

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.

PRE-FILED EVIDENCE
OF THE APPLICANT
GREENFIELD SOUTH POWER CORPORATION
(AMENDED)

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SECTION 1 - OVERVIEW AND PURPOSE OF APPLICATION

Greenfield South Power Corporation (“**Greenfield South**” or “**the Applicant**”) has entered into a 20-year Amended and Restated Clean Energy Supply contract with the Ontario Power Authority (“**OPA**”) to construct and operate a new natural gas-fired power plant called the Greenfield Electron Power Plant (the “**GEPP**”) with 300 megawatts net nominal capacity. The original Clean Energy Supply contract was awarded to Greenfield South through the Ontario Ministry of Energy’s open and competitive request for proposals for 2500 megawatts of new, clean energy.

GEPP’s original location was Mississauga, Ontario. On July 10, 2012, it was announced that the GEPP would be relocated to St. Clair Township, south of Sarnia, Ontario.

The OPA has determined, by virtue of having entered into an Amended and Restated Clean Energy Supply in respect of the facility, that the GEPP is necessary and consistent with the Long Term Energy Plan approved by the Ontario Energy Board (“**OEB**”). The GEPP will generate power needed to meet Ontario’s projected peak electricity requirements, address electrical transmission system congestion and otherwise contribute to the economic health of the Province of Ontario.

To operate GEPP, Greenfield South will require a natural gas system to deliver natural gas from the natural gas supply point to the generating plant (the “**GEPP Natural Gas Utilization System**”). The GEPP Natural Gas Utilization System includes, without limitation, an NPS 8 inch high pressure steel pipe connected to the Vector pipeline and tap (located on the southern portion of the GEPP property). It will run underground for approximately 450 meters and connect to a metering and pressure reduction station. From that point, it will connect to and service the plant through various works and facilities, including: (1) A high pressure branch to feed the gas turbine via a fuel conditioning skid; (2) A medium pressure system to feed the duct burner in the HRSG; and (3) A low pressure system to feed miscellaneous plant equipment. The entire GEPP Natural Gas Utilization System would be located exclusively on Greenfield South’s privately-owned property. It would not cross any public or third party lands, any roads, or any other pipelines.

The GEPP Natural Gas Utilization System will be connected to the Vector pipeline at a tap (the “**Vector Tap**”). Vector Pipeline Limited Partnership (“**Vector**”) has already received all necessary regulatory approvals for the Vector Tap through the National Energy Board. Vector advises that the existing pipeline and any reconfigurations of such existing pipeline, including in our case the Vector Tap, are subject to the NEB’s Section 58 Streamlining Order. Accordingly, Vector has already been federally authorized to proceed with the Vector Tap and report same to the NEB in its annual submission.

Greenfield South seeks a certificate of public convenience and necessity under section 8(1) of the *Municipal Franchises Act* to construct and operate the GEPP Natural Gas Utilization System. The GEPP Natural Gas Utilization System is in the public interest. There is a demonstrable need for the GEPP Natural Gas Utilization System and Greenfield South and its affiliate Eastern Power Limited (“**Eastern Power**”) and their respective subcontractors have the experience and capability to construct and operate it.

There are no existing pipeline facilities that service the GEPP. As a result, the construction of the GEPP Natural Gas Utilization System will not duplicate or strand existing facilities and will have no negative effects on Ontario ratepayers. The GEPP Natural Gas Utilization System would have virtually no impact outside of Greenfield South-owned property, as it would not cross any public or third party lands, any roads, or any other pipelines.

In the OEB application bearing file nos. RP-2005-0022, EB-2005-0441, EB-2005-0442, EB-2005-0443 and EB-2005-0473, the OEB granted a certificate of public convenience and necessity for the applicant to construct a gas utilization system which included over 2 km of lateral natural gas pipeline to the nearby Vector pipeline in order to obtain the supply of natural gas for a power plant located near Sarnia, Ontario. The pipeline in that case crossed third party lands, roads, and other pipelines. The case at hand is similar in purpose but much simpler, as Greenfield South is merely seeking to construct a natural gas utilization system on its own property without any request for expropriations or crossings of any existing infrastructure, and the Greenfield South system does not trigger any “Leave to Construct” thresholds.

