly than Vector firm. Table 4B demonstrates that Union interruptible service is over \$12,000,000 more costly than Vector firm, and that Union firm is over \$18,000,000 more costly than Vector firm. In either case, Union's rates are neither competitive nor robust against bypass.

c)	How does this new table compare with the table presented in Greenfield's evidence, Summary of Comparative Greenfield Costs (page 12, table 4). Discuss and explain any variances?
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GSPC Response:

The table originally provided in the Elenchus evidence was intended to compare Union's cost of delivery service against Vector's cost of delivery service, without reference to ancillary services from third party suppliers unrelated to the Vector vs. Union options. That original table showed that, when comparing the service cost charged by Vector to the service cost charged by Union, the Vector option was over \$6 million more cost effective than Union's T2 interruptible service, and over \$18 million more cost effective than Union's T2 firm service.

The tables above compare the cost of Union delivery service and Vector delivery service, factoring in the cost of storage payable to third parties, in each scenario. When including storage costs in the comparison, the Vector option is still over \$6 million more cost effective than Union's T2 interruptible service, and is still over \$18 million more cost effective than Union's T2 firm service. There is no material change to the effective conclusion Union's services are neither competitive nor robust against bypass.

Specific differences:

(1) All of the original tables reflected up front capital cost as being in "Year 1". This has now been corrected in all cases to reflect the capital costs being incurred in "Year 0".

(2) Table 4B has been provided to also reflect the estimated costs of gas service interruption on T2 Interruptible. These costs were described in page 8 of the Elenchus Report but not incorporated into the original Table 4 prepared by Elenchus.

(3) The original Elenchus tables included the \$10,000 O&M costs, but these costs were not included in the NPV calculation. They are now included.

(4) A typo in Row E of the original table has been corrected. It erroneously showed Row C (\$2,612,000) minus Row A (\$575,510) as totalling \$1,036,490, instead of \$2,036,490. This has been corrected.

OEB-2

References: Union Gas Limited Intervenor Evidence, Exhibit A, Tab 1, Page 14 lines 9-14

Preamble: Union's intervenor evidence stated that when offering an interruptible service option to Greenfield, Union advised Greenfield that it would need to provide to Union a letter of credit. The letter or credit would be "...as secured collateral equal to the estimated capital cost of the supply facilities connected to the Sarnia Industrial line system (\$6 million) which would decline over the term of the contract." Union stated that the only acceptable alternative to the letter of credit would be a cash deposit or an OPA guarantee.

Questions:

a)	Please provide details of the option that the OPA provides a guarantee as an alternative to secured collateral provided by Greenfield.
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GSPC Response:

There is no such option. The OPA has no contractual obligation to provide a guarantee; GSPC has no contractual right to demand a guarantee and the OPA has not offered to provide a guarantee.

b)	Was the option that the OPA provides a guarantee as an alternative to a letter of credit by Greenfield considered by the parties during Union's negotiations with Greenfield? If so, what was Greenfield's position regarding this option?
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GSPC Response:

There was no such discussion because there is no such option. GSPC has no mechanism to cause the OPA to provide a guarantee to Union.

UNION-1

References: Greenfield South Application and Supplementary Evidence

Preamble: Greenfield South's application and the supplementary evidence prepared by John Todd of Elenchus Research Associates (page 3) state that the total capital cost of the GEPP Natural Gas Utilization System from the Vector Tap to the related metering facilities near the power plant is estimated to be \$500,000 (\$250,000 for GEPP underground pipe and fittings and \$250,000 for GEPP Meter & Control Station) and the cost of the Vector Tap is another \$1,125,000.

Questions:

a)	Will the GEPP Meter & Control Station be providing a regulated pressure supply? If yes, at what pressure?
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GSPC Response:

Yes. 475 psig.

b)	Please identify where and how the natural gas will be odourized.
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GSPC Response:

The current design includes gas odourization, but GSPC may ultimately not odourize the gas turbine natural gas, for the following reasons:

- (i) GSPC submits that automated methane detectors are superior for the detection of a gas leak because they are not subject to human error. A number of similar generation facilities have opted to use methane detectors as a superior tool to odourization.
- (ii) GE, as turbine manufacturer, prefers that odourant not be added.

Accordingly, GSPC's final design will include methane detectors.

c)	Please specify the protocols that will be in place, from an integrity management perspective, to ensure the safe and reliable delivery of natural gas from the Vector Tap to the GEPP.
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GSPC Response:

The integrity management protocols that will be in place to ensure the safe and reliable delivery of natural gas from the Vector Tap to GEPP are based on best industry practices (i.e. CSA Z662 and CEPA practices) and include:

- design to CSA and TSSA standards by qualified professional engineers;
- welding of pipe and fittings only by qualified welders;
- radiographic inspection of welds as per TSSA certificate and approved quality assurance plan;
- hydrostatic testing as per industry practices to be witnessed by QC staff;
- leak check testing;
- corrosion protection to industry standards (including use of jacketed pipe, wrapped joints and cathodic protection);
- continuous monitoring during operation by qualified operating engineers;
- regular visual inspection;
- annual leak checking using methane detection equipment; and
- prohibition on any powered digging within 5 m of any buried portion or any crossing by heavy equipment unless directly and continuously supervised by a professional engineer in accordance with prior approved written procedures.

