IESO_PRO_0499

REPORT

System Impact Assessment Report

Thierry Mine Development

CONNECTION ASSESSMENT & APPROVAL PROCESS

CAA ID 2008-309

Applicant: Richview Resources Inc

Market Facilitation Department

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System Impact Assessment Report

Thierry Mine

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 approval or disapproval of the proposed connection under Chapter 4, section 6 of the Market Rules.

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, you must be aware that the IESO may revise drafts of this report at any time in its sole discretion without notice to you. 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 it is using the most recent version of this report.

HYDRO ONE

Special Notes and Limitations of Study Results

The results reported in this study are based on the information available to Hydro One, at the time of the study, suitable for a preliminary assessment of a new generation or load connection proposal.

The 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 thermal loading impact of the proposed connection on facilities owned by other load and generation (including OPG) customers.

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 preliminary 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.

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SIA Findings

Summary

Thierry Mine is located in Pickle Lake in North-western Ontario. It has been shut down since 1982, but planning to reopen the operations in 2010.

The peak load is expected to be 9 MW and include four 450 HP induction motors. The supply line is an existing 6 km 115 kV line to the mine site that is owned by Hydro One and is tapped off at the Etruscan Junction which is located about 250 km from Ear Falls on the 440 km long radial line E1C+M1M.

Conclusions

The following conclusions were made.

(1) The incorporation of the Thierry mine results in potential thermal overloading of the E1C circuit.

(2) With the addition of the Thierry Mine load, the 115 kV voltages at Musslewhite, Etruscan and Thierry Mine would drop significantly. A Reactive compensation of minimum 27 MVAr is required at, the side connected to 4.16 kV bus to restore the voltage to nominal value (118 kV).

(3) The results of time domain simulations that were performed to evaluate the dynamic performance of induction motors during starting as well as their behavior in response to a contingency show that the minimum voltage remains over 89 % of nominal voltage and rotor oscillations do not propagate to the IESO-controlled grid.

(4) Manitou Falls GS and Ear Falls GS provide voltage support for local loads. Based on real time data from 2007 to 2008, it can be seen that 95% of the time at least two Manitou Falls units and one Ear Falls unit are in I/S. Under these conditions, no recognized contingency including loss of one Manitou Falls unit causes excessive voltage decline. Absence of generation resources less than above may require a limit on Thierry Mine load. Derivation of this limit needs further analysis.

IESO's Requirements - For Richview Resources Inc.

The following requirements have been identified:

(1) Measures must be taken to mitigate thermal overloading of 115 kV circuit E1C. Section 3.10 of this report presents various mitigation options.

Richview Resources Inc. is required to work closely with Hydro One on the thermal overload mitigation solution, with due regard for the timing of planned transmission expansion.

Once the thermal overloading of the E1C circuit is mitigated, the Thierry Mine load will be able to connect to the grid, and the following requirements will also apply. Note that the following requirements are subject to a reassessment by the IESO once the thermal overload mitigation solution is in place.

(2) An L/R scheme for automatic load rejection at the mine in the event of loss of any alternate supply path will have to be installed (since E1C would not be able to supply the Thierry Mine load by itself).

(3) A supplementary reactive power supply will have to be provided at the mine site connected to the 4.16 kV bus. This must consist of a 15 MVAr shunt capacitor bank with suitable steps and a +12/-8 MVAr SVC. The above mentioned L/R scheme will also have to perform automatic load rejection at the mine in the event of loss of the capacitor bank and/or the SVC.

(4) Starting of 450 HP induction motors will have to be staggered to reduce transient voltage sag. To that end, the 450 HP induction motors must have interlocking so as to avoid their simultaneous starting.

(5) The performance of the equipment will have to meet or exceed the predicted performance observed in simulations done by the IESO based on data and assumptions used. If the data, assumptions or study conditions do not reflect actuality, the IESO will have to be informed and parts of simulations must be repeated.

(6) The real-time monitoring requirements identified in this report will have to be provided.

(7) A fault clearing device will have to be provided at the tap point to E1C such that the fault exposure of E1C is not increased.

(8) The existing protections will have to be suitably adjusted to cater to the extra power withdrawal.

(9) At-least 35% of the total peak load will have to be connected to UFLS relays to trip 12% at 59.3 Hz and additional 23% at 58.5 Hz.

(10) The 4.16/115 kV transformer must have adequate automatic on-load tap changer facilities to operate continuously within normal variations on the transmission system as set out by the Market Rules, i.e. 132 kV to 113 kV, and to operate in emergencies with a further transmission system voltage variation of ± 6%.

(11) The registration of the new facilities will need to be completed through IESO's Market Entry process before any part of the facility can be placed in-service.

IESO requirements - For HONI

Hydro One is required to work closely with Richview Resources Inc. on the E1C thermal overloading mitigation solution, with due regard for the timing of planned transmission expansion.

Hydro One is requested to ensure that the 6 km long 115 kV line from the Etruscan Junction to the mine site is in good shape and will be able to supply the load reliably.

Notification of Disapproval

From the information provided, our review concludes that the existing transmission system cannot supply the additional load and Hydro One is required to investigate a feasible transmission reinforcement to accommodate the proposed load addition. It is recommended that Richview Resources Inc. and Hydro One work closely to identify and coordinate the implementation of a feasible system enhancement that will support the reliable supply of the additional load. Under the present conditions it is not feasible to issue a Notice of Conditional Approval as without any transmission reinforcement, adding the Thierry Mine load to the E1C circuit will reduce the reliability of IESO-controlled grid.

