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February 3, 2012

VIA COURIER, EMAIL AND RESS

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
2300 Yonge Street
27th Floor, Box 2329
Toronto, ON M4P 1E4

Dear Ms. Walli:

Re: Detour Gold Corporation Exemption Application
Board File No.: EB-2012-0032

We are counsel to Detour Gold Corporation.

Please find enclosed two (2) hard copies of the application by Detour Gold Corporation for an exemption from the transmission system code to permit an amendment to the connection agreement it is required to enter into with Hydro One Networks Inc. A copy of this application has been filed on the Boards RESS system.

Yours truly,

AIRD & BERLIS LLP

Scott Stoll

Scott A. Stoll

SAS/hm
Encl.

cc: Wayne Clark
Derek Teevan, Detour Gold Corporation Inc.
Hydro One
Sasoon Assaturian, IESO

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DETOUR GOLD

EB-2012-0032

Detour Gold Corporation

Application for Approval to Amend A Term in the Connection Agreement between Detour Gold Corporation and Hydro One Networks Inc.

February 2012

11755344.1

DETOUR GOLD CORPORATION

EXHIBIT LIST

Exh	Tab	Schedule	Contents
A			**Administration**
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B			**Applicant's Pre-filed Evidence**
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		3	Photograph of Pinard TS
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IN THE MATTER of the *Ontario Energy Board Act, 1998*, S.O. 1998, c.15, Schedule B;

AND IN THE MATTER of an Application by Detour Gold Corporation for an Order or Orders granting an amendment to the Connection Agreement with Hydro One Networks Inc.

DETOUR GOLD CORPORATION: APPROVAL TO AMEND A TERM IN THE CONNECTION AGREEMENT WITH HYDRO ONE NETWORKS INC.

APPLICATION

1) Detour Gold Corporation ("**Detour**" or the "**Applicant**") is a corporation with its head office in Toronto, Ontario. Detour carries on the business of developing and operating mines. Detour is in the process of redeveloping the Detour Lake Mine (the "**Mine**") approximately 180 km northeast of the Town of Cochrane near the Ontario/Quebec border.

2) Detour hereby applies to the Ontario Energy Board (the "**Board**") for approval to amend the connection agreement, Schedule E, section 1.2.1 by deleting the existing provision and substituting the following:

> *1.2.1. The Customer shall provide, at the connection point, a mid-span opener (MSO) , which physically and visually opens the main current-carrying path and isolates the Customer's facility from the transmission system.*

3) If the Board grants the amendment of Schedule E, section 1.2.1 then Detour would request that Schedule E, section 1.2.2 be deleted as the isolating disconnect switch referenced in section 1.2.1 will no longer exist.

4) Detour is obligated to comply with the Transmission System Code ("**TSC**") and thereby required to enter into a connection agreement with Hydro One Networks Inc. ("**Hydro One**"). The Connection Agreement is to be in the form provided in Appendix 1 of the TSC.

5) The TSC, Section 4.1.2, requires a party to obtain approval of the Board prior to amending any term of the connection agreement unless the connection agreement expressly provides the ability to amend such term. There is no express authority in the connection agreement that permits Detour and Hydro One to agree to make such an amendment. As such, Detour and Hydro One require approval of the Board prior to being able to agree to the requested amendment.

6) The request is made because the provision would require Detour to install a disonnect switch which would be duplicative of the existing Hydro One disconnect switch and has the potential to make the working space in the Pinard TS congested. The requirement is unnecessary in this specific instance and results in a less efficient expansion of the transmission system.

7) The list of interest parties includes Hydro One and the Independent Electricity System Operator (the "**IESO**"). A list of interested parties is provided in Exhibit A, Tab 3, Schedule 2.

8) A copy of the approved system impact assessment, dated June 8, 2011, may be found at Exhibit B, Tab 1, Schedule 4. A single line diagram of the proposed connection is provided at Exhibit B, Tab 1, Schedule 1.

9) The Application is supported by written evidence which is pre-filed and may be amended and updated from time to time prior to the Board's final decision on this Application. Detour may seek meetings with Board Staff and other interested parties in an attempt to identify and reach agreement on issues arising out of this Application.

10) Detour request the Board issue a decision in this matter prior to at its earliest opportunity without the necessity of conducting a hearing as provided by section 21(4) of the *Ontario Energy Board Act, 1998*, S.O. 1998, c.15, Schedule B as no other party will be adversely impacted by the Board's decision in this proceeding.

11) Detour requests that correspondence in this proceeding be conducted in English and that all correspondence should be directed to:

a) The Applicant:

Address:	Detour Gold Corporation Royal Bank Plaza, South Tower 200 Bay Street, Suite 2200 Box #23 Toronto, ON M2J 2J1
	Attention: Mr. Derek Teevan
Telephone:	(416)304-0800
Fax:	(416)304-0184
Email:	DTeevan@detourgold.com

b) The Applicant's Counsel:

Address:	Aird & Berlis LLP Suite 1800, box 754 Brookfield Place, 181 Bay Street Toronto, ON M5J 2T6
	Attention: Mr. Scott A. Stoll
Telephone:	(416)865-4703
Fax:	(416)865.1515
Email:	sstoll@airdberlis.com

c) Applicant's Consultant

Address:	SanZoe Consulting Inc. 25 Priest Ave. Minesing, ON L0L 1Y3
	Attention: Wayne Clark
Telephone	(705)728-3284
Fax:	(705)721-0974

Email: c.w.clark@sympatico.ca

12) Therefore, Detour respectfully requests:

a) Approval to amend the Connection Agreement, Schedule E, section 1.2.1 as specified herein;
b) If the relief in paragraph a), above, is granted, approval to amend the Connection Agreement by deleting Schedule E, 1.2.2.; and
c) Such order(s) as necessary for the resolution of this matter and the granting of the requested approval without the need for a hearing as provided in section 21(4) of the *Ontario Energy Board Act, 1998*, S.O. 1998, c.15, Schedule B.

DATED February 4, 2012 at Toronto, Ontario

DETOUR GOLD CORPORATION
By its Counsel
AIRD & BERLIS LLP

Original signed by Scott Stoll

_____
Scott A. Stoll

11755404.2

PREFILED EVIDENCE

Detour Gold Corporation ("**Detour**") is applying for approval of the Board to amend Schedule E, section 1.2, of the connection agreement it is required to enter into with Hydro One Networks Inc. ("**Hydro One**") as set out in the Transmission System Code ("**TSC**"). Section 4.1.2 permits an amendment to the form of connection agreement in two circumstances: (i) where the connection agreement expressly contemplates an amendment; or (ii) with the prior approval of the Board. Detour understands that Hydro One and the Independent Electricity System Operator ("**IESO**") have no objection to the relief requested herein.

The Applicant

Detour is a publicly traded gold mine company that is in the process of redeveloping the Detour Lake Mine, which is located approximately 180km northeast of the town of Cochrane and just west of the Ontario-Quebec border. The head office of Detour is located in Toronto, Ontario. Detour is a licensed wholesaler, EW-2011-0079, and a market participant registered with the IESO.

Detour has applied to and received from the Board leave to construct certain transmission facilities (Phase I – EB-2010-0243 and Phase II EB-2011-0115). Phase I construction is complete and Phase II construction is underway. Phase II is to connect to the Hydro One transmission system at the Pinard TS. The IESO approved the System Impact Assessment ("**SIA**") for the connection on June 8, 2011. A copy of the approved SIA is provided at Exhibit B, Tab 1, Schedule 4.

Connection Agreement

Section 4.1.1 of the TSC requires the transmitter to enter into a connection agreement in the form provided in Appendix 1. Further, section 4.1.2 prohibits any changes to the form of

connection agreement. As such, Detour and Hydro One are obligated to enter into the form of connection agreement provided in the TSC, Appendix 1, without amendment except: (i) where the connection agreement expressly contemplates an amendment; or (ii) with the prior approval of the Board.

> 4.1.2 A transmitter may not enter into a connection agreement on terms and conditions other than those set forth in the applicable version of the connection agreement set out in Appendix 1 or amend the terms and conditions of a connection agreement relative to the terms and conditions set forth in the applicable version of the connection agreement set out in Appendix 1 except as expressly contemplated in the applicable version of the connection agreement set out in Appendix 1 or with the prior approval of the Board.

The Connection Agreement, Schedule E, section 1.2 is reproduced below and requires the installation by the Customer of "*an isolating disconnect switch at the point of the interconnection*". During discussions in late 2011, Hydro One and Detour discussed the potential to amend this provision as the installation of the disconnect switch equipment required under Section 1.2.1 was technically unnecessary in the circumstances and the installation of a mid-span opener ("**MSO**") would be more appropriate instead. In discussion with the Board Staff, it was confirmed to Hydro One that Board approval would be required in order for Detour and Hydro One to amend this provision of the connection agreement.

Schedule E

> *1.2. Isolation from the Transmission System*
>
> *1.2.1. The Customer shall provide an isolating disconnect switch or device at the point or junction between the Transmitter and the Customer, i.e., at the point of the interconnection, which physically and visually opens the main current-carrying path and isolates the Customer's facility from the transmission system.*
>
> *1.2.2. The isolating disconnect switch shall meet the following criteria:*

1.2.2.1. it shall simultaneously open all phases (i.e., group-operated open/close) to the connection;
1.2.2.2. it shall be lockable in the open and closed positions;
1.2.2.3. when the device is used as part of the HVI failure protection system, it shall be motor-operated and equipped with appropriate control circuitry; and
1.2.2.4. it shall be suitable for safe operation under the conditions of use.

Detour seeks approval to revise section 1.2.1 of the connection agreement, as provided below, and to delete section 1.2.2, on the basis that such a switch would be redundant to the isolating disconnect switch inside Hydro One's station and that Detour's agreement to provide an MSO at the point of interconnection would provide the necessary demarcation between Hydro One's and Detour's respective facilities.

1.2.1. The Customer shall provide, at the connection point, a mid-span opener (MSO) , which physically and visually opens the main current-carrying path and isolates the Customer's facility from the transmission system.

Section 1.2.2 should be deleted in this circumstance because the isolating disconnect switch to be provided by the customer referred to in section 1.2.1 will no longer exist if section 1.2.1 is amended as proposed.

The single line drawing ("**SLD**") shows the connection arrangement in Pinard TS for the Detour supply. The Hydro One disconnect and grounding switch is shown. Exhibit B, Tab 1, Schedule 2, the plan view of the connection shows the Hydro One approved location of the Detour line (inside the blue lines). The plan view also shows where the existing Hydro One conductors will be re-routed to their new breaker position. It is clear from this that the insertion of a switching station just outside the Pinard TS fence would make this area even more congested. The SIA does not show the duplication of the disconnect switch and the requested change does not contradict the SIA and is consistent with good utility practice.

The SIA does indicate that the connection is to be completed in accordance with the TSC. As such Detour has contacted the IESO regarding the requested amendment and has included the IESO as an interested party to be notified of this Application. Detour has contacted the IESO and understands the IESO does not oppose the request.

Exhibit B, Tab 1, Schedule 3 shows a picture of the Hydro One Pinard TS where it is proposed that Detour will connect. With the switch inside Hydro One's station, the TSC requirement to install another disconnect switch on the Detour side is unnecessary from an operational or safety point of view and adds significant unnecessary cost, likely in the order of $200,000 to the connection. Such a switch, if installed, would not form part of the HVI failure protection system, as this function is performed by the Hydro One circuit breaker inside the fence, along with associated protection and control devices at both Pinard TS and the Detour mine station.

Electrically and operationally, the TSC-mandated switch would be fully redundant to the Hydro One switch inside Pinard TS. Both would exclusively switch only the Detour line, which is a dedicated feeder. In the proposed arrangement, the MSO would serve as a demarcation point, and the switch inside Hydro One's station would be used for isolation of the 230kV transmission line.

Where an additional redundant switch is inserted serially, the switch would also result in a negative impact on service reliability to Detour Gold as well as the reliability of the grid. As a mechanical device with multiple insulators and connections, switches are potential points of failure on any system. Such failure would cause both an outage to Detour and a breaker operation at Pinard, neither of which are desirable. Moreover, routine and emergency maintenance on the switch will require periodic interruptions of the power supply to Detour, requiring a complete shutdown of the mine whenever maintenance is required.

The Schedule

Detour is currently constructing the Phase II facilities. The line construction project is currently underway, as are the tasks at Pinard TS by Hydro one to enable the connection. Scheduled energization is for mid-July 2012.