UNION-2

References: Greenfield South Application (page CPCN-13) and Supplementary Evidence (page 7)

Preamble: Greenfield South indicates that it will be capable of operating as either a baseload or an intermediate generating resource on the Ontario power grid and that negotiations for natural gas delivery services were conducted with Union Gas between the summer of 2012 and the fall of 2013. Greenfield South submits that during that time, Union Gas presented two service options - Firm Service (T1 Service, which subsequently became T2 Service) and Interruptible Service.

Questions:

a)	Please confirm that Union prepared a Rate T2 interruptible service offer at Greenfield South's request.
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GSPC Response:

No. GSPC invited Union to provide all options which could result in a reasonable rate. GSPC did not specify T2 or any other rate.

Union determined on its own that a firm service connection to Vector would be cost-prohibitive (as stated in Union's Evidence at Page 13, Lines 2-5). Union also determined on its own that BCD would not be offered to GSPC (as stated in Union's Evidence at Page 13, Lines 7-9). Union also determined on its own that T2 service was the best option for GSPC (as stated in Union's Evidence at Page 13, Lines 11-17). However, the Union proposal was cost prohibitive for GSPC.

GSPC requested that Union identify any other options that could bring costs down to a reasonable rate. Union accordingly decided, again on its own, to propose a Rate T2 interruptible service (as stated in Union's Evidence at Page 13, Lines 26-27).

b)	Please explain why Greenfield South asked Union for an interruptible gas distribution service when it will have firm commitments to provide power as a Clean Energy Supply generator.
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GSPC Response:

As explained in (a) above, GSPC did not ask Union for an interruptible gas distribution service. GSPC asked Union to propose a reasonably priced service, which Union failed to provide.

c)	Please provide details of all gas supply arrangements that Greenfield South has put in place to date.
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GSPC Response:

GSPC has executed an Interconnect Agreement with Vector.

GSPC has not entered into any gas supply contracts at this point in time. The economics of the GEPP rely on the purchase of primarily spot gas at floating market prices, and the ability to deliver such gas to the GEPP when needed (thus the need for firm delivery service from Vector).

Eastern Power and its affiliates have existing gas supply arrangements in place in respect of their other facilities and could expand those arrangements to include the GEPP.

UNION-3

References: Greenfield South Pre-filed Evidence and Supplementary Evidence

Preamble: Greenfield South indicates in its pre-filed evidence that the GEPP Natural Gas Utilization System includes a NPS 8 inch high pressure steel pipe connected to the Vector pipeline (page CPCN-8), that the Vector Pipeline has sufficient physical gas transportation capacity to meet this requirement (page CPCN-13) and that it anticipates using a number of the Vector Pipeline services to meet its needs (page CPCN-16).

Appendix 34 of Greenfield South's supplementary evidence submitted November 5, 2014 is a letter dated October 26, 2012 from Vector Pipeline to Eastern Power Limited in which Vector proposes services to meet the proposed GEPP load of 2,320 GJ/hour. The Vector services are Firm Transport – Hourly (“FT-H”) and Operational Variance Service (“OVS”). Vector states in its proposal letter that for FT-H:

“There are two main requirements of this service. The first is that the receipt and delivery volumes need to be equal and synchronous each hour. This demands Eastern contract with a third-party storage provider that has a service that will match up with FT-H (both Union and Enbridge have such services). The second requirement is that nominations cannot be made for retroactive hours.”

For the OVS service, Vector states in its letter:

“Like FT-H, OVS requires a service from a storage provider that will match up to it”.

Greenfield South's supplementary evidence prepared by John Todd of Elenchus Research Associates includes a description of the Greenfield / Vector Service Option which is used to develop a comparative analysis versus acquiring service from Union Gas.

Questions:

a)	Please confirm that Greenfield South is unable to operate the GEPP in the manner represented in the Greenfield / Vector Service Option without contracting for services from a third-party storage provider.
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GSPC Response:

Greenfield will require services from a third-party storage provider or gas marketer to operate the GEPP. Greenfield has not denied in any of its submissions that storage is required.

b)	Please confirm Greenfield South's hourly requirement of 2,320 GJ/hour.
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GSPC Response:

No. GEPP's peak gas consumption is up to 2,320 GJ/hour. GEPP's actual hourly requirement may be significantly less for significant periods of time. Such consumption need not and will not all come from storage. Therefore 2,320 GJs of consumption does not necessarily require 2,320 GJs of storage. One of the many ways in which Vector service is superior to Union service is the flexibility that Vector's unbundled rate provides.

c)	Please provide details of discussions / correspondence with storage service providers with whom Greenfield South has contacted for the required services to match Vector's FT-H and OVS services.
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GSPC Response:

GSPC has had discussions with Union in respect of storage services. GSPC respects Union's right to preserve the confidentiality of its pricing and services in a competitive field such a storage and therefore does not intend to disclose any further information about such discussions.

If any other discussions had taken place with direct competitors of Union, they would similarly contain commercially sensitive information and be the subject of confidentiality undertakings. It would be commercially unreasonable and an indication of bad faith for Union to expect to receive its competitors' confidential pricing and other information in the midst of an ongoing competitive procurement for storage.