– End of Section –

1. Project Description

Thierry Mine is located in North-western Ontario in the town of Pickle Lake. The mine was originally owned by Union Miniere Explorations and Mining Corporation (UMEX) and was shut down in 1982. Recently, the mine site was purchased by Richview Resources, and is planning to reopen the operations of the facility in 2010.

The peak mine load is expected to be about 9 MW which mainly consists of many induction motor loads. It is the intention of the proponent to re-utilise the existing 6 km 115 kV line to the mine site that is still owned by Hydro One from the Etruscan Junction. The Etruscan Junction is located 260 km from Ear Falls on 440 km long radial line E1C+M1M. The above 6 km line was not removed at the time the mine was closed in 1982 and is still in place, but not energized. The calculated positive sequence R and X values for this existing 115 kV line are R = 2.12 ohms and X = 3.32 ohms.

– End of Section –

2. Review of Connection Proposal

Following is the proposed connection arrangement.

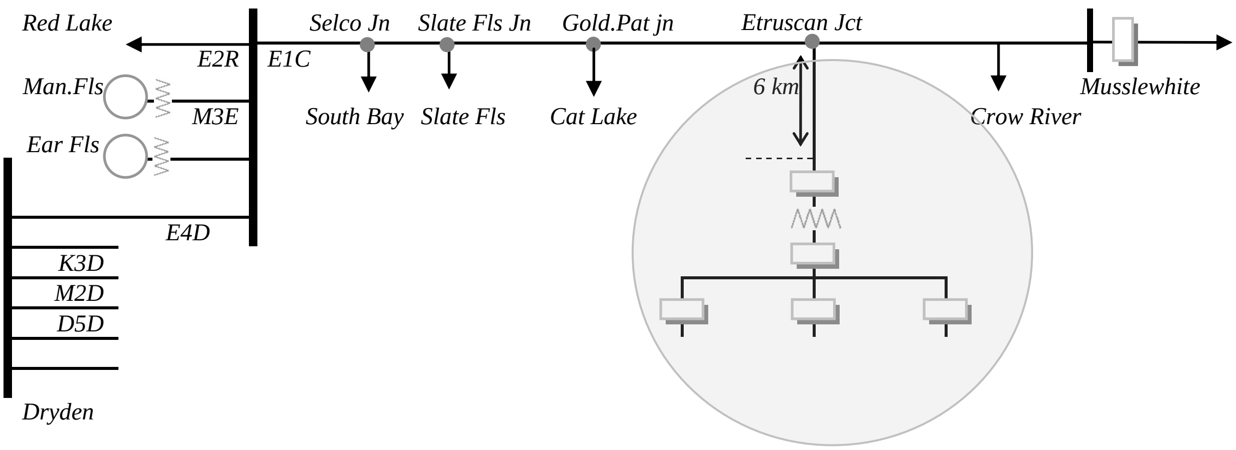

FIGURE 1 : CONNECTION ARRANGEMENT

It is estimated that the peak mine load will be 9 MW. There are several motors in the mine, the largest being four induction motor water pumps which could be as large as 450 HP each and operated simultaneously. The power factor of the mine at 4.16 kV bus will be determined predominantly by the performance of induction motors. The starting of the motors could be staggered, but the starting of the last pump with other site load operating at peak would be the worst case.

2.1 Current System Conditions

The Figure 2 show following quantities obtained as 1 Hr samples from IESO real-time data depository for the period of 2007 April 1 – 2008 April 1.

(a) MW flow at Ear Falls into E1C
(b) 115 kV voltage at Ear Falls
(c) 115 kV voltage at Musslewhite

Following can be observed with the exclusion of changes due to momentary events.

Maximum MW flow at Ear Falls into E1C	=	21 MW
Minimum MW flow at Ear Falls into E1C	=	11 MW
Average 115 kV voltage at Ear Falls	=	123 kV (1.042 pu)
Average 115 kV voltage at Musslewhite	=	121 kV (1.025 pu)