Detour has provided a schedule on the progress of Phase II at Exhibit B, Tab 1, Schedule 5. The schedule is a high level description of the major tasks to be completed before energization and doe not include the many subtasks, particularly those associated with protection and control changes, including the commissioning and testing phases. Project integration between Detour and Hydro One is in its early stages Detour and Hydro One will continue to work together to coordinate the project.

Granting Relief without a Hearing

The *Ontario Energy Board Act, 1998,* S.O. 1998. C-15, Sched. B (the "**OEB Act**") provides the Board the ability to dispose of a matter without a hearing in certain circumstances. Detour would request that the Board only require notice to be given to Hydro One, the IESO and that absent an objection from such entity the Board proceed to grant the requested relief without conducting a hearing. Detour understands the physical layout and nature of the connection is unique so this request should not be of interest to other load customers. The proposed change will only address the connection agreement between Detour and Hydro One and will not adversely impact any other party in a material way. Detour is of the view the request is consistent with the objectives of the Board in respect of electricity as set out in section 1 of the OEB Act.

> 21(4) Despite section 4.1 of the *Statutory Powers Procedure Act*, the Board may, in addition to its power under that section, dispose of a proceeding without a hearing if,

(a) no person requests a hearing within a reasonable time set by the Board after the Board gives notice of the right to request a hearing; or

(b) the Board determines that no person, other than the applicant, appellant or licence holder will be adversely affected in a material way by the outcome of the proceeding and the applicant, appellant or licence holder has consented to disposing of a proceeding without a hearing.

LIST OF INTERESTED PARTIES

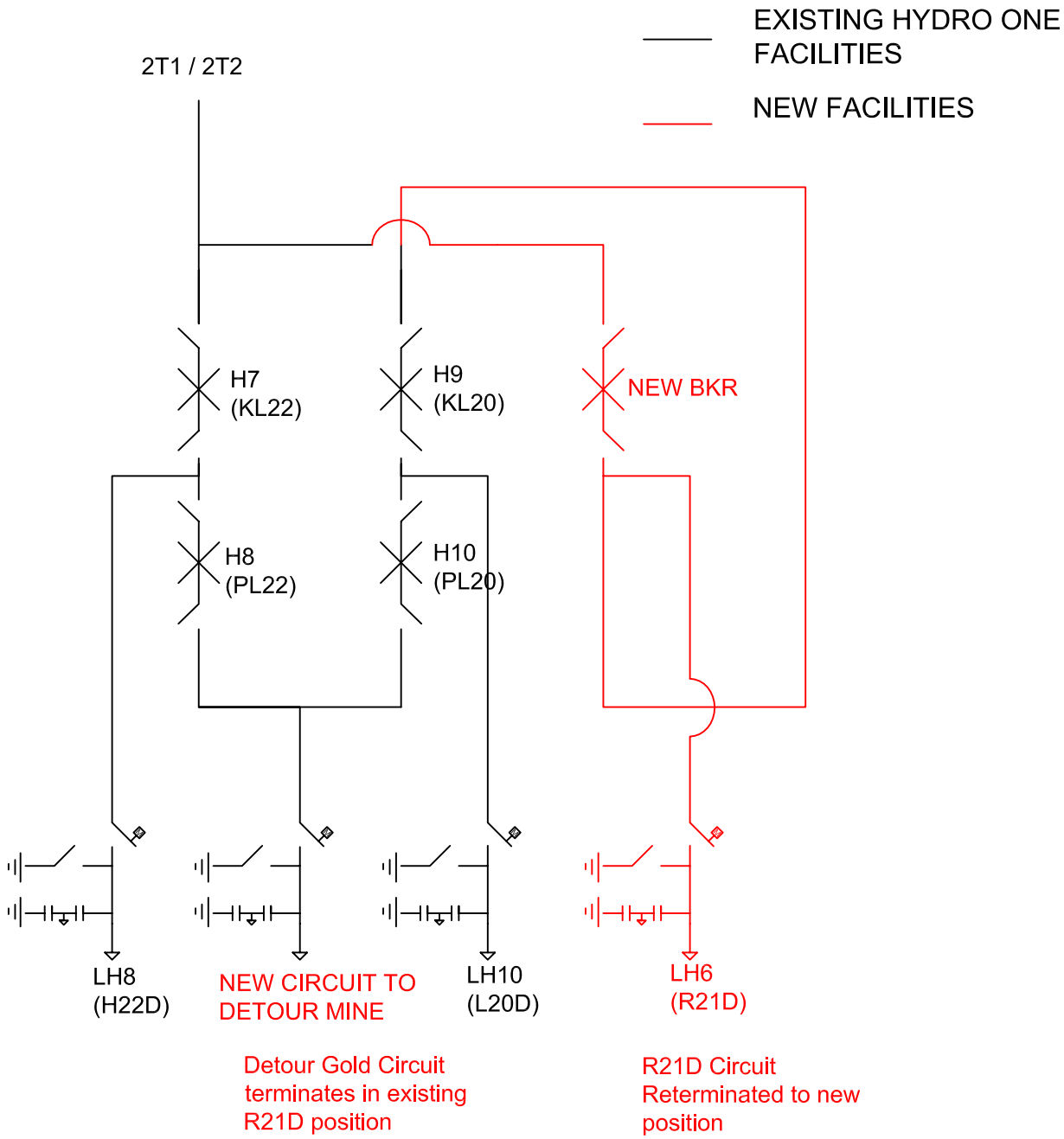
Interested Party	Contact Information
Hydro One Networks Inc.	483 Bay Street North Tower, 15th Floor Reception Toronto, Ontario M5G 2P5
Independent Electricity System Operator	655 Bay Street Suite 410, P.O. Box 1 Toronto, ON M5G 2K4

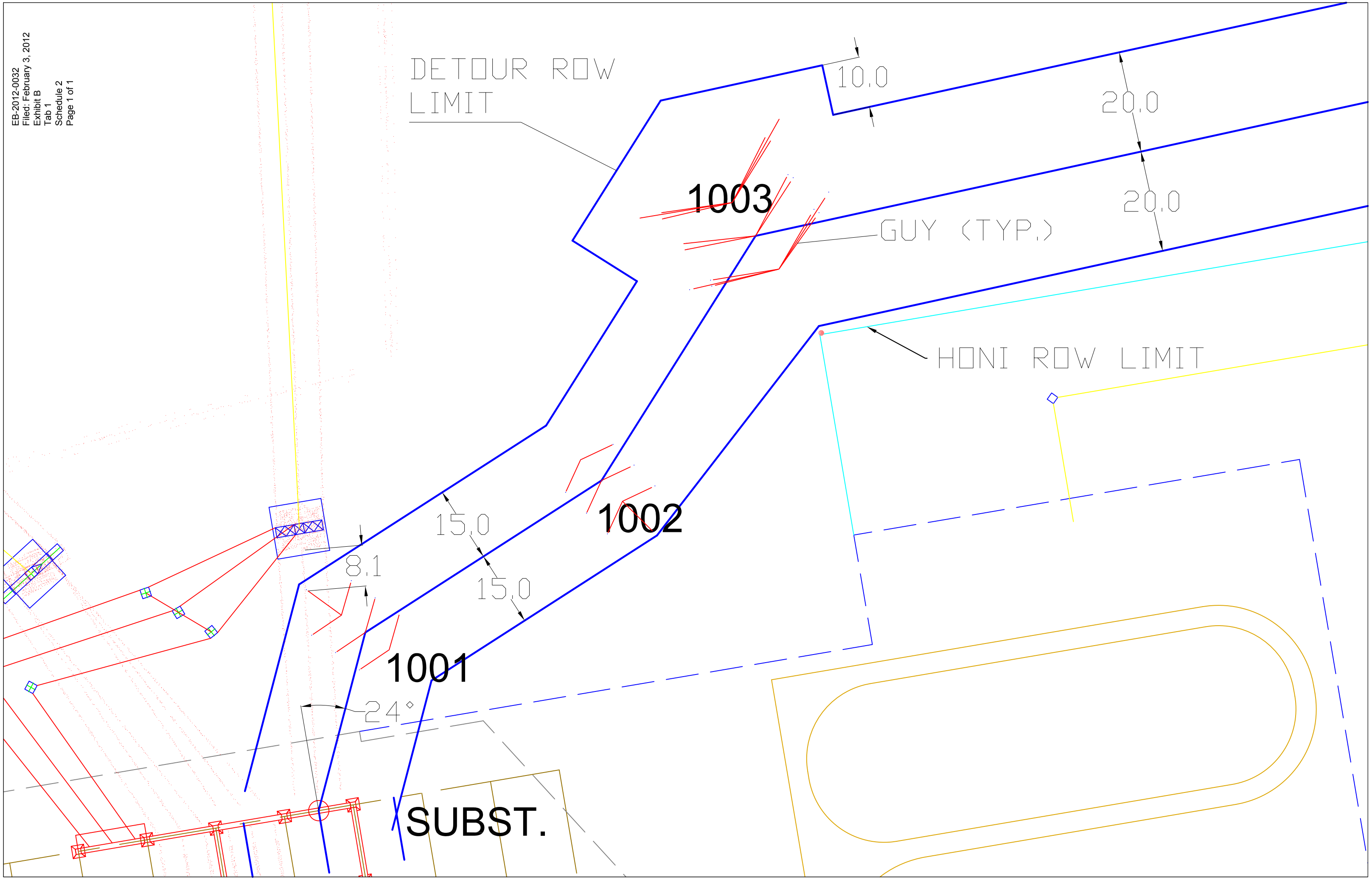
Letters of Direction, Notices & Procedural Orders

None at time of Application (to be updated)

11787627.1

PINARD TS - Proposed Connection of new 230kV Equipment (IESO requirement)

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REPORT

Power to Ontario.
On Demand.

System Impact Assessment Report

CONNECTION ASSESSMENT & APPROVAL PROCESS

Issue 1.0

Final Report

Project: Detour Lake 230 kV Connection
Applicant: Detour Gold Corporation

CAA ID 2009-359

Market Facilitation Department
June 8th, 2011

EB-2012-0032
Filed: February 3, 2012
Exhibit B
Tab 1
Schedule 4
Page 1 of 31

Document ID	IESO_REP_0728
Document Name	System Impact Assessment Report
Issue	Issue 1.0
Reason for Issue	Final Report
Effective Date	June 8th, 2011

System Impact Assessment Report

Detour Lake 230 kV Connection

Acknowledgement

The IESO wishes to acknowledge the assistance of Hydro One in completing this assessment.

Disclaimers

IESO

This report has been prepared solely for the purpose of assessing whether the connection applicant's proposed connection with the IESO-controlled grid would have an adverse impact on the reliability of the integrated power system and whether the IESO should issue a notice of conditional approval or disapproval of the proposed connection under Chapter 4, section 6 of the Market Rules.

Conditional approval of the proposed connection is based on information provided to the IESO by the connection applicant at the time the assessment was carried out. The IESO assumes no responsibility for the accuracy or completeness of such information, including the results of studies carried out by Hydro One at the request of the IESO. Furthermore, the conditional approval is subject to further consideration due to changes to this information, or to additional information that may become available after the conditional approval has been granted.

If the connection applicant has engaged a consultant to perform connection assessment studies, the connection applicant acknowledges that the IESO will be relying on such studies in conducting its assessment and that the IESO assumes no responsibility for the accuracy or completeness of such studies including, without limitation, any changes to IESO Base case models made by the consultant. The IESO reserves the right to repeat any or all connection studies performed by the consultant if necessary to meet IESO requirements.

Conditional approval of the proposed connection means that there are no significant reliability issues or concerns that would prevent connection of the proposed facility to the IESO-controlled grid. However, the conditional approval does not ensure that a project will meet all connection requirements. In addition, further issues or concerns may be identified by the transmitter(s) during the detailed design phase that may require changes to equipment characteristics and/or configuration to ensure compliance with physical or equipment limitations, or with the Transmission System Code, before connection can be made.

This report has not been prepared for any other purpose and should not be used or relied upon by any person for another purpose. This report has been prepared solely for use by the connection applicant and the IESO in accordance with Chapter 4, section 6 of the Market Rules. The IESO assumes no responsibility to any third party for any use, which it makes of this report. Any liability which the IESO may have to the connection applicant in respect of this report is governed by Chapter 1, section 13 of the Market Rules. In the event that the IESO provides a draft of this report to the connection applicant, the connection applicant must be aware that the IESO may revise drafts of this report at any time in its sole discretion without notice to the connection applicant. Although the IESO will use its best efforts to advise you of any such changes, it is the responsibility of the connection applicant to ensure that the most recent version of this report is being used.