In any event, GSPC has not entered into any storage arrangements with any service providers yet, in part because it would be commercially imprudent to enter into storage contracts while the present CPCN application is outstanding.

d)	Please provide the status of the contracts for each of these third party storage services.
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GSPC Response:

GSPC has not entered into any third party storage contracts, since it would be commercially imprudent to enter into storage contracts while the present CPCN application is outstanding. However, GSPC believes that there are multiple storage service options available for contract.

e)	Please describe and detail the costs of the third party services required to match Vector's FT-H and OVS services.
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GSPC Response:

GSPC intends to contract for approximately 16,459 GJ/day of high deliverability storage to balance its gas supply and gas consumption on the Vector pipeline. The high deliverability storage required by GSPC is subject to market pricing and is not readily available in published rate schedules. Greenfield estimates the cost of 16,459 GJ/day of storage deliverability at market rates to be approximately \$500,000 per year.

GSPC then benchmarked this volume against the storage volumes contracted by Greenfield Energy Centre to confirm the appropriateness of the volume identified by GSPC. The GEPP is approximately 70% smaller than the Greenfield Energy Centre (300 MW vs. 1,005 MW), and GEPP intends to contract for approximately 70% less storage deliverability than the Greenfield Energy Centre (16,459 GJ/day vs. 54,862 GJ/day).

Even if GSPC were to receive delivery service from Union under Union's T2 Rate, GSPC would still be required to purchase market priced storage, just as it would for a Vector connection, because only a limited amount of cost-based storage space and deliverability is available to large natural gas power generation customers such as GSPC.

f)	Please indicate if any third-party storage provider has confirmed in writing whether firm services are the available to match Vector's FT-H and OVS services.
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GSPC Response:

It is GSPC's understanding, from discussions with Vector and others, that such services are available from Union, Enbridge and others. Greenfield Energy Centre, which is located nearby and similarly connects to Vector, has contracted with both Union and Enbridge (as evidenced by Tabs A and B attached to GSPC's interrogatories to Union).

UNION-4

References: Greenfield South Supplementary Evidence

Preamble: Greenfield South's supplementary evidence prepared by John Todd of Elenchus Research Associates includes tables 1, 2, 3 and 4 where capital and operating costs are translated into a Present Value.

Questions:

a)	Please provide all data and assumptions used in the calculations and a copy of the live Excel spreadsheet with formulas intact of the annual figures for the discounted cash flow showing the derivation of the present value for each of tables 1, 2, 3 and 4.
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GSPC Response:

The requested information, to the extent it is available, is attached as Appendix 36. A copy of the Excel spreadsheet will be provided to Union's counsel, as the OEB filing system does not allow for the posting of Excel files in their native format.

b)	Please provide details of the cost of the storage services matching up with the FT-H service on an annual basis and how Mr. Todd has included this in the discounted cash flow for table 1 and, if not included, why this significant cost is excluded in the analysis.
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GSPC Response:

The cost of storage services were not reflected in the original table, as the table was intended to compare the direct costs of the Vector service versus the direct costs of Union T2 and T2 interruptible services (i.e. apples to apples, being without storage vs. without storage). A further "apples to apples" comparison reflecting with storage vs. with storage can be found in GSPC's response to Interrogatory OEB-1.

c)	Please provide details of the cost of the storage services matching up with the OVS service on an annual basis and how Mr. Todd has included this in the discounted cash flow for table 1 and, if not included, why this significant cost is excluded in the analysis.
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GSPC Response:

The cost of storage services were not reflected in the original table, as the table was intended to compare the direct costs of the Vector service versus the direct costs of Union T2 and T2 interruptible services. A further comparison which includes market costs for ancillary storage services can be found in GSPC's response to Interrogatory OEB-1.

d)	Please reproduce tables 1 and 4 with the anticipated costs of the required storage services included.
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GSPC Response:

Table 4 has been reproduced as requested in GSPC's response to Interrogatory OEB-1. Table 4 aggregates all of the data that would be found in Tables 1, 2 and 3.

UNION-5

References: Greenfield South Supplementary Evidence

Preamble: Greenfield South's supplementary evidence prepared by John Todd of Elenchus Research Associates includes a reference to an Interconnection Agreement with Vector Pipeline under which Greenfield South will transport natural gas to the GEPP using Vector's Hourly Firm Transportation Service (FT-H) and Operation Variance Service (OVS). Mr. Todd states (page 3) that the FT-H service is a firm service; hence, unlike the Union Service Option, it cannot be curtailed during periods of high natural gas demand.

Appendix 34 of Greenfield South's supplementary evidence submitted November 5, 2014 is a letter dated October 26, 2012 from Vector Pipeline which indicates that the primary receipt point for its FT-H service is Union-Dawn or Sombra-Enbridge Gas Distribution.

Question:

	Please provide details of the firm transportation service that Greenfield South has contracted to ensure firm capacity is available from the receipt point to the delivery point where Greenfield South interconnects with Vector Pipeline.
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GSPC Response:

GEPP will receive firm transportation service from Vector pursuant to Vector's 15-year offer for FT-H and OVS service, a copy of which was included as Appendix 34 to GSPC's Supplementary Evidence.

Such service has a receipt point of Union-Dawn or Sombra-Enbridge, and a delivery point at the new interconnection with Eastern Power (being the Vector Tap).

Such Vector service will therefore provide firm transportation from Union-Dawn or Sombra-Enbridge to the GEPP Natural Gas Utilization System.