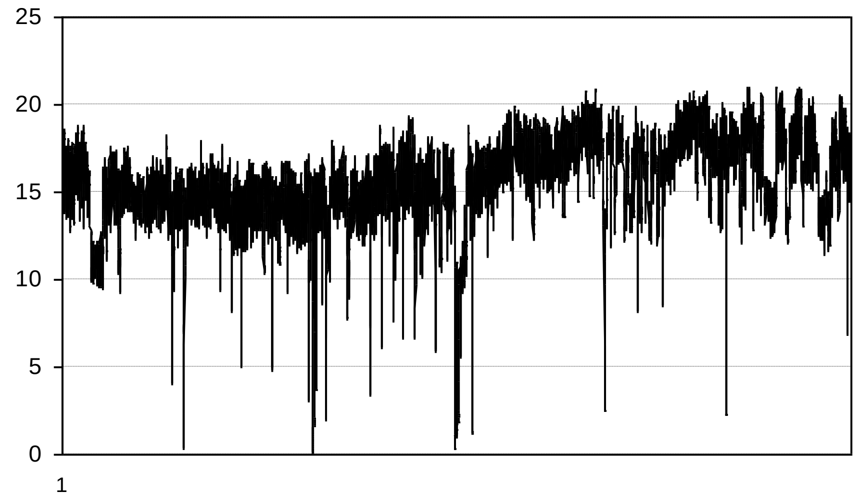

FIGURE 2A : MW FLOW AT EAR FALLS INTO E1C

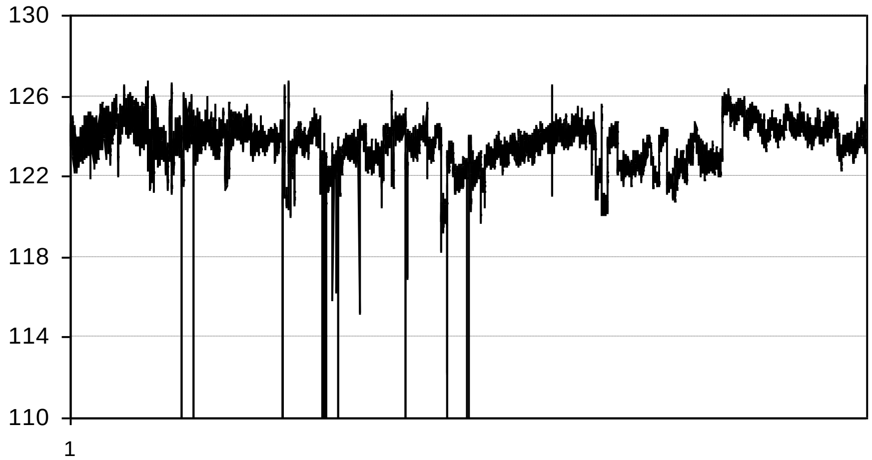

FIGURE 2B : 115 KV VOLTAGE AT EAR FALLS

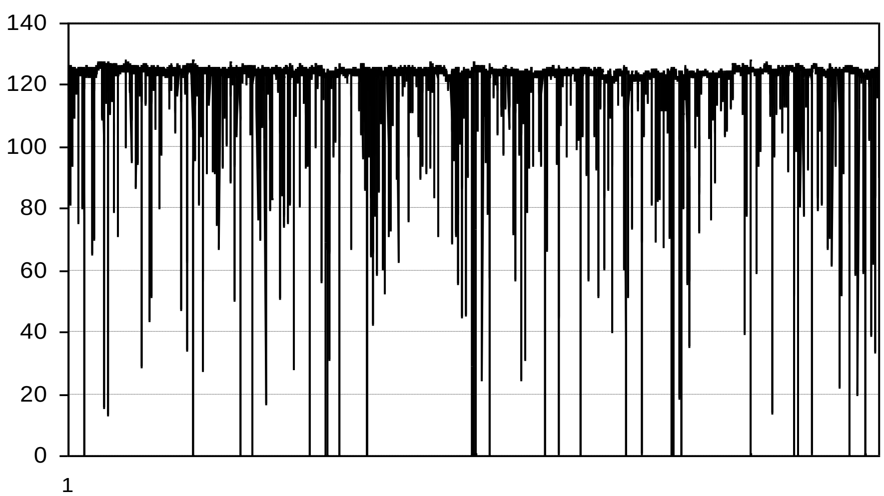

FIGURE 2C : 115 KV VOLTAGE AT MUSSLEWHITE

– End of Section –

3. System Impact Studies

3.1 Assumptions

- The study is performed for a system with all transmission elements are in service.
- The Musslewhite SVCs are modeled with a synchronous generator of zero active power and reactive power range equivalent to that of sum of SVCs.
- At steady state, the mine peak is 9 MW (power factor is 0.8 for motors and 0.9 for non-motors).
- Minimum two Manitou Falls units and one Ears Falls unit are I/S. This is based on the IESO real-time data obtained for May 1, 2007 to May 1, 2008 which shows 96 % of that duration, at-least two Manitou Falls units and 98 % of that duration, at-least one Ear Falls unit was I/S.

3.2 Data

- The IESO load forecast for loads connected to E2R, E1C and M1M circuits does not show a drastic growth over next several years. The forecast coincidental MW peaks for 2013 shown below , were used in the study. The rest of the loads in the province remain at 2008 summer peak conditions.

E2R	Red Lake = 33.5/34			
E1C/M1M	Slate Falls = 0.4	Cat Lake = 0.5	Crow River = 2.4	Musselwhite = 19
E1C+M1M	19.9/17	E1C+M1M+E2R	53.4/51	

- Musslewhite SVC : There are two SVCs at Musslewhite 4.16 kV bus. Each has two individually switched 3.5 MVAr capacitor banks and a 13.5 MVAr thyristor-controlled reactor connected in parallel. Thus, when both capacitor banks are I/S, a total of 14 MVAr (capacitive) to 13 MVAr (reactive) dynamic range is available.