HYDRO ONE

The results reported in this study are based on the information available to Hydro One, at the time of the study, suitable for a System Impact Assessment of this connection proposal.

The short circuit and thermal loading levels have been computed based on the information available at the time of the study. These levels may be higher or lower if the connection information changes as a result of, but not limited to, subsequent design modifications or when more accurate test measurement data is available.

This study does not assess the short circuit or thermal loading impact of the proposed connection on facilities owned by other load and generation customers.

In this report, short circuit adequacy is assessed only for Hydro One circuit breakers. The short circuit results are only for the purpose of assessing the capabilities of existing Hydro One breakers and identifying upgrades required to incorporate the proposed connection. These results should not be used in the design and engineering of new or existing facilities. The necessary data will be provided by Hydro One and discussed with the connection proponent upon request.

The ampacity ratings of Hydro One facilities are established based on assumptions used in Hydro One for power system planning studies. The actual ampacity ratings during operations may be determined in real-time and are based on actual system conditions, including ambient temperature, wind speed and facility loading, and may be higher or lower than those stated in this study.

The additional facilities or upgrades which are required to incorporate the proposed connection have been identified to the extent permitted by a System impact Assessment under the current IESO Connection Assessment and Approval process. Additional facility studies may be necessary to confirm constructability and the time required for construction. Further studies at more advanced stages of the project development may identify additional facilities that need to be provided or that require upgrading.

Table of Contents

Executive Summary

Description

This System Impact Assessment has examined the effects of the proposed connection of the 230 kV Detour Lake Gold Mine. The assessment relies on the technical studies conducted by AMEC Americas Limited ("the consultant"), an external consulting company retained by the Detour Gold Corporation.

Detour Gold Corporation is proposing to develop a new 230 kV connection for their expanded mine site. The expanded mine site is the second and final stage of the recomissioned Detour Lake Gold Mine located in Northeastern Ontario. The mine site will be connected through a 180 km, 230 kV tap line connected radially to the Pinard 230 kV bus and three 230/13.8 kV transformers. Peak load at the mine will be approximately 95 MW and will consist of various large induction and synchronous motors.

The project has an in-service date of fall 2012 and will begin operation after the temporary 115 kV, 20 MW Detour Mine connected to Island Falls SS has been decommissioned. Load from the 115 kV site will be transferred to the 230 kV connection, while the temporary 140 km tap line (built for 230 kV but operated at 115 kV) will be extended another 40 km and connected to the Pinard TS 230 kV bus. A separate SIA has studied the system impact of the temporary 115 kV Detour Mine (CAA #2010-380).

SIA Findings

All conclusions identified below are based on the project data provided by Detour Gold and the technical studies completed by the consultant and the IESO.

With the addition of the Detour Lake 230 kV Mine and under studied scenarios, the assessment concluded that:

1. The proposed project will not materially affect the reliability of the IESO-controlled grid.
2. The proposed facility will slightly increase system fault levels. However, there is sufficient short circuit capacity in the existing system to accommodate these increases. Short circuit contributions of the large synchronous motors at Detour are blocked by the variable frequency drives which connect these motors to the system.
3. Starting of the most impactive motor at the mine (2500 HP induction pump) will result in voltage sags of less than 1% at Pinard TS, within the acceptable 4% threshold for motor starting. Starting of the large synchronous motors at Detour result in a negligible effect on system voltages as the inrush current during starting is limited by their variable frequency drives. Starting of large motors at Detour will be staggered to help limit the impact on system voltages.
4. Under Flow North conditions, switching in of the new 180 km Detour circuit results in voltage rises of 1.8% at the Pinard 230 kV bus and 1.5% at the Pinard 500 kV bus, within the acceptable 10% threshold outlined in the Market Rules. Switching in of the new line under Flow South conditions results in lower voltage rises as a result of higher system fault levels due to the hydroelectric generation along the Moose River Basin.
5. The incorporation of the Detour Lake 230 kV Mine will not cause any pre-contingency or post-contingency thermal overloading of local area transmission. Any post-contingency violations of the H9K circuit's Long Term Emergency rating are mitigated by the rejection of load at Spruce

Falls and Detour Gold, to respect existing voltage collapse flow limits through the Spruce Falls T7 autotransformer.

6. With the proposed on-site reactors, the Detour facility will be capable of operating within the required 0.9 lead – 0.9 lag power factor at the defined metering point for all ranges of normal and maintenance/outage conditions at the mine.

   The switching in of the proposed reactors will be automatic and based on load levels at Detour. Exact details about reactor switching thresholds will be finalized before the IESO Market Entry process.

7. During maintenance outages at the mine, load levels will drop and would result in Mvar injection at Pinard TS due to the 40 Mvar charging capacitance of the 180 km radial line. These Mvar injections would contribute to the existing overvoltage issues at Pinard TS, but will be mitigated using the on-site reactors located at the mine.

8. Depending on the Mvar consumption at the Detour Mine when it operates at full capacity, voltages at the Detour 230 kV system can dip below 220 kV under steady state operation. This does not represent a concern to the IESO as voltages at Pinard TS will still remain within the required 220 – 250 kV operating range. The Detour Lake 230 kV Mine has specified that they will have the ability to operate within a 210 – 270 kV voltage range for all operating conditions due to the large tap range of their transformer's ULTCs.

   To ensure that voltages at the Detour Mine do not fall below 210 kV resulting in the undesirable tripping of load at Detour, the IESO will have to operate the voltages at Pinard TS at 230 kV or higher under normal operating conditions.

9. The loss of the D501P circuit in the existing system results in post-contingency voltages above the maximum allowable threshold of 250 kV at Pinard and Kapuskasing. This occurs in situations when load at the Spruce Falls mill is high and hydroelectric generation along the Moose River Basin is out of service, requiring load rejection to help maintain the post-contingency power flow levels through the Spruce Falls T7 autotransformer. The incorporation of the Detour Lake 230 kV Mine will not alleviate or contribute to this issue due to the ability of rejecting the entire Detour facility, including the Detour 180 km tap line. Existing system overvoltage concerns are mitigated by operating one Moose River Basin generation unit in condenser mode for reactive power support. The future system can be operated in the same manner.

10. To mitigate post-contingency overvoltage concerns at Pinard TS, contingencies that result in the tripping of the main 230 kV Detour breaker, which results in the loss of all load at Detour, must also trip the Detour circuit via the tripping of appropriate breakers at the Pinard 230 kV bus. This will ensure that the line will be disconnected and will not inject its 40 Mvar of charging capacitance into the Pinard 230 kV bus.

11. To help respect existing flow limits at Ansonville TS for the P502X contingency and Spruce Falls T7 for the D501P contingency, the proposed Detour Lake 230 kV Mine must connect to and participate in the Northeast 115 kV L/R & G/R Special Protection Scheme. The Northeast 115 kV L/R & G/R SPS is expected to maintain its Type III SPS classification after the incorporation of the proposed project.

IESO's Requirements for Connection

Transmitter Requirements

1. The transmitter must modify the existing 115 kV Northeast L/R & G/R scheme to allow for the selection of various load at the Detour Lake 230 kV Mine for the D501P and P502X contingencies. Selectable loads for rejection must include the Detour T1, Detour T2 transformers as well as the entire Detour facility including the 180 km Detour circuit.

Applicant Requirements

Specific Requirements: The following specific requirements are applicable to the applicant for the incorporation of 230 kV Detour Mine. Specific requirements pertain to the level of reactive compensation needed, operation restrictions, SPS, upgrading of equipment and any project specific items not covered in the general requirements:

1. The applicant is required to install facilities for and participate in the Northeast 115 kV Load & Generation Rejection SPS as directed by the IESO and Hydro One. The Northeast 115 kV Load & Generation Rejection SPS is designated as a Type 3 SPS and as such communication facilities associated with it are not duplicated. As such, communication facilities associated with incorporating the Detour Lake 230 kV Mine into the NE 115 kV SPS also do not need to be duplicated at this time. In the future, should designation of the SPS change to Type 1, communication facilities associated with the Northeast 115 kV Load & Generation Rejection SPS will need to be duplicated.
2. The applicant must work with the IESO to finalize the acceptable automatic switching thresholds for their proposed reactors, before the IESO Market Entry stage.
3. The applicant must ensure that breakers which isolate the 180 km Detour line at the Pinard 230 kV bus are tripped for any contingencies which result in the opening of the main 230 kV Detour breaker.
4. All 230 kV equipment at the Detour Lake 230 kV Mine must be capable of continuously operating in the range between 210 kV and 270 kV, as specified by the applicant.

General Requirements: The proposed connection must comply with all the applicable requirements from the Transmission System Code (TSC), IESO Market Rules and standards and criteria. The most relevant requirements are summarized below and presented in more detail in Section 2 of this report.

1. Protective relaying must be set to ensure that transmission equipment remains in-service for voltages between 94% of the minimum continuous and 105% of the maximum continuous values in the Market Rules, Appendix 4.1.
2. The Market Rules require that the connection applicant have the capability to maintain a power factor (pF) within the range of 0.9 lagging and 0.9 leading as measured at the defined metering point of this facility.
3. The connection applicant is required to ensure that the UFLS targets specified in Section 10.4.6 of Chapter 5 of the Market Rules and Section 4.5 of Market Manual 7.4 are met after the addition of the new facility. The connection applicant is required to submit during the IESO Market Entry process a revised schedule of feeder selections and their related load amounts for each shedding stage that will ultimately satisfy the UFLS targets.

4. The connection applicant shall ensure that new protection systems at the facility are designed to satisfy all the requirements of the Transmission System Code and any additional requirements identified by the transmitter.

   Any modifications made to protection relays by the transmitter after this SIA is finalized must be submitted to the IESO as soon as possible or at least six (6) months before any modifications are to be implemented on the existing protection systems.

5. The connection applicant shall ensure that the new equipment is designed to sustain the fault levels in the area. If any future system enhancement results in an increased fault level higher than the equipment's capability, the connection applicant is required to replace the equipment at its own expense with higher rated equipment capable of sustaining the increased fault level, up to maximum fault level specified in Appendix 2 of the Transmission System Code.

6. Appendix 2 of the Transmission System Code states that the maximum rated interrupting time for the 230 kV breakers must be ≤ 3 cycles. Thus, the connection applicant shall ensure that the installed breakers meet the required interrupting time specified in the Transmission System Code.

7. As specified in Appendix 4.17 and 4.22 of the Market Rules, the connection applicant is required to install all the equipment needed to provide telemetry data to the IESO on a continuous basis.

8. If revenue metering equipment is being installed as part of this project, the connection applicant should be aware that revenue metering installations must comply with Chapter 6 of the IESO Market Rules. For more details the connection applicant is encouraged to seek advice from their Metering Service Provider (MSP) or from the IESO metering group.

9. Prior to connecting to the IESO controlled grid, the connection applicant shall ensure that the proposed facility is compliant with the applicable reliability standards set by the North American Electric Reliability Corporation (NERC) and the North East Power Coordinating Council (NPCC).

10. The connection applicant must complete the IESO Facility Registration/Market Entry process in a timely manner before IESO final approval for connection is granted.

    Models and data, including any controls that would be operational, must be provided to the IESO at least seven months before connecting to the IESO-controlled grid. This includes both PSS/E and DSA software compatible mathematical models representing the new equipment for further IESO, NPCC and NERC analytical studies.

    The connection applicant must provide evidence to the IESO confirming that the equipment installed meets the Market Rules requirements and matches or exceeds the performance predicted in this assessment. This evidence shall be either type tests done in a controlled environment or commissioning tests done on-site. The evidence must be supplied to the IESO within 30 days after completion of commissioning tests.

    If the submitted models and data differ materially from the ones used in this assessment, then further analysis of the project will need to be done by the IESO.

Notification of Approval for Connection Proposal

It is recommended that a Notification of Conditional Approval for connection of the Detour Lake 230 kV Mine be issued to Detour Gold Corp. for a load connection of up to 95 MW, subject to IESO's requirements for Connection listed above, and any further requirements that may be identified by Hydro One Networks Inc. in the Customer Impact Assessment.

– End of Section –

1. Project Description

The 230 kV Detour connection is the final stage of the recommisioned and expanded Detour Lake Gold Mine and proceeds the temporary 115 kV, 20 MW Detour connection at Island Falls SS which will be built and energized in 2011 (CAA #2010-380).

The project has an in-service date of fall 2012 and will begin operation after the temporary 115 kV, 20 MW Detour Mine connected to Island Falls SS has been decommissioned. Load from the 115 kV site will be transferred to the 230 kV connection, while the new 140 km tap line built for the 115 kV connection will be extended another 40 km to Pinard TS and operated at 230 kV.

