



IMO_REP_0030

CONNECTION ASSESSMENT & APPROVAL PROCESS

PRELIMINARY ASSESSMENT REPORT

APPLICANT: Kitchener-Wilmot Hydro Inc.

PROJECT: Proposed New 230-14.2 kV Transformer Station

CAA ID No. 2001-033

Long Term Forecasts & Assessments Department

Date: *July 17, 2001*

TABLE OF CONTENTS

- Disclaimer 3
- 1.0 PROPOSAL 4**
- 2.0 LOAD 4**
- 3.0 REVIEW OF CONNECTION ARRANGEMENT 4**
 - 3.1 High Voltage Isolation..... 4**
 - 3.2 Voltage Reduction..... 4**
 - 3.3 Under-Frequency Load Shedding..... 5**
 - 3.4 Power Factor 5**
 - 3.5 Telemetry..... 5**
- 4.0 IMPACT ASSESSMENT 5**
 - 4.1 Assumptions 5**
 - 4.2 Impact On Reliability 5**
 - 4.3 Impact on Load Meeting Capability 5**
 - 4.3.1 Kitchener-Wilmot Area Transmission System..... 5
 - 4.3.2 Transmission Elements Affected 6
 - 4.3.3 Results of Analysis 6
 - 4.4 Impact on Transmission System Voltages..... 6**
 - 4.4.1 Abrupt Voltage Changes..... 6
 - 4.4.2 Steady State Voltages 6
- 5.0 REQUIREMENTS FOR CONNECTION 7**
- 6.0 SYSTEM IMPACT ASSESSMENT 7**
- 7.0 NOTIFICATION OF APPROVAL OF THE CONNECTION PROPOSAL..... 7**

FIGURES

- FIGURE 18**
- FIGURE 29**

TABLES

- TABLE 110**

PRELIMINARY ASSESSMENT REPORT

KITCHENER-WILMOT HYDRO INC. PROPOSED NEW 230 - 14.2 KV TRANSFORMER STATION

Disclaimer

This report has been prepared solely for the purpose of assessing whether the connection applicant's proposed connection with the IMO-controlled grid would have an adverse impact on the reliability of the integrated power system and whether a System Impact Assessment of the proposed connection should be conducted 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, Hydro One and the IMO in accordance with Chapter 4, section 6 of the Market Rules. The IMO assumes no responsibility to any third party for any use which it makes of this report. Any liability which the IMO may have to the Connection Applicant in respect of this report is governed by Chapter 1, section 13 of the Market Rules. The IMO may revise this report at any time, in its sole discretion, without notice to the Applicant. Although the IMO 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.

PRELIMINARY ASSESSMENT REPORT

KITCHENER-WILMOT HYDRO INC.

PROPOSED NEW 230 - 14.2 KV TRANSFORMER STATION

1.0 PROPOSAL

Kitchener-Wilmot Hydro Inc. is proposing to build a new 230 -14.2 kV transformer station (to be designated Kitchener #8 TS) in the City of Kitchener. The proposed site is adjacent to the Hydro One corridor for 230 kV circuits M20D/M21D near Huron Road, approximately 8.3 km from Detweiler TS. The new TS, to be supplied from the existing M20D/M21D circuits, will be a standard DESN arrangement with 2x 30/40/50 MVA transformers and associated HV and LV equipment. Kitchener-Wilmot Hydro advised that their current practice is to load this type of station up to the nameplate rating of one of the transformers, i.e. 50 MVA.

The proposed in-service date for the new TS is June 2004.

2.0 LOAD

Initially, Kitchener-Wilmot Hydro plans to transfer 15-20 MVA of load from their existing Kitchener #2 and #3 TSs to their new TS. This is necessitated by a large load increase at an adjacent auto parts plant. The new station will then supply new load development in the south-west area of Kitchener. The load is not expected to reach the station rating of 50MVA until beyond 2015.

3.0 REVIEW OF CONNECTION ARRANGEMENT

3.1 High Voltage Isolation

Based on information provided by Kitchener-Wilmot Hydro, each power transformer will be connected to the transmission system via a 230 kV circuit switcher. This is acceptable as long as the requirements listed in the Transmission System Code for this type of connection are satisfied.

3.2 Voltage Reduction

The proposed new supply point is to be equipped with facilities that would allow a 3% and a 5% voltage reduction to be initiated remotely.