SECTION 2 - CORPORATE STRUCTURE

The Applicant Greenfield South is the developer and owner of the proposed GEPP and the sole owner of the lands on which the GEPP and the GEPP Natural Gas Utilization System will be situated.

Greenfield South is licensed by the OEB as an electricity generator to own and operate the GEPP, pursuant to EB-2009-0023.

Greenfield South is an Ontario corporation and an affiliate of Eastern Power. Eastern Power is an Ontario corporation that builds, owns, and operates clean and green power generation plants, and is also licensed by the OEB as an electricity generator, pursuant to EB-2003-0093.

Both Greenfield South and Eastern Power are wholly-owned by members of the Vogt family through one or more holding companies. A copy of each of the Greenfield South and Eastern Power OEB licenses is attached at Appendix 1.

Greenfield South intends to draw on Eastern Power's significant experience in the construction and operation of large-scale power generation facilities. Since its inception in 1985, Eastern Power has grown to become one of the largest green energy providers in Ontario. Eastern Power is active in the biogas, biomass, wind and high efficiency natural gas areas of power production. Eastern Power has owned and operated two of the world's largest landfill gas fuelled power plants, both located in the Greater Toronto Area: the Keele Valley Power Plant in Vaughan, Ontario, and the Brock West Power Plant in Pickering, Ontario. These plants have won awards from their local municipalities. Eastern Power Limited directly engineered, constructed and commissioned the Keele Valley Power Plant with primarily its own staff, including project management, engineering, construction management, and construction trades personnel.

Other than a certificate of public convenience and necessity, Greenfield South and Eastern Power have all requisite approvals required under all applicable laws to construct the entire project, including the GEPP Natural Gas Utilization System, including from the Technical Standards and Safety Authority.

Greenfield South and Eastern Power have proceeded with the construction of the GEPP and have to date completed the construction of almost all the foundations, most civil works, have substantially installed heavy, complex power plant machinery including the gas turbine, steam turbine, electrical generators, and a heat recovery steam generator, including casings, modules, and high pressure piping.

Since construction began on the GEPP in July 2013, there have been no lost-time accidents on the project, nor have there been any injuries to any member of the public.

Eastern Power's team on the GEPP currently includes 12 professional engineers, two construction safety officers, as well as qualified construction supervisors and licensed trades persons who have the requisite knowledge, experience and skill to undertake the design, construction and operation of the GEPP Natural Gas Utilization System.

Greenfield South has available the financial resources necessary to complete construction of, and to operate, the GEPP including committed financing for the GEPP from a major Canadian financial institution, to supplement equity financing from Greenfield South and an Amended and Restated Clean Energy Supply Agreement with the OPA.

SECTION 3 - GREENFIELD ELECTRON POWER PLANT

(a) Location

The GEPP will be located in the Township of St. Clair, south of Sarnia, in the County of Lambton. The address of the GEPP is 477 Oil Springs Line, Courtright, Ontario, N0N 1H0, and the legal description is:

PT LT 26 CON 2 MOORE; PT LOT 26 PL 24 MOORE; PR RDAL BTWEN LT 26 CONC 1 AND LOT 26 PL24 MOORE PART 1 TO 10, 25R1585, CLOSED BY MO28032; S/T L225170, L241804, L820086, L871611, L871615, L872940, L872941, PIN 43308-0105(LT), ST. CLAIR, ONTARIO, CANADA.

A map showing the location of the GEPP is found at Appendix 2.

The Ontario Government has eliminated all coal-fired electricity plants in the province on the basis that new and planned plants, such as GEPP, will provide sufficient energy.

In its July 8, 2005 *10 Year Outlook: An Assessment of the Adequacy of Generation and Transmission Facilities to Meet Future Electricity Needs in Ontario From January 2006 to December 2015* at p. 40, in its discussion of the Province's coal replacement plan, the IESO stated:

Replacement generation ideally should be located so that the existing import and export capability is not reduced. If replacement resources are located such that they utilize transmission capability that is normally required to deliver imported power, there could be a decrease in the supply available for Ontario consumers, and degradation in overall system reliability. Some offset of import capability with new resources internal to Ontario may be acceptable. Where practical this should be avoided by locating the replacement supply near the load, near existing generation sites or on transmission paths that do not connect the major tie lines to the load centre in the Greater Toronto Area.