The mine will be connected through a 180 km, 230 kV tap line connected radially to the Pinard 230 kV bus and three 230/13.8 kV transformers connected via a common 230 kV bus. Peak load at the mine will be approximately 95 MW and will consist of various large induction and synchronous motors. The largest motors on site are four 7.1 MW synchronous machines located at the Ball Mills. Transformers T1 and T3 will be used to feed two independent yet identical productions lines. Transformer T2 will be used to feed lighting and other critical load at the mine. Emergency power for the project will be supplied by two 2.5 MW backup generators which will not be paralleled with the IESO controlled grid. A connection diagram of the 230 kV Detour facility is shown in Figure 1.

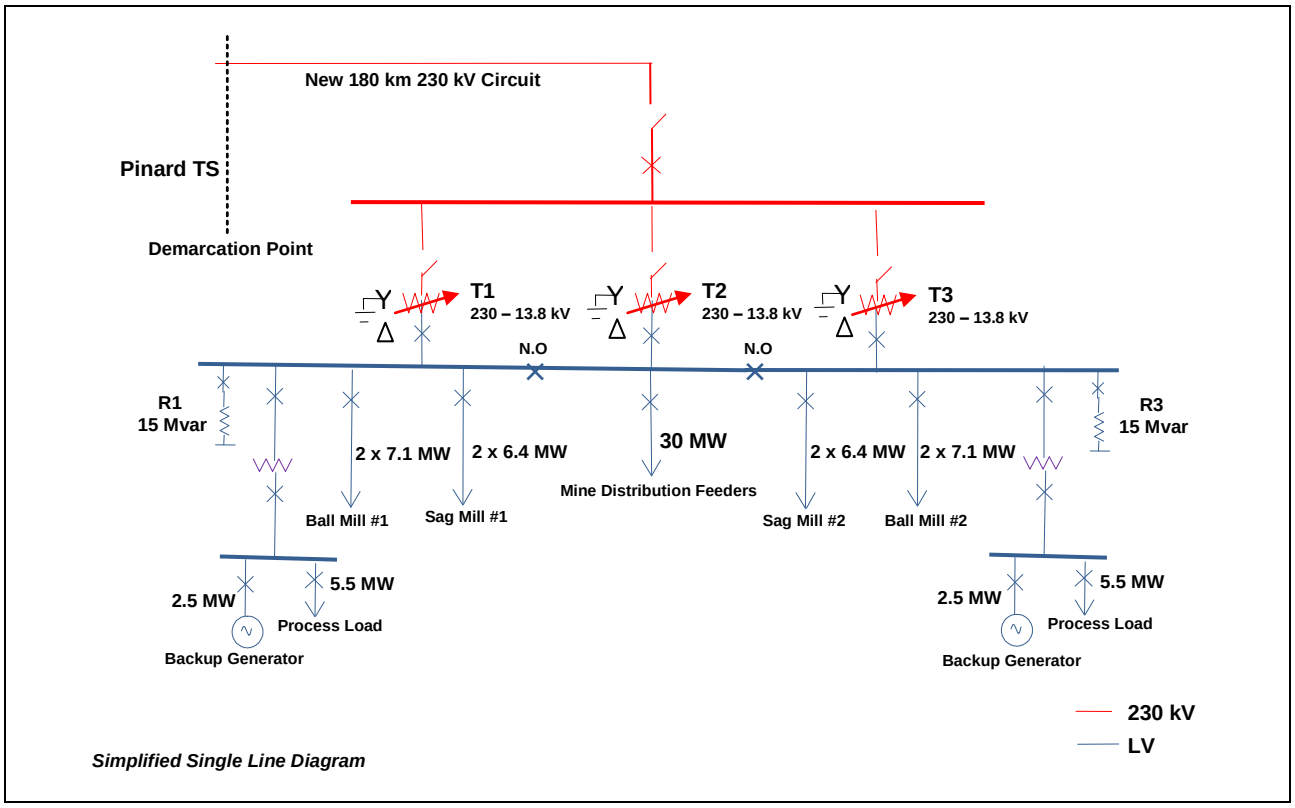


Figure 1: Detour Lake 230 kV Facility

The proposed connection arrangement of the 230 kV Detour facility into the Pinard 230 kV bus is shown in Figure 2.

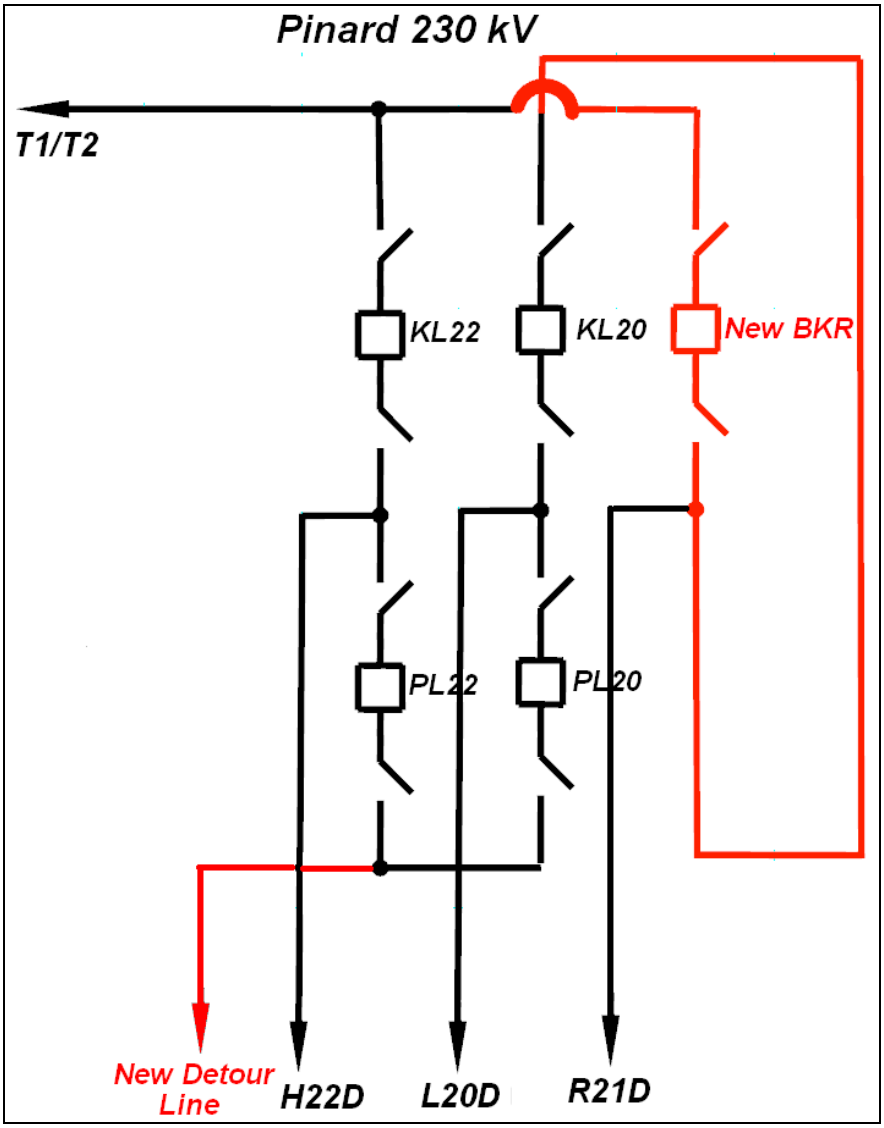


Figure 2: Connection Arrangement at Pinard TS

The proposed project will connect into the existing 230 kV ring bus at Pinard TS by adding a fifth breaker to the existing four-breaker arrangement. The existing R21D circuit will be moved to the new breaker diameter and the new Detour line will be connected to the old R21D breaker diameter between the H22D and L20D circuits. This connection arrangement will offer the benefit of preventing the existing Otter Rapids and Abitibi Canyon generation stations from being disconnected by configuration in case of double circuit contingencies to the H22D and L20D circuits. This double circuit contingency can result in the loss of all hydroelectric generation connected along the Moose River Basin.

– End of Section –

2. General Requirements

2.1 Voltage Requirements

Appendix 4.1, reference 2 of the Market Rules states that under normal conditions voltages are maintained within the range of 220 kV to 250 kV. However, the applicant specified that all 230 kV equipment at the Detour Lake 230 kV Mine will be capable of continuously operating in the range between 210 kV and 270 kV.

Fault interrupting devices must be able to interrupt fault current at the maximum continuous voltage. Appendix 2 of the Transmission System Code states that the maximum rated interrupting time for the 230 kV breakers must be ≤ 3 cycles. Thus, the connection applicant shall ensure that the installed breakers meet the required interrupting time specified in the Transmission System Code

Protective relaying must be set to ensure that transmission equipment remains in-service for at least 30 minutes for voltages up to 105% of the maximum continuous values in the Market Rules, Appendix 4.1.

If revenue metering equipment is being installed as part of this project, these metering installations must comply with Chapter 6 of the IESO Market Rules for the Ontario electricity market. For more details the applicant is encouraged to seek advice from their Metering Service Provider (MSP) or from the IESO metering group.

2.2 Power Factor Requirements

The Market Rules require that the connection applicant have the capability to maintain the power factor within the range of 0.9 lagging and 0.9 leading as measured at the defined metering point of the facility. For this facility the defined metering point is at Pinard TS.

2.3 Under-Frequency Load Shedding Requirements

Detour Gold has a total peak load at all its stations that is equal to or greater than 25 MW (95MW), therefore, is required to participate in the under frequency load shedding (UFLS) according to Section 4.5 of the Market Manual Part 7.4.

In all automatic UFLS areas, there must be at least 30% of area load connected to under-frequency relays according to Section 10.4, Chapter 5 of the Market Rules. In order to ensure at least 30% of area load shedding is achieved while taking into account UFLS relay and feeder outages as well as generation units that trip prematurely for low frequencies, 35% of the load of those distributors and connected wholesale customers with a peak load of 25 MW or greater must be connected to UFLS relays.

Each distributor and connected wholesale customer shall select load for UFLS based on their load distribution at a date and time specified by the IESO that approximates system peak.

For distributors and connected wholesale customers with a peak load of 50 MW or more and less than 100 MW, the UFLS relay connected loads shall be set to achieve the amount to be shed stated in the following table:

UFLS Stage	Frequency Threshold (Hz)	Total Nominal Operating Time (s)	Load Shed at stage as % of MP Load	Cumulative Load Shed at stage as % of MP Load
1	59.5	0.3	≥ 17	≥ 17
2	59.1	0.3	≥ 18	≥ 35

Distributors and connected wholesale customers, in conjunction with the relevant transmitter shall also shed those capacitor banks connected to the same station bus as the load to be shed by the UFLS facilities, at 59.5 Hz with a time delay of 3 seconds.

Inadvertent operation of a single under-frequency relay during the transient period following a System Disturbance should not lead to further system instability. For this reason, the maximum amount of load that can be connected to any single under-frequency relay is 150 MW.

The connection applicant is required to ensure that the UFLS targets specified in Section 10.4.6 of Chapter 5 of the Market Rules and Section 4.5 of Market Manual 7.4 are met after the addition of the new facility. The connection applicant is required to submit during the IESO Market Entry process a revised schedule of feeder selections and their related load amounts for each shedding stage that will ultimately satisfy the UFLS targets.

2.4 Protection Systems

The protection systems must be designed to satisfy all the requirements of the Transmission System Code as specified in Schedules E, F and G of Appendix 1 and any additional requirements identified by the transmitter. New protection systems must be coordinated with the existing protection systems. Facilities on Ontario's Bulk Power System (BPS) list must be protected by two redundant protection systems according to section 8.2.1a of the TSC. These redundant protections systems must satisfy all requirements of the TSC but in particular they may not use common components, common battery banks or common secondary CT or PT windings. As currently assessed by the IESO, this facility is not on the current BPS list. In the future, as the electrical system evolves, this facility may be placed on the BPS list.

The connection applicant is required to initiate an assessment of the protection systems proposed for the new facility with the transmitter.

The transmitter shall identify any protection relay modifications (e.g. equipment and settings) required to incorporate the new facility into the integrated power system. To allow sufficient time to assess the impact on power system reliability, the transmitter must submit any proposed protection relay modifications to the IESO as soon as the protection assessment for the new facility is finished or at least six (6) months before any actual modifications are to be implemented on the existing protection systems.

The IESO will evaluate the impact on system reliability due to any protection relay modifications and any modifications to functionality, timing or reach. The IESO will not assess aspects of protection systems which are solely the accountability of the transmitter (e.g. coordination of protection relays).