UNION-6

References: Greenfield South Supplementary Evidence

Preamble: Greenfield South's supplementary evidence prepared by John Todd of Elenchus Research Associates suggests (page 8) that under Union's Rate T2 interruptible service, Greenfield South's gas supply will be interrupted periodically. Greenfield South has estimated that each day that its gas supply is interrupted is likely to result in a loss of net income in the order of \$135,000.

Appendix 31 of Greenfield South's supplementary evidence identifies natural gas service interruptions in Enbridge's Central Delivery Area.

Question:

	Please explain how the reliability of service in Enbridge's CDA is an accurate indicator of service reliability on Union's Sarnia Industrial Line.
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GSPC Response:

Union's T2 interruptible service allows for up to 40 days of interruption per year, not the 4 days that GSPC has estimated.

In order to compare different services (firm and interruptible services), GSPC needed to assign a cost to potential interruptions under interruptible service options, as explained in GSPC's original submissions. Although GSPC could have used 40 days per year, since that is the only figure provided by Union to date, GSPC instead used 4 days per year which is just 10% of the maximum allowed under the Union service.

GSPC provided recent interruption history from Enbridge's CDA because this information was available to GSPC and confirmed that our estimate was reasonable. The average days of interruption in Enbridge's CDA was 6.125 for the last 4 years; in its analysis, GSPC gave Union the benefit of the doubt and assumed just 4 days of interruption under Union service, which is approximately 33% fewer interruptions than the average in Enbridge's CDA.

Potential gas interruptions create a risk for GSPC and GSPC needs to look at a 20 year period to match its power contract with the OPA. GSPC feels its estimate is reasonable given that GSPC will be required to bear all of the costs of potential interruptions.

We note that Union has neither offered any more accurate data in respect of its own system, nor offered to limit the potential number of interruptions to a number less than 40 per year. If Union will guarantee less than 4 days of interruption per year on its system, then GSPC would concur that its estimate of losses should be reduced to less than 4 days as well.

UNION-7

References: Greenfield South Supplementary Evidence

Preamble: Greenfield South's supplementary evidence prepared by John Todd of Elenchus Research Associates indicates that the annual cost of credit support for the Union interruptible service option is estimated to be \$402,000 initially based on Union's requirement to post an initial \$6 million Letter of Credit which would decline over the term of the contract. The cost of credit support for the Vector Pipeline connection is estimated to be \$35,510 annually.

These costs of credit support are based what appears to be a weighted average cost of capital of 6.7% associated with the Green Electron Power Plant (per Appendix 27).

According to the Ontario Energy Board's EB-2009-0084 Report of the Board on the Cost of Capital for Ontario's Regulated Utilities, the deemed capital structure for electricity generators is determined on a case-by-case basis (page 50).

Questions:

a)	Please provide documentation and explanations of the capital structure, debt rate and equity return level assumed in Greenfield's calculations in Appendix 27.
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GSPC Response:

GSPC is not a regulated utility and does not apply to the Ontario Energy Board to set its rates. GSPC is an independent power producer that has a contract with the OPA. GSPC is unable to recover additional costs that it incurs from ratepayers which is why GSPC needs to minimize its capital and operating costs.

GSPC used a reasonable discount rate to compare the different services available on a net present value basis given the differences in initial capital and operating costs. GSPC used a discount rate of 6.7% to compare the various services. The details of the assumptions used to determine this rate were provided in Appendix 27 of GSPC's Supplementary Evidence, and are restated below for convenience.

Weighted Average Cost of Capital (WACC) Inputs		
Cost of Debt	6.00	%
Tax Rate	25.00	%
% Equity (for WACC)	40.00	%
% Debt (for WACC)	60.00	%
Required Equity Return	10.00	%
Weighted Average Cost of Capital (WACC)	6.70	%

GSPC assumed a deemed capital structure of 40% equity and 60% debt. GSPC assumed a cost of long term debt of 6%, an equity return of 10%, and tax rate of 25%. GSPC believes these amounts to be reasonable for an independent power producer.

b)	Please confirm that the Ontario Energy Board's current weighted average cost of capital for an electricity generator assuming a deemed capital structure of 40% equity, 60% debt is 6.56%.
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GSPC Response:

GSPC does not apply to the OEB to approve its rates, and therefore is not aware of the OEB's WACC for a generator with a deemed capital structure of 40% equity and 60% debt. Nonetheless, if Union prefers to use a WACC of 6.56% instead of 6.70%, then the new Tables 4A and 4B, with storage and interruption costs reflected, would be as follows:

Table 4A -2

Row	Service	Year 0 Capital Cost & Contribution (2015)	Annual Costs (20 years)		Present Value (2015)
			Transportation	Storage	
A	Vector FT-H and OVS	\$1,625,000	\$574,768	\$500,000	\$13,411,107
B	Union Rate T2 Interr.	\$250,000	\$1,474,600	\$500,000	\$19,679,928
C	Union Rate T2 Firm	\$250,000	\$2,603,600	\$500,000	\$32,060,753
D	Row B – Row A	(\$1,375,000)	\$899,832		\$6,268,822
E	Row C – Row A	(\$1,375,000)	\$2,028,832		\$18,649,646