A site plan is shown in Appendix 3. Existing land uses are shown in Appendix 4.

(b) Description of GEPP

GEPP is a combined cycle natural gas fuelled generating facility with nominal capacity of about 300 megawatts. It will consist of a 1x1x1 combined cycle power plant train, using:

- One gas turbine generator set fuelled by natural gas;
- One heat recovery steam generator with natural gas duct burner; and
- One triple pressure, reheat, full condensing steam turbine generator set.

A simplified diagram describing the operation of a combined-cycle gas turbine power plant is shown in Appendix 5.

Plant cooling will be provided by a wet mechanical draft cooling tower. The plant will use existing transmission infrastructure, local to the plant, connecting to an existing Hydro One circuit to feed into the IESO-controlled grid.

Natural gas will be the only fuel used. A sketch showing the proposed location of the GEPP Natural Gas Utilization System is shown in Appendix 6.

The project has completed an Environmental Assessment under O.Reg 116/01, which applies to electricity projects. An Environmental Compliance Approval for the project has been issued by the Ministry of the Environment. Greenfield South and/or Eastern Power have obtained the necessary approvals from the Technical Standards and Safety Authority (the “TSSA”) to allow installation of boilers and pressure vessels, power piping and fuel system components for the project. Applicable agreements have been entered into with utility companies and others including Hydro One Networks Inc. to allow for the interconnection of the GEPP with the high voltage grid as well as other utility services.

Site preparation of the GEPP began in July 2013. As of the date of this application, almost all of the foundations and other concrete structures are completed; almost all structural steel has been erected; several of the floors have been completed and the rest are underway; exterior siding is almost complete; roofing is underway; most major equipment has been installed at site including gas and steam turbines, generators, main output transformers, and heat recovery steam generator. Installation of power piping, electrical cabling and bus work, as well as auxiliary and the balance of plant equipment is underway. Installation of instrumentation and control equipment will begin shortly.

Photos of the plant showing the progress of construction are shown in Appendix 7.

SECTION 4 - GEPP'S FUEL REQUIREMENTS

(a) Peak Gas Consumption

GEPP will be a large consumer of natural gas. Under peak operating conditions, GEPP will be able to consume as much as 2,320 GJ of natural gas per hour. The GEPP Natural Gas Utilization System has been sized to meet this peak hourly gas flow requirement.

The Vector Pipeline has sufficient physical gas transportation capacity to meet this requirement. The Vector Pipeline is a high-pressure pipeline that extends 348 miles from Joliet, Illinois to the Dawn Hub in Ontario. The U.S. portion of the Vector system includes 274 miles of 42-inch diameter pipeline, and 59 miles of 36-inch diameter pipeline. Vector Pipeline connects with multiple pipelines in the Chicago area, including Alliance, Northern Border, and Guardian Pipelines. The Canadian portion is owned and operated by Vector Pipeline Limited Partnership and consists of 15 miles of 42-inch diameter pipeline from the international border to the Dawn Hub. Vector Pipeline commenced commercial operations December 1, 2000. A map of the Vector Pipeline is found at Appendix 8.

Vector Pipeline shippers include U.S. and Canadian gas distribution companies, natural gas marketers and electric power generators. The Vector Pipeline is already the sole gas transportation services provider to the Greenfield Energy Centre, a 1010 megawatt facility that is also located in St. Clair Township. The Vector Pipeline is also the sole gas transportation services provider for a 550 megawatt combined-cycle facility located in Jackson, Michigan, and is one of two suppliers for a 320 megawatt peaking plant in Crete, Illinois.

Vector Pipeline has end-to-end annual capacity of 1,345,800 GJ per day from Chicago to Dawn, and can seasonally transport a larger quantity, up to 1,646,000 GJ per day on the Canadian portion of its system. Because gas on Vector Pipeline generally flows from west to east, gas deliveries at the GEPP will typically be accomplished by dropping off gas that would otherwise flow further downstream to the Dawn Hub. If necessary, Vector Pipeline also has the operational capability to reverse the flow on the pipeline, so that the GEPP could be supplied by physically transporting gas to the plant from Dawn. No additional mainline pipeline capacity will need to be constructed by Vector to supply natural gas to GEPP.