The connection applicant shall ensure that the new protection systems at the facility are designed to satisfy all the requirements of the Transmission System Code and any additional requirements identified by the transmitter.

Any modifications made to protection relays by the transmitter after this SIA is finalized must be submitted to the IESO as soon as possible or at least six (6) months before any modifications are to be implemented on the existing protection systems.

2.5 Fault Levels

The Transmission System Code (TSC), Appendix 2 establishes maximum fault levels for the transmission system. For the 230 kV system the maximum 3 phase symmetrical fault level is 63 kA and the single line to ground (SLG) symmetrical fault level is 80 kA (usually limited to 63 kA).

The TSC requires that new equipment be designed to sustain the fault levels in the area where the equipment is installed.

If any future system enhancement results in an increased fault level higher than the equipment's capability, the connection applicant is required to replace the equipment at their own expense with higher rated equipment capable of sustaining the increased fault level, up to the TSC's maximum fault level for the 230 kV system.

The connection applicant shall ensure that the new equipment be designed to sustain the fault levels in the area.

2.6 IESO Telemetry Requirements

In accordance with the telemetry requirements for connected wholesale customers and distributors (see Appendices 4.17 and 4.22 of the Market Rules) the connection applicant must install equipment at this project with specific performance standards to provide telemetry data to the IESO. The data is to consist of certain equipment status and operating quantities which will be identified during the IESO Market Entry Process.

As part of the IESO Facility Registration/Market Entry process, the connection applicant must also complete end to end testing of all necessary telemetry points with the IESO to ensure that standards are met and that sign conventions are understood. All found anomalies must be corrected before IESO final approval to connect any phase of the project is granted.

2.7 Reliability Standards

Prior to connecting to the IESO controlled grid, the proposed facility must be compliant with the applicable reliability standards established by the North American Electric Reliability Corporation (NERC) and reliability criteria established by the Northeast Power Coordinating Council (NPCC) that are in effect in Ontario. A mapping of applicable standards, based on the proponent's/connection applicant's market role/OEB license can be found here:

http://www.ieso.ca/imoweb/ircp/orcp.asp

This mapping is updated periodically after new or revised standards become effective in Ontario.

The current versions of these NERC standards and NPCC criteria can be found at the following websites:

http://www.nerc.com/page.php?cid=2|20

http://www.npcc.org/documents/regStandards/Directories.aspx

The IESO monitors and assesses market participant compliance with a selection of applicable reliability standards each year as part of the Ontario Reliability Compliance Program. To find out more about this program, write to orcp@ieso.ca or visit the following webpage: http://www.ieso.ca/imoweb/ircp/orcp.asp

Also, to obtain a better understanding of the applicable reliability compliance obligations and engage in the standards development process, we recommend that the proponent/ connection applicant join the IESO's Reliability Standards Standing Committee (RSSC) or at least subscribe to their mailing list by contacting rssc@ieso.ca. The RSSC webpage is located at:

http://www.ieso.ca/imoweb/consult/consult_rssc.asp.

2.8 Facility Registration/Market Entry Requirements

The connection applicant must complete the IESO Facility Registration/Market Entry process in a timely manner before the IESO grants the final approval for the connection.

Models and data, including any controls that would be operational, must be provided to the IESO. This information should be submitted at least seven months before energization to the IESO-controlled grid, to allow the IESO to incorporate this project into IESO work systems and to perform any additional reliability studies.

As part of the IESO Facility Registration/Market Entry process, the connection applicant must provide evidence to the IESO confirming that the equipment installed meets the Market Rules requirements and matches or exceeds the performance predicted in this assessment. This evidence shall be either type tests done in a controlled environment or commissioning tests done on-site. In either case, the testing must be done not only in accordance with widely recognized standards, but also to the satisfaction of the IESO. Until this evidence is provided and found acceptable to the IESO, the Facility Registration/Market Entry process will not be considered complete and the connection applicant must accept any restrictions the IESO may impose upon this project's participation in the IESO-administered markets or connection to the IESO-controlled grid.

The evidence must be supplied to the IESO within 30 days after completion of commissioning tests. Failure to provide evidence may result in disconnection from the IESO-controlled grid.

If the submitted models and data differ materially from the ones used in this assessment, then further analysis of the project will need to be done by the IESO.

– End of Section –

3. Data Verification

3.1 Tap Line

Specifications of the tap line as provided by the connection applicant are listed below.

Voltage	230 kV
Length	180 km
Rating	900 A
R/X/B	14.4/87.7/0.0006 Ohms (Mhos)
Charging Capacitance	40 Mvar

3.2 Transformers

Specifications for the three 230/13.8 kV step down transformers are listed below.

Transformation	230/13.8 kV
Rating	42/56/70/78 MVA (ONAN/ONAF/ONAF/ONAF)
Impedance	0.003 + j0.085 pu based on 42 MVA
Configuration	3 phase, high side: grounded wye, low side: delta
Tapping	under load tap changers at HV (259 kV – 201 kV in 23 steps)

The large tapping range of the Detour transformer ULTCs will allow the mine to operate at voltages between 210 - 270 kV.

3.3 Circuit Breakers and Switches

Specifications of the isolation devices provided by the connection applicant are listed below.

Circuit Breakers:

Maximum cont. rated voltage (kV)	270 kV
Rated continuous current (A)	2000 A
Rated short circuit capability (kA)	40 kA
Interrupting time (ms)	32-48 ms

Disconnect Switches:

Maximum cont. rated voltage (kV)	270 kV
Rated continuous current (A)	1200 A

The interrupting time of the 230 kV circuit breaker is 32-48 ms, which satisfies the Transmission System Code requirement of ≤ 3 cycles (50 ms).

The symmetrical rated short circuit breaking current of the 230 kV breakers is 40 kA. This value is below the maximum 3 phase symmetrical fault level of 63 kA established by the Transmission System Code for the 230 kV system. Fault studies shown in Section 5 of this report show that the 230 kV breaker ratings of 40 kA are sufficient to withstand fault levels at the proposed facility. The applicant should be aware that if any future system enhancement results in an increased fault level higher than the equipment's capability,

the applicant would be required to replace these breakers at its own expense with higher rated breakers up to the maximum fault level of 63 kA.

The 270 kV maximum continuous voltage rating meets IESO connection equipment criteria in Northern Ontario.

3.4 Synchronous Motors

The mine will have two independent production lines consisting of one ball & sag mill each. Each mill will consist of two large synchronous motors for a total of eight synchronous motors at the facility. The details of the motors are provided below:

Mill	Location	Rated Voltage (kV)	Rated HP	Operating MW	Mvar Capability
Ball Mill #1	Behind Detour T1	13.8	2 x 10000	2 x 7.1	+7.5 to -7.5
Sag Mill #1	Behind Detour T1	13.8	2 x 10000	2 x 6.4	+7.5 to -7.5
Ball Mill #2	Behind Detour T3	13.8	2 x 10000	2 x 7.1	+7.5 to -7.5
Sag Mill #2	Behind Detour T3	13.8	2 x 10000	2 x 6.4	+7.5 to -7.5

Each mill will be capable of adjusting its reactive power output from +/- 7.5 Mvar using their front end variable frequency drives. Reactive output will be controlled to achieve unity power factor at the HV side of the T1 and T3 transformers. This will result in a near unity power factor at Pinard TS and will ensure that the facility will have a minimum impact on the voltages at Pinard TS.

3.5 Reactors

The 230 kV Detour Lake Mine will be equipped with two reactors to help maintain the facility power factor within the required Market Rules range of 0.9 lead – 0.9 lag as measured at Pinard TS. Details of these reactors are given below.

Nomenclature	Location	Rating
R1	Behind Detour T1	15 Mvar @ 13.8 kV
R3	Behind Detour T3	15 Mvar @ 13.8 kV

To allow for operational flexibility, both reactors will be tapped so that they have the capability to supply 10 or 15 Mvar. The combination of reactors will be able to provide 10, 15, 20, 25 and 30 Mvar steps of reactive power. The reactors will be automatically switched in based on load levels at Detour.

– End of Section –

4. System Description

4.1 Existing System

The 230 kV Detour Mine is proposing to connect to the existing 230 kV bus at Pinard TS. The 230/115 kV power system around Pinard TS consists of several thermal and hydroelectric generating stations. Major load facilities in the local area include the Spruce Falls Paper Mill, Kapuskasing TS and Hearst TS. When hydroelectric facilities in Northern Ontario are shut down during off-peak demand hours or drought conditions, local area load is supplied by existing thermal units and power transferred from southern Ontario through the Flow North interface.

A diagram of the existing system is shown in Figure 3.

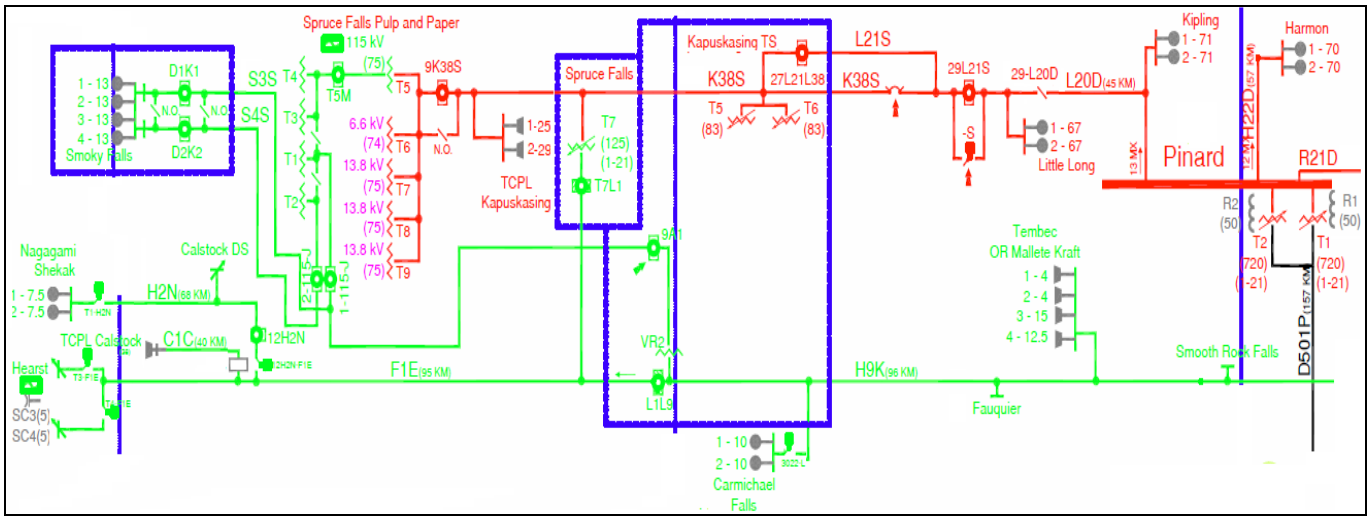


Figure 3: Existing Local Area Power System

The following thermal ratings were used for the studies:

Circuit	Section		Continuous		LTE	
			Amps	MVA	Amps	MVA
L21S	LITTLE LONG	KAPUSKASING	880	335.4	960	365.8
H9K	HUNTA	HUNTA H9K J	850	173.8	1100	224.9
	HUNTA H9K J	SMOOTH RCK J	270	55.2	270	55.2
	HUNTA H9K J	H9K 127A J	260	53.2	260	53.2
	SMOOTH RCK J	H9K 127A J	270	55.2	270	55.2
	H9K 127A J	TEMBEC SR J	370	75.7	470	96.1
	TEMBEC SR J	ISLAND FALLS JCT	360	73.6	360	73.6
	ISLAND FALLS JCT	FAUQUIER J	360	73.6	360	73.6
	FAUQUIER J	CARMICH FLJ	370	75.7	470	96.1
	CARMICH FLJ	SPRUCE F J	290	59.3	290	59.3
	SPRUCE F J	KAPUSKASING TS	850	173.8	980	200.4

Table 1: Local Area Equipment Thermal Ratings

The continuous ratings for the overhead conductors were calculated at the lowest of the sag temperature or 93°C operating temperature, with a 30°C ambient temperature and 4 km/h wind speed.

The long term emergency ratings (LTE) for the overhead conductors were calculated at the lowest of the sag temperature or 127°C operating temperature, with a 30°C ambient temperature and 4 km/h wind speed.

4.2 Load Forecasts and Historical Data

Table 2 shows the IESO forecasted extreme winter weather demand for the Northeast area for the years 2012 – 2015.