Table 4B-2

Row	Service	Year 0 Capital Cost & Contribution (2015)	Annual Costs (20 years)			Present Value (2015)
			Transportation	Storage	Cost of Interruption	
A	Vector FT-H and OVS	\$1,625,000	\$574,768	\$500,000	\$0	\$13,411,107
B	Union Rate T2 Interr.	\$250,000	\$1,474,600	\$500,000	\$540,000	\$25,601,669
C	Union Rate T2 Firm	\$250,000	\$2,603,600	\$500,000	\$0	\$32,060,753
D	Row B – Row A	(\$1,375,000)	\$1,439,832			\$12,190,562
E	Row C – Row A	(\$1,375,000)	\$2,028,832			\$18,649,646

Even with storage costs reflected, as Union suggested they should be, and even using a WACC of 6.56%, as Union suggested, the present value cost of Union T2 interruptible service is still over \$12,000,000 greater than the present value cost of Vector firm service, and the present value cost of Union T2 firm service is still over \$18,000,000 greater than the present value cost of Vector firm service.

No matter what inputs Union changes, Union has still not provided an offering that is either comparable to or robust against bypass.

UNION-8

References: Greenfield South Application, Appendix 14

Preamble: In Appendix 17.4 (AMEC Natural Resources Baseline Report and Environmental Impact Study East Site) of the Environmental Screening and Review Report prepared by Greenfield South found in Appendix 14, Species at Risk are discussed at pages 16-23 and 32-41.

The AMEC Report states that there is the potential for Blanding's Turtle, Butler's Garter Snake and the Eastern Fox Snake to be found in the vicinity of the proposed Vector Pipeline connection and the proposed pipeline from Vector to the Greenfield South power plant. At page 33 of its report, AMEC recommends that continuing consultation with the MNR is required and that further species- specific considerations may be required depending on the outcome of consultation with the MNR.

Questions:

a)	Please provide copies of any studies that have been completed in regard to Species at Risk.
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GSPC Response:

An on-site field study was conducted on September 10, 2012 and reported as part of the November 2012 AMEC Natural Resources Baseline Report and Environmental Impact Study East Site, a copy of which can be found at Appendix 14 of GSPC's Pre-Filed Evidence, and is the Report referenced in Union's question. At page 18 of the Report, AMEC notes that no Species at Risk were observed at the site during such on-site field study.

b)	Please provide a list of all mitigation measures that will be implemented to protect Species at Risk.
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GSPC Response:

Mitigation measures to protect Species at Risk during construction are those as identified on page 33 of the AMEC Natural Resources Baseline Report and Environmental Impact Study East Site, which can be found at Appendix 14 of GSPC's Pre-Filed Evidence, and which is reproduced here for convenience:

Prior to construction, the MNR should be consulted again by the proponent for potential guidance and to determine the appropriate course of any action required relative to process requirements and any additional mitigation measures to those identified below that may be appropriate relative to the potential presence of SAR in the Project study area. On the basis of inferred habitat use and the assumption of potential SAR presence on site as noted previously, the following specific mitigation measures that may be considered for the minimization and/or avoidance of significant adverse environmental effects during construction include:

- *During construction, construct silt fencing to keep wildlife out of Project footprint. Avoid use of silt fencing with nylon mesh netting reinforcing the regular, woven plastic strand material. Large-bodied snakes become entangled in this mesh and perish.*
- *Routine surveillance could be conducted to ensure that there is no SAR present at the work site. Identification material for potential SAR should be provided to construction contractors.*
- *Those working on the project shall alert the Project Manager if any SAR or those thought to be SAR are observed at the work site.*
- *Should a SAR be encountered at any time during the Project, work shall be stopped in the vicinity of the individual until the SAR can retreat to a safe distance or until measures can be implemented to avoid destruction, injury, or interference with the species, its residence and/or its habitat.*
- *Should any species designated as "Threatened" or "Endangered" be encountered during the progress of construction within the study area, MNR will be contacted immediately to determine any requirements pursuant to the ESA 2007.*

c)	Please provide copies of any permits Greenfield South has obtained in relation to Species at Risk, or Letters of Advice from the Ontario Ministry of Natural Resources and Forests.
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GSPC Response:

The MNR determined that permits in relation to Species at Risk were not required. Copies of Letters of Advice (LOA) AYL-L-070-13 and AYL-1-003-14 from the MNR are attached as Appendix 37.

d)	Please provide the results of the recommended consultation with MNR in relation to the proposed construction of the Vector tie in, and the proposed pipeline from Vector to the Greenfield South power plant.
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GSPC Response:

Greenfield South Power Corporation consulted further with the MNR in relation to SAR mitigation measures to be employed during construction on March 25, 2013 (copy of AMEC meeting notes attached as Appendix 38), and later consulted again regarding construction of a temporary rail crossing south of the power plant, and yet again for a permanent rail crossing west of the power plant. The MNR was advised at the March 25, 2013 meeting that natural gas supply to the project was to be obtained on the project property itself, with supplier pipelines already on the south end of the site and thus avoiding the need to run new gas supply lines south from Oil Springs Line and across Government Drain #10. The MNR indicated their SAR concern for the project was restricted to the rail corridor along the west border of the site, and that MNR were supportive of the Government Drain #10 crossing construction plan for which they provided advice at the meeting. The MNR later provided Letters of Advice (attached) in relation to construction of both of the rail crossings. All MNR requirements have been complied with.