- The 6 km 115 kV line to the Thierry Mine

R		X		Cont. Rating	LTR	Length
2.12 Ω	0.01522 pu	3.32 Ω	0.02384 pu	-	-	6 km

- Induction Motor Data (single-cage representation)

Rated Output	Voltage	MVA	Rated Speed	Slip at Full Load	H	VI	D
450 HP	4.16 kV	0.353	1770 rpm	1.55 %	0.354	0.0	1.0
No of Poles	Xa	Ra	R1	X1	R2	X2	Xm
4	0.1029	0.0383	0.0152	0.1167	999.0	999.0	3.652

- Collector to HT step-up transformer

Voltage	Maximum Rating	Impedance in pu	Off Load Taps
115/4.16 kV	7.5/10 MVA	0.00335 + j 0.0977 on 10 MVA base	95 % – 105 %

- Ratings of existing Hydro One equipment.

The lower of the sag temperature or 93 °C has been used to calculate the continuous rating, the lower of the sag temperature or 127 °C has been used to calculate the Long Term Emergency (LTE) rating and the sag temperature has been used to calculate the 15-min LTR.

E1C circuit section	Wind km/hr	Sag Temp	Ambient Temp.	Conductor Size (kcmil), Strands	Cont. Rating	LTE Rating	15-min LTR
Ear Falls × Selco	4 km/hr	60 °C	30 °C	167.8, 6/1	220 A	220 A	220 A
Selco × Slate Falls	4 km/hr	60 °C	30 °C	167.8, 6/1	220 A	220 A	220 A
State Falls × Gold. Pat	4 km/hr	60 °C	30 °C	167.8, 6/1	220 A	220 A	220 A
Gold. Pat × Etruscan	4 km/hr	60 °C	30 °C	167.8, 6/1	220 A	220 A	220 A

3.3 Induction Motor Performance (IMD Simulation)

The PSS/E can be used to project the performance of a 450 HP induction motors in the mine. The under-voltage tripping relay has been disabled.

(a) Terminal Voltage = 1.0 pu

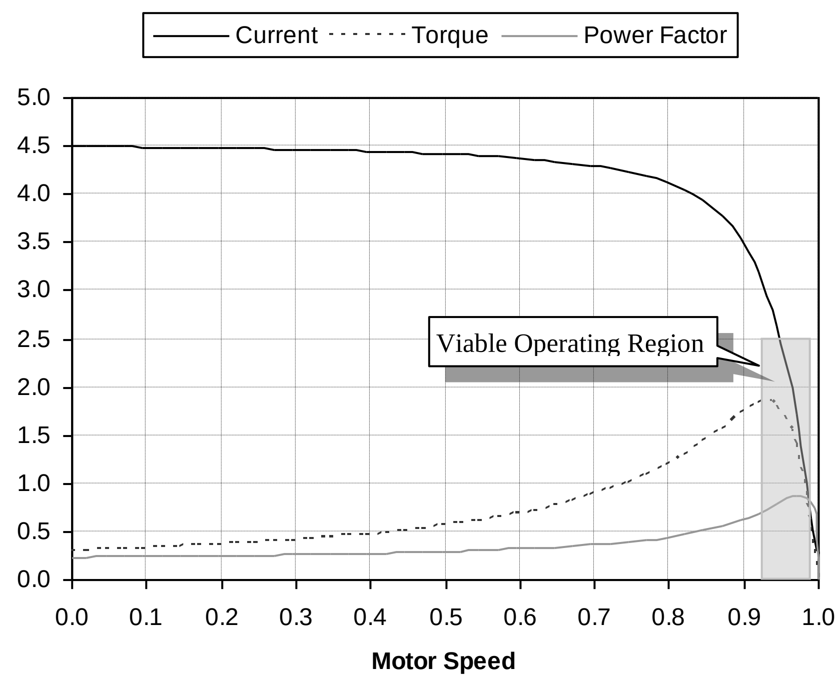

FIG 3A : CURRENT, TORQUE AND PF

Pullout torque = 1.84 pu at 0.93 pu speed
Starting torque = 0.29 pu
Starting power factor = 0.23
Starting current = 4.49 pu
Running power factor at full speed = 0.8

(b) Terminal Voltage = 0.95 pu

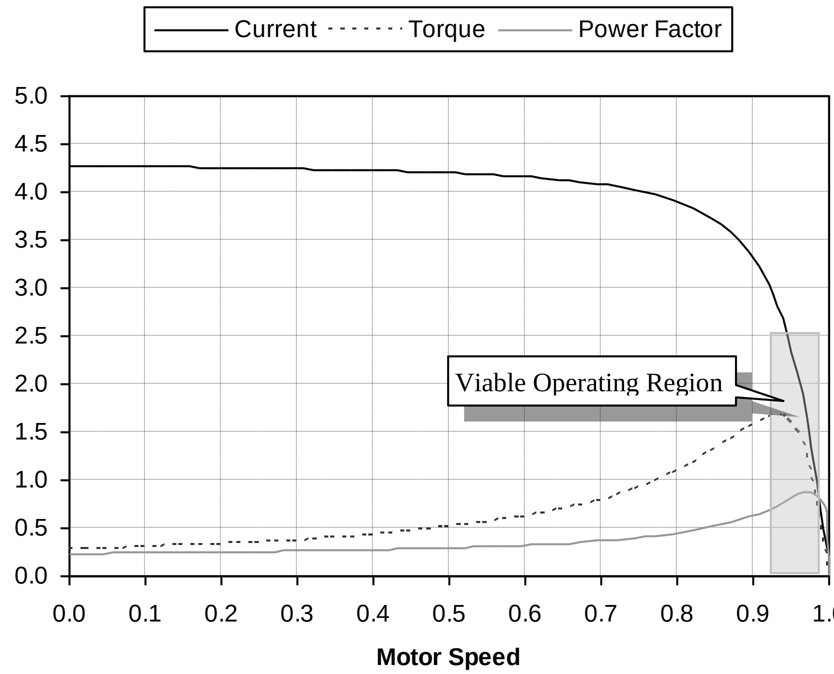

FIG 3B : CURRENT, TORQUE AND PF

Pullout torque = 1.66 pu at 0.93 pu speed
Starting torque = 0.26 pu
Starting power factor = 0.23
Starting current = 4.27 pu
Running power factor at full speed = 0.8