(b) Total Gas Use

GEPP will be capable of operating as either a baseload or an intermediate generating resource on the Ontario power grid. Since GEPP is intended to displace coal-fired generation that traditionally served as a flexible source of power for load balancing and operating reserves, gas consumption will vary both hourly and daily, depending on load conditions and pricing in the power and natural gas markets. Assuming that the plant operates at an annual capacity factor between 20 percent and 50 percent, total annual gas use is expected to be in the range of approximately 4,000,000 GJ to 10,000,000 GJ.

(c) Required Delivery Pressure

The combustion process in a gas-fired turbine requires gas to be delivered to the plant at a relatively high pressure. To avoid the need for GEPP to install and operate additional gas

compression facilities, GEPP needs to receive natural gas into its gas conditioning and regulation facilities in the gas yard at the plant, at a minimum pressure of 450 psig. Vector Pipeline can meet this requirement. Vector Pipeline has a maximum operating pressure of 1,000 psig, and generally operates in the range of 700 psig to 750 psig on the Canadian part of its system. Based on the length and diameter of certain portions of the GEPP Natural Gas Utilization System, a delivery pressure of 700 psig at the interconnection with Vector Pipeline will provide a delivered pressure of at least 625 psig into the gas conditioning and regulation facilities for the highest pressure equipment at the plant.

(d) Gas Acquisition

Constructing the GEPP Natural Gas Utilization System to connect with the Vector Pipeline will give GEPP several options for supplying fuel to the plant. Under one option, GEPP will be able to purchase delivered natural gas at the inlet to the GEPP Natural Gas Utilization System from sellers holding transportation capacity on Vector Pipeline. Under this scenario, suppliers who would otherwise deliver gas to the Dawn Hub will be able to use Alternate Delivery Point rights under the Vector Pipeline tariff to deliver gas at the GEPP meter. Suppliers holding transportation rights to the Dawn Hub will be able to redirect gas to the GEPP meter without incurring additional charges on the Vector Pipeline. A second option would be for GEPP to purchase gas at the Dawn Hub and deliver the gas to the plant using its own transportation capacity on the Vector Pipeline. The main advantage to purchasing gas at the Dawn Hub is that the Dawn Hub offers a greater number of suppliers and increased transaction liquidity when compared to the market for delivered gas on the Vector Pipeline.

Under either of these options, GEPP will be able to buy gas at a commodity price that is at, or very close to, the Dawn Index. This is true whether GEPP purchases indexed gas under a term arrangement, or buys gas in the day-ahead market. The ability to purchase gas at a price tied to the daily Dawn Index is important to the ability of GEPP to minimize its financial risk under its Amended and Restated Clean Energy Supply contract with the OPA. The contract links the fuel component of the generation costs to the Dawn Index.

In addition to these two principal options, GEPP may also purchase gas at the Chicago Hub or at points in Michigan. GEPP would acquire forward-haul transportation capacity on Vector Pipeline to transport the gas from the point of purchase to the GEPP delivery meter.

Finally, GEPP will have the option of making interconnections with other pipelines in the future, including the TransCanada facilities that are located in the area. Connections to more than one major natural gas transmission system would provide further gas acquisition flexibility for GEPP.

(e) Vector Tap

Vector has executed an Interconnect Agreement pursuant to which Vector has agreed to install the Vector Tap, to which the GEPP Natural Gas Utilization System will be connected. A copy of the Interconnect Agreement is attached as Appendix 9. A detailed description of the Vector Tap can be found at Exhibit B to the Interconnect Agreement.

Vector advises that it does not require a certificate of public convenience and necessity nor OEB leave to construct because Vector and its works are federally regulated and therefore do not fall under the OEB's jurisdiction. The existing pipeline was authorized and approved by National Energy Board Order #GH-5-98 (attached at Appendix 10), and any reconfigurations of such existing pipeline, including in our case the additional of the Vector Tap, are subject to the National Energy Board Order XG/XO-100-2012 (the "**Streamlining Order**", attached at Appendix 11). Accordingly, Vector has already been federally authorized to proceed with the Vector Tap and report same to the NEB in its annual submission.