UNION-9

References: Greenfield South Application, Appendix 14 and Amended Application

Preamble: At page CPCN-15 of its amended evidence, Greenfield South states that “Vector has already been federally authorized to proceed with the Vector Tap”. At Appendix 11 of its application, Greenfield South provides a copy of the National Energy Board Streamlining Order XG/XO-100-2012. Step 2.7 of the Streamlining Order states that “the project will not impact Schedule 1 Species at Risk Act species (plant and/or wildlife) or habitat”.

In Appendix 17.4 (AMEC Natural Resources Baseline Report and Environmental Impact Study East Site) of the Environmental Screening and Review Report prepared by Greenfield South found in Appendix 14 of its application, Species at Risk are discussed.

Question:

	Please explain how step 2.7 of the Streamlining Order has been addressed by Greenfield South.
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GSPC Response:

The proposed Vector Tap is entirely on GSPC property, for which SAR presence is only of low or moderate risk, and for which accepted SAR mitigation measures are in place for construction. The Vector Tap is east of, and does not impact, the rail corridor of SAR concern to the MNR. The Vector Tap is under agriculturally cultivated land which is not habitat for any SAR. The Vector Tap is in the same area as the proposed temporary rail crossing shown in drawing 402-20-12 REV D which was reviewed by the MNR and was addressed from a SAR perspective by LOA AYL-L-070-13. Therefore the requirements of Step 2.7 of the Streamlining Order have, in GSPC’s view, been addressed.

Notwithstanding the foregoing, this Application is submitted by GSPC for a Certificate of Public Convenience and Necessity to allow GSPC to construct the GEPP Natural Gas Utilization System. This Application does not apply to, and no permission is being sought for, any work by Vector on the Vector Tap. The Vector Tap is not a work of the Applicant; it does not form part of the GEPP Natural Gas Utilization System; and issuance of the requested CPCN will not serve to authorize the Vector Tap.

It is Vector’s responsibility to obtain whatever licenses, permits or orders it requires in order to construct its own works. The Board must consider the application before it, which is for construction of the GEPP Natural Gas Utilization System by GSPC – not for construction of the Vector Tap by Vector.

GREENFIELD_IRR_OPA_&_UNION_20141128

APPENDIX 36
[Provided on CD in hard copies]

**Ministry of
Natural Resources**
615 John Street North
Aylmer ON N5H 2S8
Tel: 519-773-9241
Fax: 519-773-9014

**Ministère des
Richesses naturelles**
615, rue John Nord
Aylmer ON N5H 2S8
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Télé: 519-773-9014



October 22, 2013

AYL-L-070-13

Bruce E. Holbein, Ph. D
Eastern Power Ltd.
2275 Lake Shore Boulevard West, Suite 401
Toronto, ON M8V 3Y3

Dear Mr. Holbein:

RE: Temporary Rail Access for the Green Electron Power Project and the *Endangered Species Act, 2007*

The Ministry of Natural Resources (MNR) has reviewed the information that you provided on October 15, 2013 regarding the proposed temporary rail access for the Green Electron Power Project in the Township of St. Clair. The information provided was assessed by MNR for potential impacts of the proposal on endangered or threatened species and their habitats. From the information provided, it is our understanding that the proposed project falls within these parameters:

- a) Project description – construction of a temporary rail access to accommodate the delivery of larger, heavy and oversize equipment that will be off-loaded from the CN rail line adjacent to the Green Electron property. The rail access will be 38.4 metres wide, extending from the construction site, through the existing ditch and ending at the rail line. The access will be constructed using a geotextile barrier, 25 millimetre clear stone and engineered fill.
- b) Project location – Green Electron Power Plant, Lot 26 Concession 2, in the former Geographic Township of Moore, Oil Springs Line, Township of St. Clair, Lambton County.
- c) Timing of activities – the access will be constructed by the end of October 2013 and removed by the end of February 2014.
- d) Engineering designs for the temporary rail access as currently proposed were provided to the MNR Aylmer District office on October 15, 2013.
- e) There are known occurrences for Eastern Foxsnake (Carolinian population) in the railway corridor. Eastern Foxsnake (Carolinian population) is listed as endangered and receives species and regulated habitat protection under the *Endangered Species Act, 2007* (ESA 2007). The rail corridor falls within the area protected by the habitat regulation for Eastern Foxsnake. In addition, there is potential for Butler's Gartersnake to occur in the rail corridor based on known occurrences in the area of the project and habitat suitability of the corridor. Butler's Gartersnake is listed as endangered and receives species and general habitat protection under the ESA 2007.

Based on a review of the above information, Ministry staff have determined that the activities associated with the temporary rail access, as currently proposed, **will likely not contravene** section 9 (species protection) and/or section 10 (habitat protection) of the *Endangered Species Act, 2007* (ESA 2007) for Eastern Foxsnake (Carolinian population) or Butler's Gartersnake **provided the following recommended conditions are implemented:**

- 1. The rail access will be removed no later than end of February 2014 in order for the corridor to remain functional for species at risk snakes following emergence from overwintering sites.