Regardless of the terminal voltage, if the motor speed drops below 0.93 pu or 1675 rpm, the motor would stall and stop. The maximum level of load up to which the motor can be subjected depends on the terminal voltage. At rated voltage, it is about 84 % above rated load.

At rated voltage, the starting current can reach as high as 4.5 times of the rated current and the starting power factor can drop as low as 0.23 lag which would cause system voltage to drop at motor starting. After reaching full speed, the motor power factor improves to 0.8 lag.

3.4 Load Modelling

To investigate steady state: At steady state, the mine peak is 9 MW which includes four 450 HP induction motors. The induction motor performance analysis showed that the running power factor of each is 0.8 lag. Therefore, the total reactive load drawn by those four motors is 1.0 MVAr. If rest of the mine, i.e. 7.66 MW operates at 0.9 lag power factor, the corresponding reactive load for rest of the mine is 3.7 MVAr. That means the total load at the entire mine (when all motors are running) is 9 + j 4.7.

To investigate motor start: The current drawn by a single 450 HP motor when running is 450×746/(√3 × 4160 × 0.8) = 58 A. Given that 450 HP is about 0.34 MW, prior to starting of the last motor, the mine peak is 8.66 + j 4.45. Motor performance analysis showed that the starting power factor could be 0.23 lag and starting current is 4.5 times of running current. That means the starting motor load is (√3 × 4160 × 58 × 4.5

× 0.23) = 0.43 MW. The corresponding reactive load is 1.82 MVAr. Thus, the peak load during the last motor start is 9.1 + j6.3.

To investigate steady-state voltage decline: During motor start or any other contingency, the active component of the mine load is modeled as equal constant current and constant admittance components. The reactive component is modeled as constant admittance load.

To investigate transient behavior: For transient studies, the PSS/E induction motor model CIM5BL where both rotating load dynamics as well as rotor electromagnetic dynamics are represented is used. The data provided by the proponent reflects the availability of only a single cage on the rotor where no starting and running windings are separately available. Therefore, the modelling of the higher resistance cage is omitted which explains the modest starting torque.

3.5 Voltage Analysis

3.5.1 Pre-Contingency Voltages

Following points are noteworthy.

(a) For northern Ontario, the IESO requires that the 115 kV voltages to be within 132 kV and 113 kV.
(c) Loads connected to E1C, M1M and E2R are as per data given in section 3.2.
(d) Red Lake capacitor and Musslewhite SVC are I/S.
(e) The effect of a new reactive compensation at 4.16 kV bus of Thierry Mine is examined.

	Thierry Mine O/S		Thierry Mine Load = 9 + j4.7		
Number of units I/S at Ear Falls GS	1	4	1	1	4
Number of units I/S at Manitou Falls GS	2	5	2	2	5
Thierry Mine cap. bank at 4.16 kV bus	-	-	0 MVAr	24 MVAr	18 MVAr
Tap of 4.16/115 kV transformer	-	-	1.1 pu	1.1 pu	1.05 pu
Voltage @ Thierry Mine 4.16 kV bus	-	-	Voltage Collapse	4.3 kV	4.2 kV
Voltage @ Thierry Mine 115 kV bus	-	-		113 kV	113 kV
Voltage @ Etruscan 115 kV bus	122 kV	123 kV		113 kV	113 kV
Voltage @ Musslewhite 115 kV bus	123 kV	124 kV		113 kV	113 kV
Voltage @ Ear Falls 115 kV bus	126 kV	126 kV		123 kV	126 kV

If mine load reaches peak when **4 Ear Falls** and **5 Manitou Falls** units are available, 18 MVAr of compensation is required. This must set the base compensation.

If mine load reaches peak when **1 Ear Falls** and **2 Manitou Falls** units are available,
(1) extra 6 MVAr compensation is required to maintain HT voltages to IESO-acceptable minimum (113 kV). At this time, the LT voltage may rise to 4.3 kV with step-down transformer tap changed to 1.1 p.u
(2) extra 9 MVAr compensation is required to maintain HT voltages to nominal voltage (118 kV). At this time, the LT voltage may rise to 4.5 kV with step-down transformer tap changed.

3.5.2 Post-Contingency Voltage Decline

One Ear Falls unit and two Manitou Falls units are I/S. Pre-contingency voltages are at or above 118 kV.