Year	Northeast Demand (MW)
2012	1,673
2013	1,660
2014	1,620
2015	1,615

Table 2: Northeast Area Demand Forecast

The forecasted extreme winter weather coincident peaks for the Northeast area show slight decrease in load demand. It should be noted that the above forecast does not take into account the recent shut down of the Kidd Creek 230 kV Metsite, resulting in the reduction of approximately 110 MW of load in the Northeast power system.

Figures 4-6 below display the MW demand of the load facilities in the local area from January 1, 2009 – June 1, 2010, plotted using hourly average samples obtained from IESO real-time telemetered data. These values are used to determine the load levels used for various study assumptions as per Section 5 of this report.

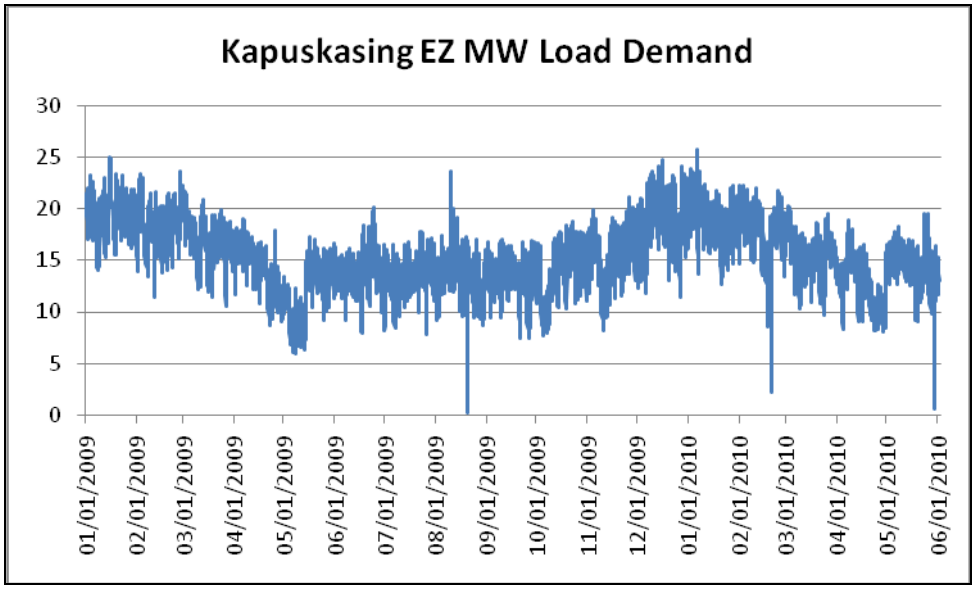


Figure 4: Telemetered Kapuskasing EZ MW Demand

The load behind the Kapuskasing EZ bus varies from a minimum of approximately 8 MW in the summer months to a maximum of approximately 25 MW in the winter months.

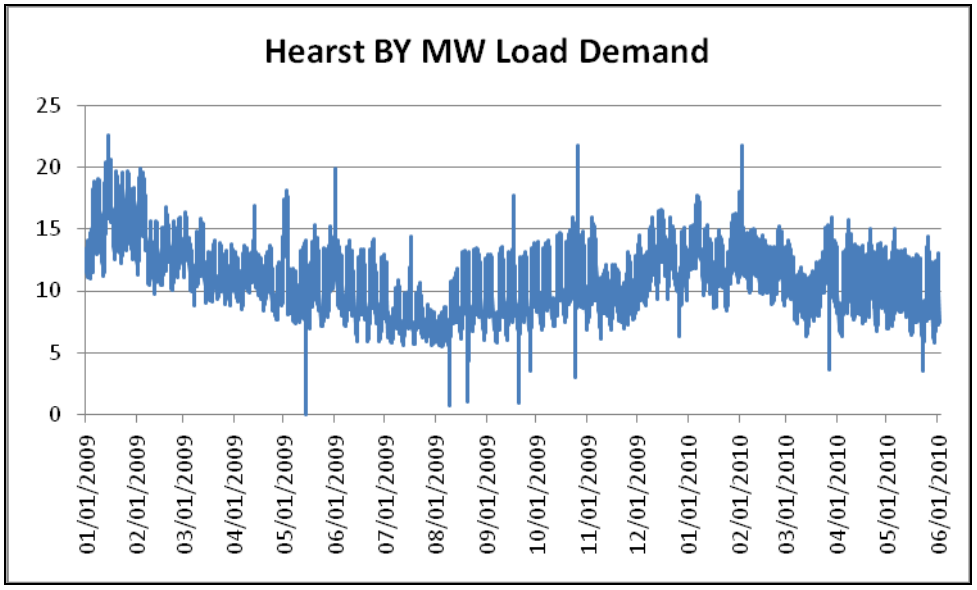


Figure 5: Telemetered Hearst BY MW Demand

The load behind the Hearst BY bus varies from a minimum of approximately 6 MW in the summer months to a maximum of approximately 20 MW in the winter months.

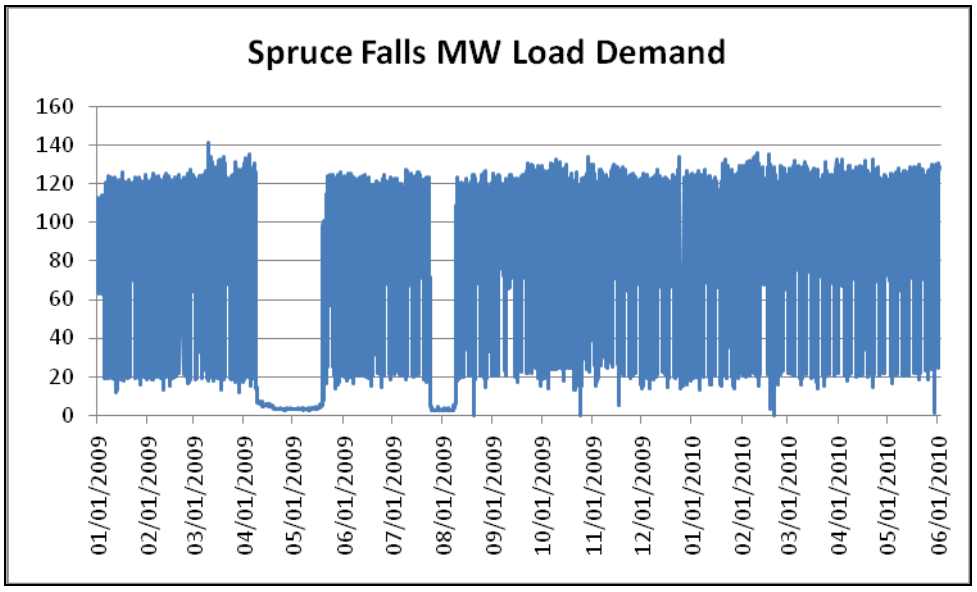


Figure 6: Telemetered Spruce Falls MW Demand

The load at the Spruce Falls mill varies from approximately 20 MW to 125 MW. As a participant of the OPA "Demand Response 2" (DR2) program, Spruce Falls shifts its production hours to consume electricity at off peak hours while running at minimum to half capacity during day time hours.

Figure 7 plots the operating voltages at the Pinard 230 kV bus from January 2010 to March 2011. The plot highlights the existing overvoltage concerns at Pinard TS with existing voltages routinely hovering around the 250 kV maximum permissible operating voltage.

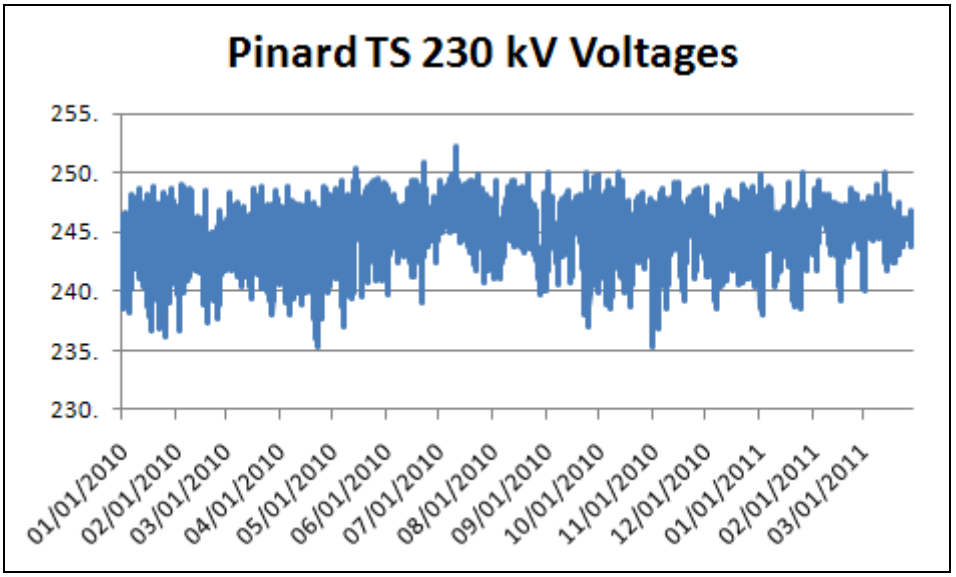


Figure 7: Pinard 230 kV Operating Voltages

– End of Section –

5. System Impact Studies

The system impact studies have been carried out by the consultant based on a scope of work provided by the IESO. The consultant's technical report has been attached to this SIA report and has concentrated on identifying the effects of the proposed facility in regards to:

1) Short circuit levels.

2) Voltage sags on the power system during the starting of large motors at the mine.

3) Voltage surges when switching in the 180 km Detour line.

4) Thermal loadings of local transmission equipment.

5) Post contingency voltage declines and rises at local area buses for various contingencies.

In addition to these studies, the IESO has performed its own review in regards to:

1) Pre-contingency voltages at Pinard TS and power factor requirements.

2) Post contingency voltage declines and rises at local area buses for the D501P contingency.

3) Required modifications to the Northeast 115 kV L/R & G/R SPS.

5.1 Study Assumptions

The winter 2010 base case was used as a starting point with the following assumptions and modifications: (These are the base assumption unless noted otherwise)

- The area was considered winter critical.
- Northeast area demand was scaled to approximately 1,500 MW to match the load forecast provided in the previous section and to take into account the recent 110 MW reduction in load at the Kidd Creek 230 kV Metsite facility.
- Power transfer through the Flow North Interface is 730 MW (before the addition of Detour)
- Local load levels were adjusted to reflect the historical data provided in the previous section, and set to a 0.9 power factor. The local load levels are as follows:

Station	MW Demand
Kapuskasing	20
Hearst	15
Spruce Falls Inc.	125

- All local area thermal generation is in-service (TCPL Kapuskasing, Calstock CGS, TCPL Tunis, NP Cochrane).
- Abitibi Canyon G2 and G3 units are operating in condenser mode, all other local area hydroelectric units are out of service (Harmon GS, Kipling GS, Little Long GS, Smoky Falls GS, Otter Rapids GS, Abitibi Canyon G1, G4 & G5, Nagagami & Shekak, Carmichael Falls).
- Pinard 230 kV reactors are in-service.
- Porcupine 230 kV SVC and Kirkland Lake 115 kV SVC are in-service

- Series compensation of X503E & X504E lines are in-service.
- Load is modeled as constant MVA for pre contingency and post contingency, post ULTC action.
- Voltage dependant load is used for post contingency, pre ULTC action.

To this study case, the consultant added the 95 MW, 230 kV Detour facility.

The following post-contingency operating limits were observed for the studies:

Interface	Limit (MW)	Contingency
Flow on A8K + A9K @ Ansonville	40 South / 50 North	Loss of P502X
Flow through Spruce Falls T7	75 South / 50 North	Loss of D501P
Flow on H9K @ Hunta	80 (In or Out)	Loss of D501P
Flow through Spruce Falls T7	40 North	Loss of L21S
Flow on H9K @ Hunta	80 In / 20 Out	Loss of L21S

Table 3: Applicable Post-Contingency Limits

5.2 Fault Level Assessment

In general, radial loads do not have a large impact on system faults levels. However, because the proposed project includes large motors, a short-circuit assessment has been conducted.

The short-circuit assessment evaluated the maximum contribution to fault current from the proposed facility. The pre-contingency voltages were assumed to be at maximum levels. All Detour Gold motors and generation resources were assumed in-service.

Fault contributions were calculated for a three phase fault and for a line-to-ground fault in the transmission system, close to the connection point. Both symmetrical and asymmetrical values were determined.

The fault current contributions from the 230 kV Detour Mine at Pinard TS, as calculated by the consultant are shown below.