(f) Pipeline Transportation Services

Service on the Canadian segment of the Vector Pipeline is subject to the terms of Vector's tariff as approved by the National Energy Board. Vector currently provides transportation service under several rate schedules. In addition to standard firm transportation service under Toll Schedule FT-1 Firm Transportation Service and interruptible transportation service under Toll Schedule IT-1 Interruptible Transportation Service, Vector has three services that are specifically designed to meet the needs of gas-fired power generators or other end-users with large, variable loads:

- Toll Schedule FT-H Hourly Firm Transportation Service

FT-H service allows a shipper to transport gas on the Vector system over a period of hours that is shorter than the standard gas day, and to nominate gas up to one hour before the start of the delivery period. This service would allow a gas-fired power generator to supply a plant that operates only during the peak hours in the electricity market and to react to changes in dispatch. The FT-H toll schedule can be found at Tab 2 of Vector's transportation tariff, which is attached at Appendix 12.

- Toll Schedule MBA Management of Balancing Agreement Service

Under the MBA service, Vector facilitates hourly balancing of power generator fuel consumption by coordinating physical receipts and deliveries of natural gas at the plant meter and one or more third party balancing points. This allows the power generator to meet its need for operating flexibility by contracting for balancing service from parties who have pipeline or storage facilities connected to the Vector system. The MBA toll schedule can be found at Tab 6 of Vector's transportation tariff, which is attached at Appendix 12.

- Operational Variance Service

OVS is an add-on service to FT-H that provides a shipper a tolerance to handle differences between hourly nominations and hourly consumption. OVS also allows a shipper to have an

imbalance between gas nominations and gas consumption at the end of a gas day. OVS is used by a shipper to balance their gas nominations and gas consumption for variable loads. The OVS toll schedule can be found at Tab 6 of Vector's transportation tariff, which is attached at Appendix from October 2012 is found at Appendix 12.

The maximum monthly reservation charge for FT-H service on Vector Pipeline's Canadian segment (based on a 15-year contract term) is currently \$0.5705 per GJ of Contracted Capacity. The usage charge is \$0. Vector Pipeline does not retain fuel for gas transportation service within Canada.

GEPP anticipates using a number of the Vector Pipeline services to meet its needs, similar to the nearby Greenfield Energy Centre, which also uses a combination of Vector services to meet its fuel requirements.

(g) Balancing and Storage Services

GEPP will need to manage imbalances between the quantities of gas delivered to the plant and the plant's actual consumption. The extent of the plant's balancing requirements will depend on how the plant is dispatched. Generally speaking these requirements are greater for a peaking plant than a baseload plant. While GEPP is expected to operate initially as an intermediate generating resource on the Ontario power grid, the operation of the plant will change over time as demand increases, electric transmission facilities are modified, and power generation facilities enter and exit the Ontario system. Balancing can be provided through flexibility in gas purchase arrangements, through imbalance tolerance in gas transportation services, or through balancing and storage services.

Vector provides GEPP with access to a variety of competitive balancing and storage services, the ability to contract for a mix of services under flexible terms, as well as the ability to change its mix of services over time in response to changing electric power market demands. The Vector tariff allows shippers to have daily imbalances up to 5% of their Contracted Capacity without penalty. Shippers on the Vector pipeline can also reduce imbalances by netting and trading with other shippers.

Vector currently supplies transportation service to combined-cycle and peaking power plants that require access to third party balancing and storage services in order to operate. Vector provides access to balancing and storage services at the Dawn Hub and is also directly connected to several storage facilities in Michigan. Major storage operators with direct connections to the Vector Pipeline include Bluewater Gas Storage, Washington 10 Gas Storage and DTE Gas Company (formerly Michigan Consolidated). The connection points on the Vector pipeline are shown on the map found at Appendix 8.

As shown in below, these three operators control 255 Bcf of working storage capacity, compared with the 150 Bcf of working capacity operated by Union Gas at Dawn:

Michigan Natural Gas Storage Connected to Vector Pipeline

Facility	Bluewater	Washington 10	DTE Gas Company
Owner	PAA Natural Gas Storage	DTE Energy	DTE Energy
Working Capacity	27 Bcf	90 Bcf	138 Bcf
Withdrawal Capacity	700 MMcf/day	~2,000 MMcf/day	1.9 Bcf/day
Vector Pipeline Interconnect Capacity	500 MMcf/day	1,400 MMcf/day	1.5 Bcf/day

In addition to these direct connections, Vector Pipeline also has indirect access to an additional 800 Bcf of Michigan storage operated by Enbridge, ANR Pipeline, Consumers Gas and other smaller operators. This includes access for Vector customers to the Tecumseh Gas Storage facility in Ontario.