Thierry Mine load + 27 MVAr status	Loss of	Ear Falls 115 kV	Musslewhite 115 kV	Etruscan 115 kV	Thierry Mine 115 kV	Thierry Mine 4.16 kV
O/S (present)	Mant. Fls G1	0.8	0.8	0.8	-	-
I/S (future)	Mant. Fls G1	1.9	2.3	2.9	2.9	5.7

When the pre-contingency system voltages at or above 118 kV, a loss of second Manitou Falls unit during mine peak load is sustainable provided 27 MVAr compensation is available. The voltage declines are within IESO standards. It must be noted that under the scenario of peak mine load if the pre-contingency voltages are at about 113 kV, the loss of second Manitou Falls unit causes voltage collapse.

3.6 Induction Motor Start-up

3.6.1 Steady State Analysis

The proponent has informed that the largest motors in the mine will be four 450 HP induction motors which are to be used in water pumps. They may be operated simultaneously, but their starting can be staggered, thus the starting of the last pump with all other site loads operating would be the worst case for voltage decline studies.

The following table provides the voltage declines of the last-motor-start compared to the pre-last-motor-start. One Ear Falls unit and two Manitou Falls units are I/S. Pre-contingency voltages are at or above 118 kV. A 27 MVAr compensation is I/S at the mine LT bus.

Busbar	Pre-Last 450 HP Motor-Start (Mine Load = 8.66 + j 4.45)	Last 450 HP Motor-Start (Mine Load = 9 + j 6.3)	ΔV
Thierry Mine 4.16 kV bus	4.5 kV	4.47 kV	0.2
Thierry Mine 115 kV bus	118 kV	116 kV	1.4
Etruscan 115 kV bus	118 kV	116 kV	1.4
Musslewhite 115 kV bus	119 kV	117 kV	1.6
Ear Falls 115 kV bus	124 kV	124 kV	0.3

It does not appear that a motor start would cause a significant voltage drop as long as pre-motor start voltages are held at 118 kV or above.

3.6.2 Transient-State Simulation Using CIM5BL

The PSS/E induction motor model CIM5BL where both mechanical and electromagnetic dynamics are modelled in details is used to represent the transient behaviour of induction motors. This model can show the distinctive characteristic of the induction motor to draw excessively high current until the peak torque develops near full speed.

The Transient behaviour of motors for two events is tested. It is assumed that only one Ear Falls and two Manitou Falls units are I/S. The two events are, the starting of the last 450 HP motor (C1) and after motor reaches steady state, a LLG fault at Ear Falls TS such that M3E+E2R+Manitou Falls GS are lost by configuration (C2). The curves for C1 are followings.