Fault	Symmetrical Current (kA)	Asymmetrical Current (kA)
Three-Phase	0.39	0.56
Line-to-Ground	0.43	0.73

Table 4: Detour Gold 230 kV Short Circuit Contributions

The study results show a slight increase in fault levels with the incorporation of the Detour Lake 230 kV Mine. The large synchronous motors at the Detour facility do not contribute short circuit current since they are connected through variable frequency drives, which block fault current from flowing into the system.

Existing fault levels are outlined in Table 4, showing that there is sufficient capacity in the local area to accommodate the marginal increase in short circuit levels.

Bus	Total Fault Current Symmetrical (kA)		Total Fault Current Asymmetrical (kA)		Breaker Ratings Symmetrical/ Asymmetrical (kA)
	3-phase	L-G	3-phase	L-G	
Pinard 230 kV	13.0	16.4	16.7	22.1	50/53.9
Little Long SS	11.0	11.4	14.8	15.5	19.1/23.1

Table 5: Existing Short Circuit Levels

The proposed facility will slightly increase system fault levels. However, there is sufficient short circuit capacity in the existing system to accommodate these increases. No short circuit reliability issues are foreseen.

5.3 Motor Starting

The motor starting analysis was used to determine the effects of starting the Detour motor with the largest impact on system voltages.

Only the starting of the most impactful motor was simulated. The most impactful motor during starting is one of two 2500 HP induction feed pump induction motor. The starting of the large synchronous motors is less severe due to the variable frequency drives they are equipped with, which limit inrush current during motor starting. To limit excessive voltage sags, starting of the motors at the Detour site will be staggered. The analysis was completed assuming all other inductive load at the facility was in-service.

The consultant's study results show a maximum voltage sag of less than 1% at Pinard TS, which is within the acceptable 4% criteria outlined in the Transmission System Code.

Starting of the 2500 HP induction pump at the mine is the most impactive to system voltages but voltage sags are still within Transmission System Code criteria. The starting of the large synchronous motors results in negligible voltage sags. This is due to the variable frequency drives that each synchronous motor is equipped with, which limits inrush current during starting. Starting of large motors at the mine will be staggered to help limit their impacts on system voltages.

5.4 Line Switching

Line switching studies examined the expected voltage surges on the transmission system when the new 180 km Detour line is switched into service.

The IESO Market Rules (Section 4.4) limits switching surges to a maximum of 10% for line switching events.

The results of the consultant's study show that line switching surges remain within the Market Rules limits.

Under Flow North conditions, switching in of the new 180 km Detour circuit results in voltage rises of 1.8% at the Pinard 230 kV bus and 1.5% at the Pinard 500 kV bus, within the acceptable 10% threshold outlined in the Market Rules. Switching in of the new line under Flow South conditions results in lower voltage rises as a result of higher system fault levels due to the hydroelectric generation along the Moose River Basin.

5.5 Thermal Analysis

The thermal assessment examined the effects the proposed facility would have on the thermal loadings of the local transmission system.

The *Ontario Resource and Transmission Assessment Criteria* requires that all line and equipment loads be within their continuous ratings with all elements in service, and within their long-term emergency ratings with any element out of service. Lines and equipment may be loaded up to their short-term emergency ratings immediately following the contingencies to effect re-dispatch, perform switching, or implement control actions to reduce the loading to the long-term emergency ratings.

The consultant's study results show scenarios under which partial rejection of load at Detour is not sufficient to respect the LTE rating of the H9K circuit or the flow rating through the Spruce Falls T7 transformer. Under these operating conditions, rejection of the entire Detour facility will be sufficient to return flow levels to the acceptable limits. There are no thermal issues anticipated.

The incorporation of the proposed facility will not cause any pre-contingency or post-contingency thermal overloading of local area transmission. Any post-contingency violations of the H9K circuit's LTE are mitigated by the rejection of load at the Spruce Falls and Detour facilities, to respect existing post-contingency power flow limits through the Spruce Falls T7 autotransformer.

5.6 Pre-Contingency Voltage and Power Factor Analysis

This analysis focused on the impacts to the pre-contingency voltages at Pinard TS with the incorporation of the proposed project. Special attention was given to maintenance conditions at the mine which results in light load conditions at Detour and the resulting power factor at Pinard TS.

The IESO's *Ontario Resource and Transmission Assessment Criteria* states that maximum continuous voltages must be between 220 – 250 kV for the 230 kV system and 490 – 550 kV for the 500 kV system.

The IESO market rules requires all connected wholesale customers to have the capability of operating at a power factor between 0.9 lead – 0.9 lag at the defined metering point.

The study was conducted by stressing voltages at Pinard TS to their near maximum and minimum values. All other assumptions outlined in section 5.1 still hold. Under full load conditions Detour has agreed to maintain their power factor near unity, as described in section 3.4 of this report. This is to ensure that there is no reactive power injected into Pinard TS through the radial Detour line.

Pinard TS Max. Voltage

Detour Load	Detour Reactors (Mvar)	Bus Voltages (kV)			Power Flow into Pinard	Power Factor @ Pinard
		Pinard 230 kV	Pinard 500 kV	Detour 230 kV		
Detour Not Connected	-	247.9	546.6	-	-	-
95 @ 0.97 PF	None	245.9	542.2	236.2	-97.4 MW + 0.2 MX	Unity
5 @ 0.85 PF	None	251.8	554.0	257.2	-5.1 MW + 35.6 MX	0.14 Lead
5 @ 0.85 PF	30	247.8	546.4	241.0	-5.1 MW + 0.3 MX	Unity
12 @ 0.87 PF	None	251.1	552.7	254.7	-12.1 MW + 31.1 MX	0.36 Lead
12 @ 0.87 PF	25	247.7	546.3	241.0	-12.1 MW + 1.4 MX	0.99 Lead
25 @ 0.87 PF	None	249.7	550.0	249.1	-25.2 MW + 21.1 MX	0.76 Lead
25 @ 0.87 PF	15	247.6	546.0	240.8	-25.3 MW + 3.0 MX	0.99 Lead

Pinard TS Min. Voltage

Detour Load	Detour Reactors (Mvar)	Bus Voltages (kV)			Power Flow into Pinard	Power Factor @ Pinard
		Pinard 230 kV	Pinard 500 kV	Detour 230 kV		
Detour Not Connected	-	232.5	534.1	-	-	-
95 @ 0.97 PF	None	229.9	528.1	217.4	-97.4 MW – 8.5 MX	Unity
5 @ 0.85 PF	None	235.0	538.9	239.8	-5.1 MW + 30.4 MX	0.17 Lead
5 @ 0.85 PF	30	232.4	533.8	225.9	-5.1 MW - 0.2 MX	Unity
12 @ 0.87 PF	None	234.5	537.9	237.3	-12.1 MW + 25.9 MX	0.42 Lead
12 @ 0.87 PF	25	232.3	533.6	225.5	-12.1 MW – 0.2 MX	Unity
25 @ 0.87 PF	None	233.4	535.6	231.7	-25.2 MW + 15.5 MX	0.85 Lead
25 @ 0.87 PF	15	232.0	533.3	224.5	-25.3 MW - 0.1 MX	Unity

Table 6: Pinard Voltages and Detour Power Factor for Various Loading Conditions at Detour

The study results show that under light load conditions at Detour, the surge impedance loading of the180 km Detour line results in a 30-40 Mvar injection at Pinard TS. The resulting power factor at Pinard violates IESO market rules and contributes to existing overvoltage concerns. To mitigate these concerns, the proposed Detour reactors will need to be switched in. The study results with the proposed reactors verify that Detour will have the capability to control power factors to within the required limits. In addition, by operating within the required power factor range, the impacts to system voltages at Pinard TS will remain minimal for all operating conditions at the mine.

When the Pinard voltage is operated near its minimum of 230 kV, the voltage at the Detour can fall below 220 kV. This does not represent a concern to the IESO as voltages at Pinard TS can still be maintained within the required 220 - 250 kV range. The Detour Lake 230 kV Mine will have the ability to operate within a 210 – 270 kV voltage range for all operating conditions due to the large reactive capability of their transformer ULTCs. To ensure pre-contingency voltages at Detour do not drop below 210 kV resulting in the unwanted tripping of load, the IESO will operate voltages at Pinard TS at 230 kV or higher under normal operating conditions.

With the proposed on-site reactors, the Detour facility will be capable of operating within the required 0.9 lead – 0.9 lag power factor for all ranges of normal and maintenance/outage conditions at the mine. The switching of the reactors will be automatic and based on load levels at Detour. Exact details about reactor switching thresholds will be finalized before the IESO Market Entry process.

By operating within the required power factor range, the Detour facility will have a minimal effect on system voltages pre-contingency.

The continuous voltage at the Detour 230 kV bus can operate outside of the 220-250 kV range specified in ORTAC. This does not represent a concern to the IESO as the voltages at Pinard TS still remain manageable within the 220 - 250 kV range, regardless of the operating conditions at Detour. The Detour facility is capable of operating between a range of 210 - 270 kV due to the large reactive range of the ULTCs on their transformers. To ensure that voltages at Detour do not fall below this range, resulting in the unwanted tripping of load, the IESO will operate Pinard voltages at 230 kV or higher under normal operating conditions.

5.7 Post-Contingency Voltage Analysis

The assessment of the post-contingency voltage performance of the local transmission system was done in accordance with the IESO's *Ontario Resource and Transmission Assessment Criteria.* The criteria states that with all facilities in service pre-contingency, system voltage declines and rises on the IESO-controlled grid following a contingency shall be limited to 10% both before and after transformer tap changer action. In addition, post-contingency voltages on the 115 kV, 230 kV and 500 kV power system in northern Ontario can be no greater than 132 kV, 250 kV and 550 kV respectively.

The results of the consultant's studies show existing concerns with contingencies to the D501P circuit. Analysis of the D501P contingency with and without the proposed project has been repeated by the IESO in Tables 7 & 8 below.

Monitored Busses		Pre-Cont Voltage (kV)	***Loss of D501P*** (1)				***Loss of D501P – Little Long G1 Operating in Condenser Mode*** (2)			
Bus Name	Base (kV)		Pre-ULTC		Post-ULTC		Pre-ULTC		Post-ULTC	
			kV	%	kV	%	kV	%	kV	%
Hanmer TS	500	534.9	530.4	-0.8	530.4	-0.9	530.3	-0.9	530.3	-0.9
Porcupine TS	500	545	529	-2.9	528.9	-3	528.8	-3	528.7	-3
Pinard TS	500	546.6	-	-	-	-	-	-	-	-
Hanmer TS	220	248.3	246.4	-0.8	246.4	-0.8	246.4	-0.8	246.4	-0.8
Porcupine TS	220	247.7	242	-2.3	242	-2.3	242	-2.3	242	-2.3
Pinard TS	220	247.9	259.6	4.7	259.8	4.8	249.8	0.8	249.8	0.8
Little Long SS	220	246.5	257.3	4.4	257.5	4.5	247.6	0.4	247.6	0.5
Kapuskasing TS	220	241.1	250.2	3.8	250.4	3.8	243.3	0.9	243.4	1
Spruce Falls TS	220	241	250	3.7	250.2	3.8	243.2	0.9	243.3	1
Hunta SS	118	128.4	127.2	-0.9	127.5	-0.7	126.7	-1.3	127	-1.1
Kapuskasing TS	118	124.5	128.1	2.9	128.2	3	125.4	0.7	125.5	0.8
Spruce Falls TS	118	124.5	128.1	2.9	128.2	3	125.4	0.7	125.5	0.8
Hearst TS	118	125.5	127.7	1.7	127.7	1.8	126	0.4	126.1	0.5

Table 7: Existing System Voltage Study Results for the D501P Contingency

Notes:

(1) Post-Contingency Flow through S.F T7 = 10 MW North
L/R @ Spruce Falls TMP 3 & 4 = 90 MW

(2) Post-Contingency Flow through S.F T7 = 12 MW North
L/R @ Spruce Falls TMP 3 & 4 = 90 MW
Little Long G1 absorbing 15 MX post-contingency

Both the IESO and consultant's study results show that on the existing system, post-contingency overvoltage violations exist for the D501P contingency. These violations occur when load is rejected at the Spruce Falls mill to ensure post-contingency power flow limits through the Spruce Falls T7 autotransformer are respected. Overvoltage concerns are mitigated by operating one Moose River Basin generation unit in condenser mode.