(h) Summary of GEPP Natural Gas Utilization System Cost

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. This cost breaks out as follows:

GEPP underground pipe and fittings	\$250,000
GEPP Meter & Control Station	\$250,000
TOTAL	\$500,000

This corresponds to an annualized capital cost of \$58,730 over the 20 year term of the Amended and Restated Clean Energy Supply contract, assuming a 10% cost of capital.

A summary of the annual cost of the GEPP Natural Gas Utilization System and associated firm transportation service on the Vector Pipeline to transport gas from the Dawn Hub is set out in Appendix 13. Note that GEPP is able to purchase natural gas at the GEPP meter from suppliers holding transportation capacity on Vector Pipeline.

SECTION 5 - THE GEPP NATURAL GAS UTILIZATION SYSTEM

(a) The GEPP Natural Gas Utilization System Facilities

The GEPP Natural Gas Utilization System consists of an NPS 8 inch high pressure steel buried line totalling approximately 450 meters in length connected at its upstream end to the Vector

Tap, a metering and pressure reduction station located near the GEPP buildings, together with branch piping leading to each of the pieces of natural gas consuming equipment in the GEPP.

As described above, the interconnection with the Vector Pipeline is under the jurisdiction of the National Energy Board. Vector has been federally authorized to construct the Vector Tap, which will connect the GEPP Natural Gas Utilization System to the Vector pipeline. Vector has agreed to the interconnection, as can be seen in the Interconnect Agreement found at Appendix 9.

(b) Selection of GEPP Natural Gas Utilization System Route

All equipment, including the entire GEPP Natural Gas Utilization System and the Vector Tap, will be located on the Greenfield South-owned project site. No equipment will be located on any third party public or private lands, nor will any such equipment cross any natural gas pipeline. A diagram of the proposed tap line and line route is attached as Appendix 6.

The GEPP carried out an Environmental Screening and Review Report (“**ESRR**”) pursuant to Ontario regulation 116/01. A copy of this report is attached as Appendix 14. It can also currently be viewed at <http://www.greenelectron.ca/electron.php?page=reports>.

During the screening process, some potential impacts were identified as requiring further assessment, particularly related to combustion emissions to the atmosphere and noise emissions. None of the potential impacts requiring further assessment were related to the construction of the GEPP Natural Gas Utilization System. The ESRR’s evaluation was that the environmental impact of the GEPP Natural Gas Utilization System would be very low, and entirely on Greenfield South-owned property. The impact is low due to the fact that the GEPP Natural Gas Utilization System would only run through an agricultural field without crossing or impacting any watercourse, wetland or area of natural or scientific interest, with the remainder being beside, between, and inside the GEPP buildings.

(c) Detailed Description of Proposed Route

The GEPP Natural Gas Utilization System will run from the southwest corner of the Green Electron Power Project site, entirely over agricultural land on Greenfield South-owned property to the GEPP in the centre of the site, as all shown in Appendix 6.

(d) Design Specifications and Construction Standards

Construction of the GEPP Natural Gas Utilization System involves a number of distinct steps that may result in environmental impacts. These steps include:

- site preparation;
- pipe delivery;
- trenching;
- joining pipe sections;

- lowering the pipe;
- backfilling;
- clean-up and restoration;
- connection to the GEPP metering, pressure-reducing, gas conditioning and gas-burning equipment; and
- testing.

The steps involved in site preparation have been completed and included staking the GEPP Natural Gas Utilization System location, identifying where other utilities are located, and clearing vegetation as required.

A description of the construction, commissioning, operation and maintenance procedures and associated environmental mitigation measures can be found at [Appendix 15](#).