2. Green Electron will contact MNR to confirm the removal of the geotextile membrane and fill materials and provide photographs of the existing site conditions, including vegetation growth. If vegetation fails to grow in the temporary rail access area during the spring 2014, MNR should be contacted for advice.
3. The area of snake exclusion fencing adjacent to the rail access should be closed as soon as the access is no longer needed (i.e. by March 1, 2014) to ensure the functionality of the fence in preventing species at risk snakes from entering the construction site.

Please note that proper snake exclusion fencing should be 1.2 metres in height above grade and buried a minimum of 20 centimetres below grade. The geotextile material should be placed on the outer side of the fence (closest to the railway corridor) so that the wooden stakes are on the construction side of the fence, preventing Eastern Foxsnake from climbing the fence. This fencing design should be implemented along the entire western boundary adjacent to the rail corridor which is species at risk habitat. This fencing should be in place by March 1, 2014.

If these conditions are implemented, the activity would likely not be prohibited under section 9 (species protection) or section 10 (habitat protection) of the ESA 2007.

If any protected species and/or habitats are observed in the project area, please contact the MNR Aylmer District office as soon as possible.

Should any of the project parameters change, or if it is not possible to comply with the above conditions, please notify the MNR Aylmer District office immediately to obtain advice on whether the changes may result in the requirement for an authorization under the ESA 2007. Please be advised that applying for a permit/agreement does not guarantee approval and processes can take several months.

Please be advised that it is also your responsibility to be aware of and comply with all other relevant provincial or federal legislation, municipal by-laws, other MNR approvals or required approvals from other agencies.

It is important to be aware that changes may occur in both species and habitat protection. The ESA 2007 applies to species listed on the Species at Risk in Ontario List (www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/246809.html). The Committee on the Status of Species in Ontario (COSSARO) meets regularly to evaluate species for listing and/or re-evaluate species already listed. As a result, species designations may change that could in turn change the level of protection they receive under the ESA 2007. Also, habitat protection provisions for a species may change (e.g. if a species-specific habitat regulation comes into effect). The regulation would prescribe the area as the habitat of the species.

If you have any concerns or questions regarding this letter, please contact me at 519-773-4748 or by email at ESAScreeningRequest.AylmerDistrict@ontario.ca.

Sincerely,



Kathryn Markham
Species at Risk Biologist
Aylmer District
Ministry of Natural Resources

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Natural Resources**
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February 14th, 2014

AYL-L-003-14

Bruce E. Holbein, Ph. D
Eastern Power Ltd.
2275 Lake Shore Boulevard West, Suite 401
Toronto, ON M8V 3Y3

Dear Mr. Holbein:

RE: Green Electron Permanent Rail Crossing and the *Endangered Species Act, 2007*

The Ministry of Natural Resources (MNR) has reviewed the information that was provided via email on February 7th, 2014 on the proposed permanent rail crossing for the Green Electron project to assess the potential impacts of the proposal on endangered or threatened species and their habitats.

From the information provided, it is our understanding that the proposed project falls within these parameters:

- a) Project location – Green Electron project site, Lot 26 Concession 2, in the former Geographic Township of Moore, Oil Springs Line, Township of St. Clair, Lambton County
- b) The proposed project involves the construction of a permanent crossing through the rail corridor along the western property boundary for access to the disconnect switch adjacent to the Hydro One right-of-way. The proposed work includes the following (as outlined in the attached engineer's drawing):
 - Installation of two (2) galvanized steel culverts (0.8m in diameter by 8m in length) on either side of the rail line. Installation will include shallow, open pit excavation.
 - Each culvert will have three (3) vertical light wells (0.8m in diameter). Culvert end openings and light well openings will be fitted with removable steel grating.
 - Culvert bottoms will be lined with 0.5 to 0.7m of river rock with natural soil substrate cover.
 - An access road (6m wide) will be constructed on both sides of the rail line, with a minimum of three (3) meters of cover about the culverts.
- c) The proposed work will begin as soon as possible and will be completed by April 2014.
- d) MNR has reviewed species at risk (SAR) occurrence information on file and determined that there are known occurrences of Eastern Foxsnake (Carolinian population) in the railway corridor. Eastern Foxsnake (Carolinian population) is listed as endangered and receives species and regulated habitat protection under the *Endangered Species Act, 2007* (ESA 2007). The railway corridor falls within the area protected by the habitat regulation for Eastern Foxsnake. In addition, there is potential for Butler's Gartersnake to occur in the railway corridor based on known occurrences in the area of the project and habitat suitability of the corridor. Butler's Gartersnake is listed as endangered and receives species and general habitat protection under the ESA 2007.

Based on a review of the above information, MNR has determined that the activities associated with the project, as currently proposed, **will likely not contravene** section 9 (species protection) and/or section 10 (habitat protection) of the *Endangered Species Act, 2007* (ESA 2007) for

Eastern Foxsnake and Butler's Gartersnake **provided the following recommendations are implemented:**

1. Disturbance and/or removal of vegetation at the culvert openings and in the railway corridor will be avoided as much as possible. If vegetation must be removed, reseeding/replanting in areas of vegetation removal must occur in Spring 2014 to restore suitable vegetation and related habitat functions to the site. Planting materials should include a mix of herbaceous and shrubby species.
2. Brush piles (2m in diameter x 1m in height) must be placed in any cleared area at an appropriate density (e.g. 5m apart) to allow for movement and protective cover while vegetation is re-establishing. Brush piles may be left permanently, if preferred, but should only be removed after new vegetation has been significantly established (i.e. to a minimum 50% ground cover with 0.5 m in average height).
3. Equipment, particularly large, heavy machinery, should not be stored in the railway corridor overnight while the project is being completed to reduce impacts to vegetation. The railway corridor should be free of all equipment and debris after works have been completed.
4. The grating installed on culvert end openings should have openings large enough to allow large-bodied snakes to pass through the culvert, while excluding predators, such as raccoons.
5. Larger rip-rap sized rocks should be installed along the banks adjacent to the culvert openings, in order to serve as potential habitat for Eastern Foxsnake.