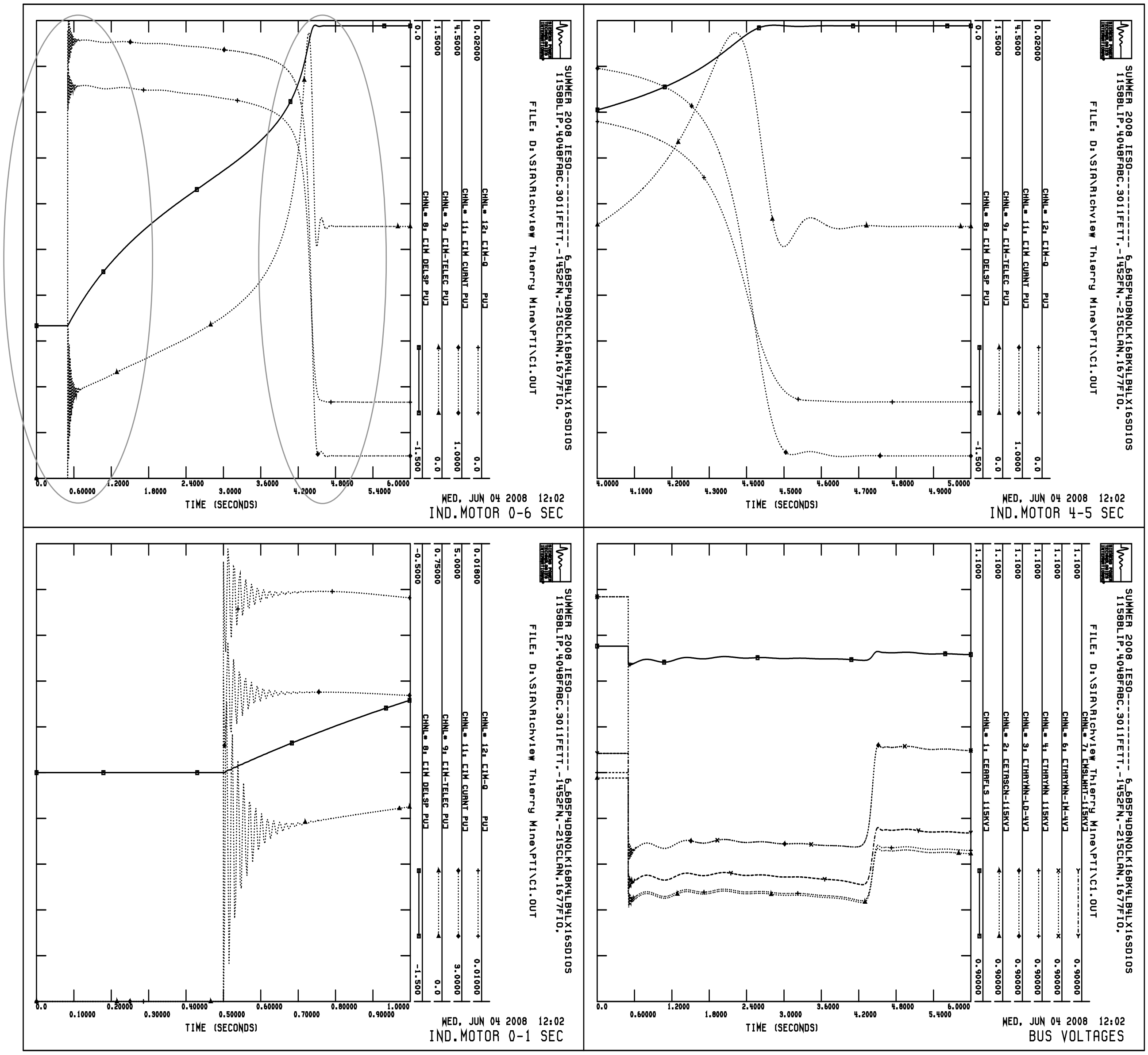

FIG 4A : FOR C1

The motor is started at 0.5 sec of the simulation. The rotors exhibit oscillations with frequency of 60 Hz while drawing current of 4.4 times of nominal current and excessively high reactive power which cause the voltage to drop by 10.6 % at Thierry Mine 4 kV, 5.6 % at Etruscan and Thierry Mine 115 kV and 0.8 % at Ear Falls 115 kV. While the voltage remains low, the rotor torque increases resulting in rapid acceleration towards full speed. At this point the current and reactive power remains almost unchanged until the rotor reaches full speed before which the current and reactive power sharply drops and the torque passes the pullout point. The entire process is completed within about 4 sec from the energizing. Then, the voltages recover back to acceptable levels, but still slightly below the pre-motor-start levels.

The following shows how the motors respond to a disturbance (LLG fault at Ear Falls followed by loss of M3E + E2R + Manitou Falls GS) after motors have been started and reached steady-state (C2).