Monitored Busses		Pre-Cont Voltage (kV)	*Loss of D501P – Little Long G1 Condensing , No L/R @ Detour Gold* (3)				*Loss of D501P – Little Long G1 Condensing , L//R @ Detour Gold , Detour Line Remains Connected* (4)				*Loss of D501P – Little Long G1 Condensing, L//R @ Detour Gold with Detour Line Rejected* (5)			
Bus Name	Base (kV)		Pre-ULTC		Post-ULTC		Pre-ULTC		Post-ULTC		Pre-ULTC		Post-ULTC	
			kV	kV	kV	kV	kV	%	kV	%	kV	%	kV	%
Hanmer TS	500	532.4	Diverged	N/A	Diverged	N/A	530.3	-0.4	530.3	-0.4	530.3	-0.4	530.2	-0.4
Porcupine TS	500	541.2	Diverged	N/A	Diverged	N/A	528.9	-2.3	528.8	-2.3	528.8	-2.3	528.6	-2.3
Pinard TS	500	542.2	-	-	-	-	-	-	-	-	-	-	-	-
Hanmer TS	220	247.3	Diverged	N/A	Diverged	N/A	246.4	-0.4	246.4	-0.4	246.4	-0.4	246.4	-0.4
Porcupine TS	220	246.1	Diverged	N/A	Diverged	N/A	242	-1.7	242	-1.7	242	-1.7	242	-1.7
Pinard TS	220	245.9	Diverged	N/A	Diverged	N/A	258.6	5.2	258.7	5.2	249.8	1.6	249.9	1.6
Little Long SS	220	245.1	Diverged	N/A	Diverged	N/A	252.9	3.2	253	3.2	247.6	1	247.6	1
Kapuskasing TS	220	240.9	Diverged	N/A	Diverged	N/A	247	2.5	247.1	2.6	243.3	1	243.4	1
Spruce Falls TS	220	240.9	Diverged	N/A	Diverged	N/A	246.9	2.5	247	2.5	243.2	1	243.3	1
Detour Gold	220	236.2	Diverged	N/A	Diverged	N/A	265.6	12.5	265.7	12.5	-	-	-	-
Hunta SS	118	127.9	Diverged	N/A	Diverged	N/A	127	-0.7	127.3	-0.5	126.7	-0.9	127	-0.7
Kapuskasing TS	118	124.2	Diverged	N/A	Diverged	N/A	126.8	2.1	126.9	2.2	125.4	1	125.5	1
Spruce Falls TS	118	124.1	Diverged	N/A	Diverged	N/A	126.8	2.2	126.9	2.2	125.4	1	125.5	1.1
Hearst TS	118	125.3	Diverged	N/A	Diverged	N/A	126.9	1.3	126.9	1.3	126	0.6	126.1	0.6

Table 8: Voltage Study Results for the D501P Contingency with Detour In-Service

Notes:

(3) Post-Contingency Flow through S.F T7 = N/A
L/R @ Spruce Falls TMP 3 & 4 = 90 MW

(4) Post-Contingency Flow through S.F T7 = 12 MW North
L/R @ Spruce Falls TMP 3 & 4 = 90 MW
L/R @ Detour Gold = 95 MW
Little Long G1 absorbing 45 MX post-contingency

(5) Post-Contingency Flow through S.F T7 = 12 MW North
L/R @ Spruce Falls TMP 3 & 4 = 90 MW
L/R @ Detour Gold = 95 MW
Little Long G1 absorbing 16 MX post-contingency

The study results with the proposed facility in-service shows that the incorporation of the proposed facility will not contribute to existing issues. By participating in the Northeast L/R & G/R scheme, sufficient amount of load will exist to obey existing power flow limits at Spruce Falls. Rejection of the Detour 180 km line when all 95 MW of load at Detour is rejected will ensure that post-contingency voltages are manageable with the previous one Moose River Basin generating unit in-service and operating in condenser mode.

The loss of the D501P circuit in the existing system results in post-contingency voltages above the maximum allowable threshold of 250 kV at Pinard and Kapuskasing. This occurs in situations when load at the Spruce Falls facility is high and hydroelectric generation along the Moose River Basin is out of service, requiring load rejection to help maintain the post-contingency power flow limits through the Spruce Falls T7 autotransformer. The incorporation of the Detour Lake 230 kV Mine will not alleviate or contribute to this issue due to the ability to reject the entire Detour facility, including the Detour 180 km tap line. Existing system overvoltage concerns are mitigated by operating one Moose River Basin generation unit in condenser mode for reactive power support. The future system can be operated in the same manner.

The results of the consultant's study also show potential overvoltage concerns when all load behind Detour is lost via the tripping of the main 230 kV Detour breaker. Overvoltage concerns can be mitigated by the remote tripping of the breakers at Pinard TS which will disconnect the facility entirely. The IESO has repeated this study in Table 9 below.

Monitored Busses		Pre-Cont Voltage (kV)	***Loss of Detour 230 kV Bus – Detour Circuit Remains Connected***				***Loss of Detour 230 kV Bus – Detour Circuit Tripped***			
Bus Name	Base (kV)		Pre-ULTC		Post-ULTC		Pre-ULTC		Post-ULTC	
			kV	%	kV	%	kV	%	kV	%
Hanmer TS	500	532.4	536	0.7	536.4	0.7	534.8	0.4	534.8	0.4
Porcupine TS	500	541.2	548.5	1.4	549.5	1.5	544.8	0.7	544.8	0.7
Pinard TS	500	542.2	552.3	1.9	553.2	2	546.3	0.8	546.3	0.8
Hanmer TS	220	247.3	248.8	0.6	249	0.7	248.3	0.4	248.3	0.4
Porcupine TS	220	246.1	249.1	1.2	247.6	0.6	247.6	0.6	247.6	0.6
Pinard TS	220	245.9	250.9	2	251.2	2.2	247.7	0.7	247.7	0.7
Little Long SS	220	245.1	248.2	1.3	248.4	1.4	246.2	0.5	246.2	0.5
Kapuskasing TS	220	240.9	243.6	1.1	243.7	1.2	242	0.5	242	0.5
Spruce Falls TS	220	240.9	243.5	1.1	243.6	1.1	241.9	0.4	241.9	0.4
Detour Gold	220	236.2	-	-	-	-	-	-	-	-
Hunta SS	118	127.9	129	0.9	129	0.9	128.4	0.4	128.4	0.4
Kapuskasing TS	118	124.2	125.6	1.1	125.6	1.1	124.9	0.5	124.9	0.5
Spruce Falls TS	118	124.1	125.5	1.1	125.6	1.2	124.8	0.6	124.8	0.6
Hearst TS	118	125.3	126.1	0.7	126.2	0.7	125.7	0.3	125.7	0.3

Table 9: Voltage Study Results for the Loss of the Detour 230 kV Bus

To mitigate post-contingency overvoltage concerns at Pinard TS, contingencies that result in the tripping of the main 230 kV Detour breaker, which results in the loss of total load at Detour, must also trip the Detour circuit via the tripping of appropriate breakers at the Pinard 230 kV bus. This will ensure that the line will be disconnected and will not inject reactive power into the Pinard 230 kV bus.

5.8 Modification to the Northeast 115 kV L/R & G/R Scheme

The Northeast 115 kV Load and Generation Rejection Scheme was designed to address the problem of excess and under generation being imposed on the underlying 115kV system under contingency conditions involving the 500 kV, 230 kV and 115 kV systems north of Sudbury.

Due to the large capacity of the 230 kV Detour Lake Mine and its location in the Northeast power system, the 230 kV Detour connection must be added to the NE 115 kV L/R & G/R Scheme to address post-contingency thermal overloading of the H9K circuit, as well as to respect existing post-contingency operating limits at Spruce Falls TS and Ansonville TS. The L/R for Detour Lake should be initiated upon the detection of contingencies involving the D501P and P502X circuits.

North East 115 kV L/R & G/R Scheme			
OUTPUT: CONTROL ACTIONS		INPUT: CONTINGENCY SIGNALS	
		P502X	D501P
	Trip Entire Detour Facility (including 180 km line) *new*	X	X
	Trip Detour T1 Transformer *new*	X	X
	Trip Detour T3 Transformer *new*	X	X

Figure 8: Modifications to the Northeast 115 kV L/R & G/R Scheme

Tripping of the the T1 or T3 transformers will result in the rejection of the process line located behind each respective transformer. This will results in the rejection of approximately 32 MW load each and will provide smaller steps and more modularity in situations where load rejection is required.

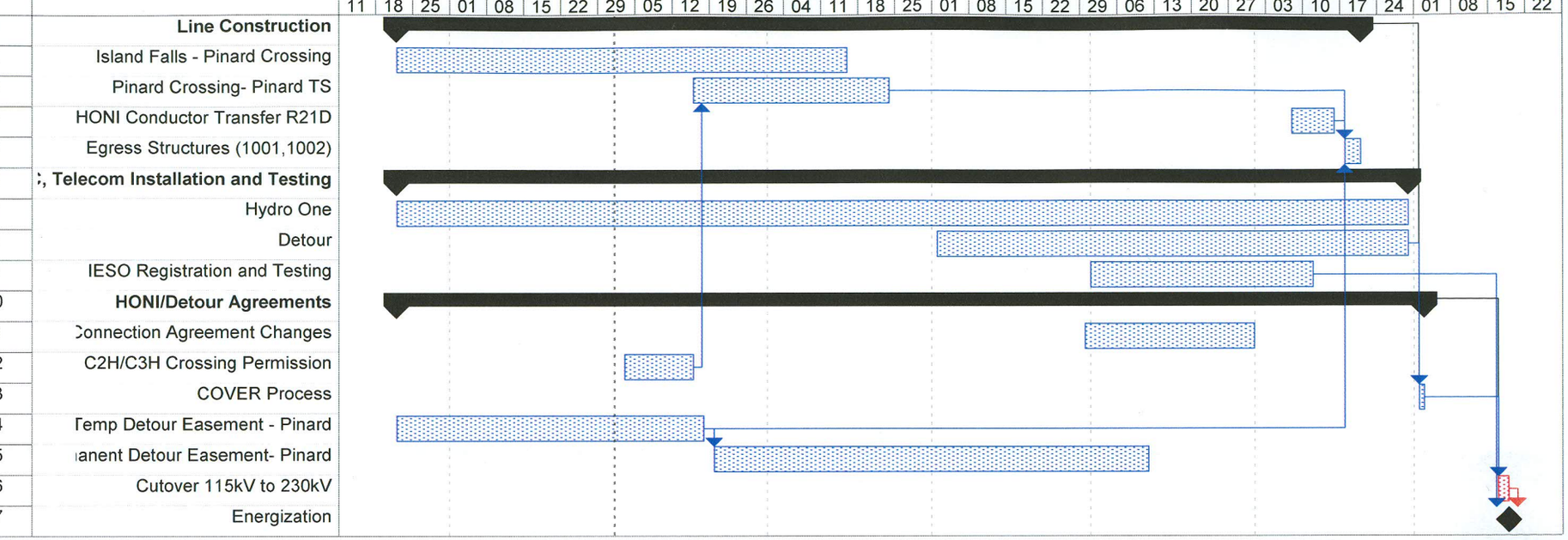
In situations where large amounts of load rejection is required, the entire Detour facility can be rejected. This will result in the rejection of 95 MW of load. To ensure post-contingency voltages are manageable in the post-L/R system, the 180 km Detour line should be rejected as well. This will ensure that there are no reactive power injections at Pinard 230 kV from the charging capacitance of the new Detour line.

Rejection of the T2 transformer individually is not possible as it will reject all critical load at the Detour Mine. This will result in the gradual shutdown of all processes and load at the mine.

The proposed 230 kV Detour Lake Mine must participate in the North East 115 kV L/R & G/R Special Protection Scheme to address post-contingency thermal overloading of the H9K circuit, as well as to respect existing post-contingency operating limits at Spruce Falls TS and Ansonville TS. The facility must be able to be selected for L/R for the loss of the D501P and P502X circuits.

– End of Document –

ID	Name
1	**Line Construction**
2	Island Falls - Pinard Crossing
3	Pinard Crossing- Pinard TS
4	HONI Conductor Transfer R21D
5	Egress Structures (1001,1002)
6	**:, Telecom Installation and Testing**
7	Hydro One
8	Detour
9	IESO Registration and Testing
10	**HONI/Detour Agreements**
11	Connection Agreement Changes
12	C2H/C3H Crossing Permission
13	COVER Process
14	Temp Detour Easement - Pinard
15	anent Detour Easement- Pinard
16	Cutover 115kV to 230kV
17	Energization



Project: Line Construction Phase 2
Date: Wed 01/02/12

Task
Critical Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Critical Task
Rolled Up Milestone
Rolled Up Progress
Split
External Tasks
Project Summary
Group By Summary
Deadline