If the above recommendations are implemented, the activity will likely not contravene section 9 (species protection) and/or section 10 (habitat protection) of the ESA 2007.

This Letter to Proponent (AYL-L-003-14) is valid until May 1, 2014.

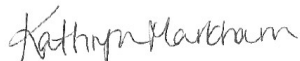
Should any of the project parameters change, or if it is not possible to comply with all of the above recommendations, please notify the MNR Aylmer District office immediately to obtain guidance on whether additional actions will need to be taken to remain in compliance with the ESA 2007.

It is important to note that changes may occur in both species and habitat protection which could affect whether proposed projects may have adverse effects on SAR. The ESA 2007 applies to endangered and threatened species listed on the Species at Risk in Ontario (SARO) List (http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_CSSR_SARO_LST_EN.html). The Committee on the Status of Species at Risk in Ontario (COSSARO) meets regularly to evaluate new species for listing and/or re-evaluate species already on the SARO List. As a result, species designations may change, which could in turn change the level of protection they receive under the ESA 2007. Also, habitat protection provisions for a species may change if a species-specific habitat regulation comes into effect.

Please be advised that it is also your responsibility to be aware of and comply with all other relevant provincial or federal legislation, municipal by-laws, other MNR approvals or required approvals from other agencies.

If you have any concerns or questions regarding this letter, please contact me at 519-773-4748 or by email at ESAScreeningRequest.AylmerDistrict@ontario.ca.

Sincerely,



Kathryn Markham
Species at Risk Biologist
Aylmer District, Ministry of Natural Resources



MINUTES OF MEETING

Date/Time March 25, 2013 /1:30 PM EDT
Location MNR Aylmer District Office
Subject Green Electron Update Meeting – East Site

File no. TC121601.6000
Written by R. Young

Present	Amanda McCloskey, MNR Brad Graham, MNR Katherine Markham, MNR Craig Newton, MOE Clinton Randolph, MOE (by phone)	Bruce Holbein, GSPC Ciro Polsinelli, GSPC Rob Young, AMEC Jeff Balsdon, AMEC
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	Items	Action
1.	Project status update (B. Holbein): <ul style="list-style-type: none"> Meeting is being held as part of the project's commitment in the ESRR to follow up with MNR with respect to SAR. An overview of the status of both East and West Sites was provided and noted the East Site was to be the focus of the meeting. Construction start on the East Site is scheduled for July, 2013. 	Info
2.	Discussion (All): <ul style="list-style-type: none"> MNR has provided comments to MOE (GSPC was not provided copies at the time). Comments were tabled for discussion. MNR clarified that these comments were provided after MNR's review of the ESRR as more detail on the East and West Sites was available in the ESRR versus the basis for their initial comments provided to Eastern Power and AMEC on September 21, 2012. MNR has information that SAR are using the railway corridor for movement. GSPC confirmed that the transmission line will be overhead and it was agreed that this will not affect SAR. Connectivity of corridors used by EFS and BGS is of concern to MNR. GSPC agreed and discussed measures to be taken with respect to the access road culvert crossing. MNR commented that the extent of snake exclusive fence suggested by GSPC would not likely be required. Recommended silt fencing and inspection would be preferred. GSPC reviewed a conceptual snake fence detail. MNR concluded that for construction a snake fence as shown in the detail would 	



ITEMS	ACTION
<p>not be required.</p> <ul style="list-style-type: none"> • GSPC also noted that the East Site will remain ploughed and will not be replanted in 2013. • Rule of thumb for snake movement in culverts is a maximum culvert length of 11 m. • MNR would prefer to see the grassed area along the drain preserved. GSPC confirmed that, except for the road crossing, the project will not disturb areas adjacent to the drain. • MNR's biggest concern is along the west side of the site and silt fence should be installed in that area. • EFS are adaptable to human environments therefore minimize attractive features for EFS during construction. • MNR prefers that rip-rap around the culvert. GSPC confirmed that 4"-6" rip-rap can be used. • MNR initially suggested the need for a hibernacula study along the railway but given the project timely, MNR would be satisfied with a snake exclusion fencing along the railway as a precautionary measure. • MNR will provide recommendations on location of snake exclusion fencing. • MNR will provide a "Letter to Proponent" once they receive input from GSPC in the form of responses to the comments tabled. • MNR can also provide a general advice letter which provide technical advice to GSPC. • MNR stated that they prefer the East Site. 	<p>MNR</p> <p>GSPC/MNR</p>
<p>3. West Site:</p> <ul style="list-style-type: none"> • MNR's position is that the West Site may be within 120 m of a PSW based on air photo interpretation and a policy approach that complexes all wetlands within 750 m of a PSW. 	