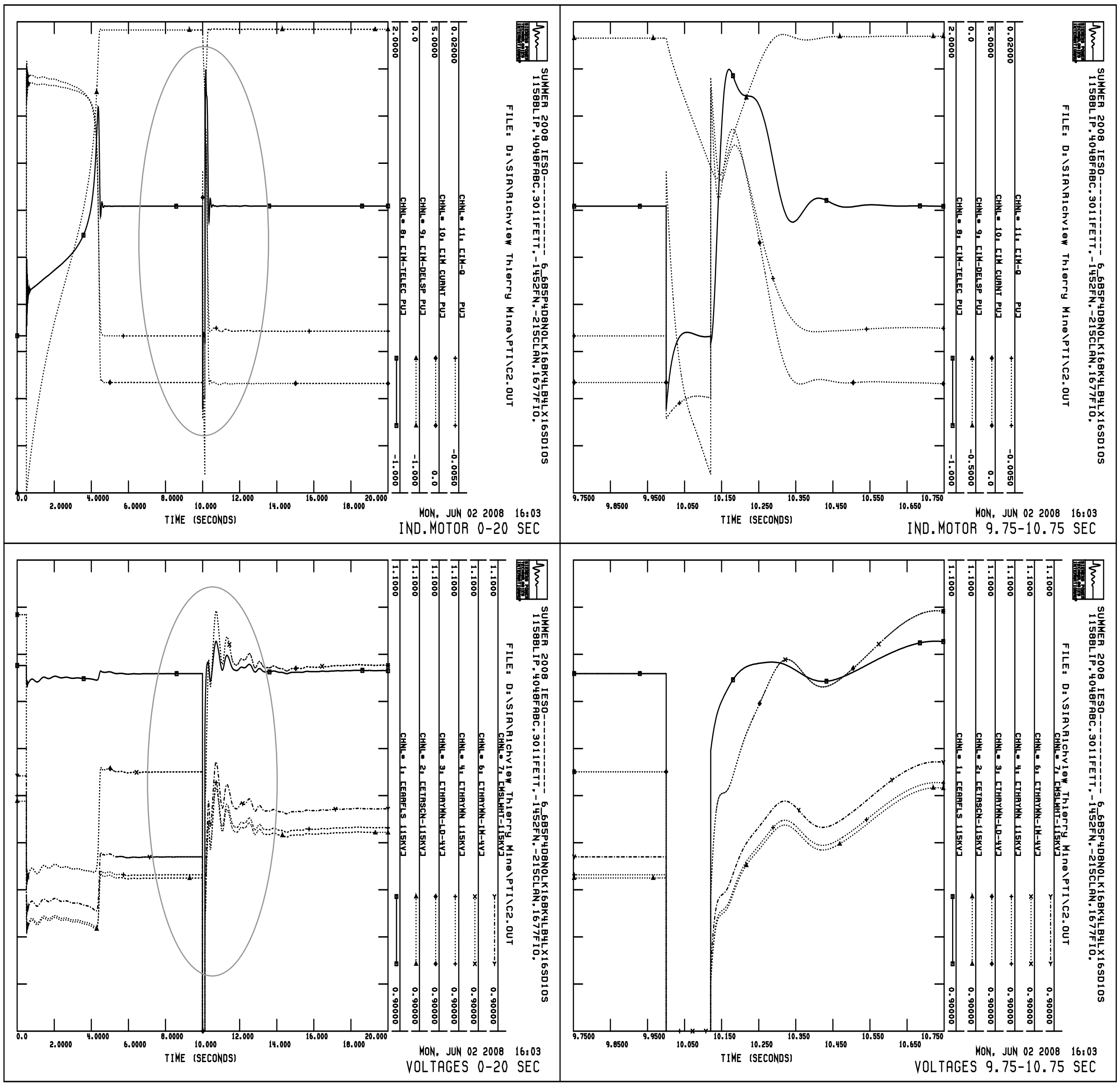

FIG 4B : FOR C2

At the time of the contingency, as a result of reduced terminal voltage, the torque sharply drops and the rotors slow down. Once the fault is cleared, the motors recover back to their full speed without significant oscillations. The post-contingency voltages show the power system can recover back to an acceptable steady state after the contingency and the dynamics of motors do not contribute adversely to post-fault recovery.

Both simulations show that there is no evidence of adverse impact on the IESO-controlled grid either by the start of one of the induction motors in the mine or the behavior of the motor due to any other disturbance in the power system.

3.7 Steady State Loading

A number of computer simulations were performed to examine the loading of E1C at steady-state. The thermal loading and loss calculation is based on 19 MW peak load already approved for Musselwhite mine.

Circuit E1C	Section
Ear Falls × Selco	L1
Selco × Slate Falls	L2
State Falls × Gold. Pat	L3
Gold. Pat × Etruscan	L4

Circuit E1C	Current Flow/Continuous Rating	
	Before Thierry Mine	After Thierry Mine
L1	147/220 = 0.66	238/220 = 1.08
L2	140/220 = 0.63	232/220 = 1.05
L3	133/220 = 0.60	226/220 = 1.02
L4	125/220 = 0.56	216/220 = 0.98

The E1C circuit between Ears Falls and Golden Patricia Junction will be overloaded and between Golden Patricia Junction and Etruscan Junction will be very close to overloading.

The following are the losses.

Thierry Mine	MW losses					MVAr losses				
	L1	L2	L3	L4	∑	L1	L2	L3	L4	∑
O/S	2.0	1.4	1.3	1.2	5.9	2.5	1.8	1.7	1.5	7.5
I/S	5.4	4.0	3.8	3.7	16.9	6.8	4.9	4.8	4.7	21.2
Increased MW losses =					11.0	Increased MVAr losses =				13.7

Due to increased current flow and longer lines, the losses in existing lines are increased more than the added load. The increase of power drawn by E1C could be more than the double of the Thierry mine load.

3.8 Monitoring

The proponent must arrange real-time telemetering of following variables available to the IESO.

- Total MW and MVAr flow into Thierry Mine 115 kV bus
- status of 115 kV breakers and disconnects
- 115 kV voltage

3.9 Under-Frequency Load Tripping

The market rules (Chapter 5, Section 10.4) require that each distributor and connected wholesale customer, in conjunction with the relevant transmitter, make arrangements to enable the automatic disconnection of up to 35% of its peak demand for conditions of system under-frequency. For the purposes of administrating this, the province is divided up into a number of UFLS areas and the UFLS targets must be met for each of these areas.

The under-frequency automatic load shedding (UFLS) should be provided by tripping feeder circuit breakers to achieve:

- Automatic load shedding of 12% of UFLS area load at a nominal set point of 59.3 Hz and
- Automatic load shedding of an additional 23% of UFLS area load at a nominal set point of 58.8 Hz, for a total load reduction of 35% of the total UFLS area load.

The applicant is required to install facilities at the station to allow for the detection of under frequency conditions, and the selection and tripping of feeder circuit breakers for load shedding. In the event that the existing UFLS area load is insufficient in meeting the UFLS targets with the addition of the new load, the 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 above targets.

3.10 Mitigation Options for the E1C Thermal Overload

In order to mitigate the thermal overload of E1C, it is appropriate the proponent investigate other potential transmission solutions with the assistance of the transmitter such as possible up-rating of E1C, installation of a second parallel line to E1C or a 115 kV connection from Valora DS. Up-rating of E1C could be nearly unfeasible due to the fact that any long term outage to E1C makes no power supply available to the loads connected to E1C for a significant period of time. Installation of a parallel companion circuit to E1C could be of limited value as a single LLG contingency can remove both lines if they are placed in same tower or a single contingency to E4D can island E1C and its companion with Ear Falls/Manitou Falls generation.

It may be prudent to examine the installation of a new 115 kV circuit from Valora DS to the Placer Junction. The new line may be positioned along the Highway 599 for a distance about 180 km. However, it will be necessary that an L/R scheme be installed to perform automatic load rejection at the mine in the event of loss of the additional circuit.

Also, Hydro One has plans to expand the transmission in the Northwest area and has a proposal in place for constructing a new 230 kV transmission line from Pickle Lake TS to Nipigon SS which would essentially connect E1C to M23L and M24L. This transmission expansion is scheduled to be in service in Q4 of 2013. When and if constructed, this line would help supply additional load on circuit E1C, including the Thierry Mine load.
Also, with the new transmission line in service, loads on E1C would benefit from the increased reliability of power supply as they would be connected to two sources of supply.

Richview Resources Inc. and Hydro One are required to work closely on the mitigation solution, with due regard for the timing of planned transmission expansion.

– End of Report