The design specifications for the GEPP Natural Gas Utilization System are as follows:

Design specifications for the High Pressure Section of the GEPP Natural Gas Utilization System (Primarily Underground)

Design Code: ASME B31.1

MATERIALS		
PIPE	NPS	8"
	Specification	A106 Gr B, Sch 80 (below grade)/A333 Gr6 Sch 80 seamless (above grade)
	Diameter	219.1 mm (NPS 8")
	Wall Thickness	12.75 mm (0.5")
	Grade	241 MPa (SMYS CSA 245.1)
		118 MPa (MAS B31.1)
	Notch Toughness	Category I
FITTINGS	Specification	ASME B16.20 (600#)
VALVES	Specification	ASME B16.34 (ANSI 600#)
	Opening	Full Port
ELBOWS	Specification	ASME B16.9
	Dimensions	3D Radius (Long Radius)
FLANGES	Specification	ASME B16.5 (600#)
CORROSION CONTROL		

COATING	Specification	CSA Z245.21
	Trenched Pipe	2 Layer External Polyethylene Coating (Yellow Jacket)
	Bored Pipe	Not applicable
CATHODIC PROTECTION	Specification	CGA OCC-1
	Sacrificial Anodes	High-Potential Magnesium
TESTING		
STRENGTH TEST	Test Level	150% of Design Pressure (6.89 MPa)
	Maximum Pressure	10.35 MPa
	Duration	4 hr.
	Medium	Water
LEAK TEST	Test Level	150% of Design Pressure.
	Maximum Pressure	10.35 MPa
	Duration	4 hr.
	Medium	Water
OPERATING CHARACTERISTICS		
OPERATING PRESSURE	Maximum (MOP)	5.75 MPa
	Normal (NOP)	5.38 MPa
STRESS LEVEL	@ MOP	54%
	@ NOP	51%
	@ DP	66%
OTHER		
	Minimum Cover	1.2m

All applicable requirements of the TSSA will be met.

(e) Construction

Design and construction of the GEPP Natural Gas Utilization System will be carried out by Greenfield South and Eastern Power using a combination of their own forces and specialized licensed subcontractors with relevant experience constructing similar high pressure systems.

SECTION 6 - CONSTRUCTION SCHEDULE

Construction of the GEPP is over 50% complete with installation of the civil works almost complete and the installation of the major mechanical and electrical equipment well underway. Photographs of GEPP construction are attached as Appendix 7.

GEPP will need to have natural gas available for plant testing and commissioning by the end of December 2014. To be certain that the gas interconnection facilities will be ready in time for GEPP to meet its obligations under the Amended and Restated Clean Energy Supply contract, and avoid the need for winter construction, GEPP's proposed plan is to begin preparation for the construction of the GEPP Natural Gas Utilization System and metering facilities in September 2014 and to complete such installations by December 15, 2014. To meet this schedule, GEPP has already taken delivery of the piping and expects to receive the other materials shortly.

As provided above, all required financing is already in place and all material permits have already been obtained including the Environmental Compliance Approval and all necessary Building Permits and TSSA approvals.

SECTION 7 - OWNERSHIP AND OPERATION

(a) Ownership

The GEPP Natural Gas Utilization System will be owned by Greenfield South.

(b) Operation and Maintenance

GEPP operations staff and expert consultants, as necessary, will operate and maintain the GEPP Natural Gas Utilization System, and ensure compliance with all applicable environmental and safety regulations. The O&M and regulatory compliance activities related to the GEPP Natural Gas Utilization System will include:

- a) developing and maintaining an Operations and Procedures Manual;
- b) developing and maintaining an Emergency Response Plan;
- c) developing and maintaining an Operator Qualification Program;
- d) developing and maintaining a Pipeline Integrity Management Program;
- e) completing and submitting reports to government agencies as required;
- f) insuring all provided personnel are qualified in the Operator Qualification Program;
- g) providing all equipment, transportation, material and supplies necessary to perform routine services;
- h) performing and documenting a Class Locations study and update as required;

- i) performing and documenting patrols at required frequency;
- j) performing and documenting Leak Surveys;
- k) documenting and classifying any leaks discovered;
- l) performing and documenting all Cathodic Protection System inspections, tests, and surveys at required frequency;
- m) performing and documenting valve maintenance at required frequency;
- n) performing and documenting Over Pressure Protection testing at required frequency;
- o) providing 24/7 Gas Control monitoring of pipeline pressure;
- p) providing a phone number for emergency notification;
- q) responding to and participating in all agency compliance audits and inspections; and
- r) providing labour and supervision for pipeline maintenance.

Tasks performed by plant personnel will include:

- a) dehydration equipment operations or maintenance;
- b) condensate removal or disposal;
- c) communication equipment installation or maintenance;
- d) gas measurement equipment installation or maintenance;
- e) facility painting beyond routine spot painting;
- f) insuring all provided personnel are qualified in the Operator Qualification Program; and
- g) providing pipeline emergency response personnel.

Operation of the GEPP Natural Gas Utilization System will be subject to the requirements of the TSSA. Note however that Ontario Regulation 210/01, made under the *Technical Standards and Safety Act, 2000*, only applies to “transmitters” and “distributors” and their “pipeline” systems and “distributors”, which are defined as follows:

“distributor” means a person who conveys or supplies gas to an end user, but does not include a person who supplies gas to a vehicle or cylinder, and “distribute” and “distribution” have corresponding meanings;

“transmitter” means a person who supplies oil and gas by pipeline to a distributor, and “transmit”, “transmission” and “transmission line” have corresponding meanings;

“pipeline” means a pipe that is used for the transmission or distribution of oil and gas and includes fittings, valves, controls, compressor stations, pressure regulating stations, meter stations and pump stations, but does not include the pipe, fittings, valves or controls of the end user;

Since Greenfield South is the “end user”, it is therefore not a transmitter or a distributor, and no part of the GEPP Natural Gas Utilization System, including the 450 metre lateral pipe, is a “pipeline”. Accordingly, O. Reg 210/01 does not apply to Greenfield South or to the GEPP Natural Gas Utilization System.

SECTION 8 - LAND MATTERS AND APPROVALS

No land rights or municipal road allowance will be required. The land on which the GEPP Natural Gas Utilization System will be constructed is owned by Greenfield South.

Required TSSA approvals/certificates have been obtained and NEB approval for crossing other pipelines is not required as no such crossings are needed or contemplated.

No Permit to Take Water will be needed since hydrostatic testing will be done only with municipal water – the volume of the largest leg of the GEPP Natural Gas Utilization System is only about 14 cubic metres.

SECTION 9 - PUBLIC INTEREST CONSIDERATIONS

As a natural gas fueled electricity generator, the GEPP requires facilities to connect to the gas transmission system to obtain its fuel.

GEPP has a clearly demonstrated need for the GEPP Natural Gas Utilization System. The generating station needs fuel to generate electricity and the GEPP Natural Gas Utilization System delivers that fuel to each piece of natural gas burning equipment. The GEPP Natural Gas Utilization System or an equivalent GEPP Natural Gas Utilization System would be necessary regardless of the source of natural gas supply, whether from the Vector pipeline or otherwise.

The GEPP Natural Gas Utilization System is a key component of a project that was chosen by the Ontario Government and included in the OPA’s Long Term Energy Plan to contribute to the security of electricity supply in Ontario. Construction of the GEPP Natural Gas Utilization System by GEPP is in the interests of the electricity ratepayers of Ontario because it will enable fuel utilization by a new generating facility that will provide cost-effective and environmentally beneficial electricity generation to the Province.

The GEPP Natural Gas Utilization System is located in the franchise area of Union Gas Limited (“**Union Gas**”), but it does not duplicate or strand any Union Gas facilities, given that a similar system would have to be constructed for Union Gas to be able to serve GEPP. The GEPP Natural Gas Utilization System has no adverse impact on Union Gas or its ratepayers.

Through its affiliate and supported by qualified consultants and contractors, the Applicant has the necessary experience and financial ability to construct and safely operate the GEPP Natural Gas Utilization System and manage all of its gas delivery needs.

The GEPP Natural Gas Utilization System will help to ensure that the Applicant achieves the lowest market cost and the greatest operational flexibility possible for the supply and delivery of the natural gas it requires to create an additional 300 megawatts of clean electricity supply for Ontario. The flexibility that the GEPP Natural Gas Utilization System provides is particularly important in light of the changing electricity market in Ontario.

Accordingly, construction of the GEPP Natural Gas Utilization System is in the public interest and a certificate of public convenience and necessity ought to be issued.

SECTION 10 - ORDER SOUGHT

The Applicant seeks:

- (i) a Certificate of Public Convenience and necessity under section 8 of the *Municipal Franchises Act* for construction of the GEPP Natural Gas Utilization System.