3.3 Under-Frequency Load Shedding

The proposed new supply point is to be equipped with an automatic underfrequency load shedding system capable of rejecting up to 35% of the load supplied from the MTS. Appropriate settings for the underfrequency relaying will be provided by the IMO, prior to commissioning.

3.4 Power Factor

Market rules require that wholesale customers and distributors connected to the IMO-controlled grid shall operate at a power factor within the range of 90% lagging to 90% leading as measured at the *defined meter point*. The *defined meter point* is determined by the IMO and is normally at the point of connection to the IMO controlled grid. The applicant indicated a power factor of 90% in their supporting documentation. It is noted that a power factor of 90% on the load side of the transformers results in a power factor of about 86% on the supply side (230 kV) of the transformers, based on a TS loading of 50 MVA. The applicant will be required to take corrective action if the power factor is outside the specified range.

3.5 Telemetry

In order to permit the IMO to direct the operations of the IMO-controlled grid, wholesale customers and distributors connected to the IMO-controlled grid shall provide the IMO with data in accordance with Chapter 4, Section 7.5 of the Market Rules.

4.0 IMPACT ASSESSMENT

4.1 Assumptions

4.2 Impact On Reliability

With the proposed 230 kV circuit switchers on the HV side of the transformers and protections in accordance with the requirements listed in the Transmission System Code, the connection of the proposed facilities should not have any significant detrimental impact on existing levels of supply reliability.

4.3 Impact on Load Meeting Capability

4.3.1 Kitchener-Wilmot Area Transmission System

The proposed new TS will be supplied at 230 kV via the existing Hydro One Detweiler TS x Middleport TS 230 kV circuits M20D and M21D, as shown in Figure 1. These circuits also supply Galt TS, Cambridge Preston TS, Gerdau Courtice Steel and the proposed new C/ND TS.

4.3.2 Transmission Elements Affected

This Preliminary Assessment considered the effect of the proposed new load on the Detweiler TS x Middleport TS 230 kV circuits M20D and M21D under various contingencies.

4.3.3 Results of Analysis

For the purpose of this assessment, the following system conditions were assumed:

- 75 MVA load at Kitchener Wilmot #6 TS
- 50 MVA load at the proposed new Kitchener Wilmot TS
- Estimated 2010 summer peak loads at remaining stations

Table 1 shows the loading of the transmission system elements based on the above loads under various contingency conditions.

Based on the results shown in Table 1, there are no line loading limitations for the loads and system conditions assumed.

4.4 Impact on Transmission System Voltages

4.4.1 Abrupt Voltage Changes

Market rules require that voltage changes shall not normally exceed 4% of steady state rms voltage for capacitor switching operations. Our studies show that, at a load level of 50 MVA, switching of a 14.2 kV, 10 Mvar capacitor bank at the proposed new TS would result in a steady state voltage change of less than 4%.

Market rules also require that voltage changes shall not normally exceed 10% of steady state rms voltage for line switching operations. Our studies show that this requirement is met for the assumed conditions.

4.4.2 Steady State Voltages

Under normal conditions, the steady state voltage for the nominal 230 kV portion of the IMO controlled grid in Southern Ontario is in the range of 220-250 kV

Our studies show that this requirement is met for the system conditions assumed.

Figure 2 shows the actual measured voltage at Detweiler TS 230 kV bus during the year 2000. The voltage at the location of the proposed new K-W TS is expected to be approximately 0.5 kV below the level at Detweiler TS. Future voltage levels may vary depending on load and system developments.

5.0 REQUIREMENTS FOR CONNECTION

Based on the above analysis, it is concluded that the proposed new Kitchener-Wilmot Hydro TS connection will not have any significant system impacts. The project may, therefore, proceed subject to meeting the requirements identified in Section 3.0 as well as all other applicable market rules and regulatory requirements. Information on Market Entry can be found at the following IMO website. <http://www.theimo.com/imoweb/marketEntry/me.asp>

6.0 SYSTEM IMPACT ASSESSMENT

Based on the results of this Preliminary Assessment, it is concluded that no further analysis is required for this project, and, it is therefore recommended that the System Impact Assessment be foregone.

7.0 NOTIFICATION OF APPROVAL OF THE CONNECTION PROPOSAL

Based on the results of this Assessment, it is recommended that the Applicant should receive a “Notification of Approval of the Connection Proposal” for this project. The Applicant is required to obtain the necessary approvals as may be required by the OEB and other regulatory authorities.

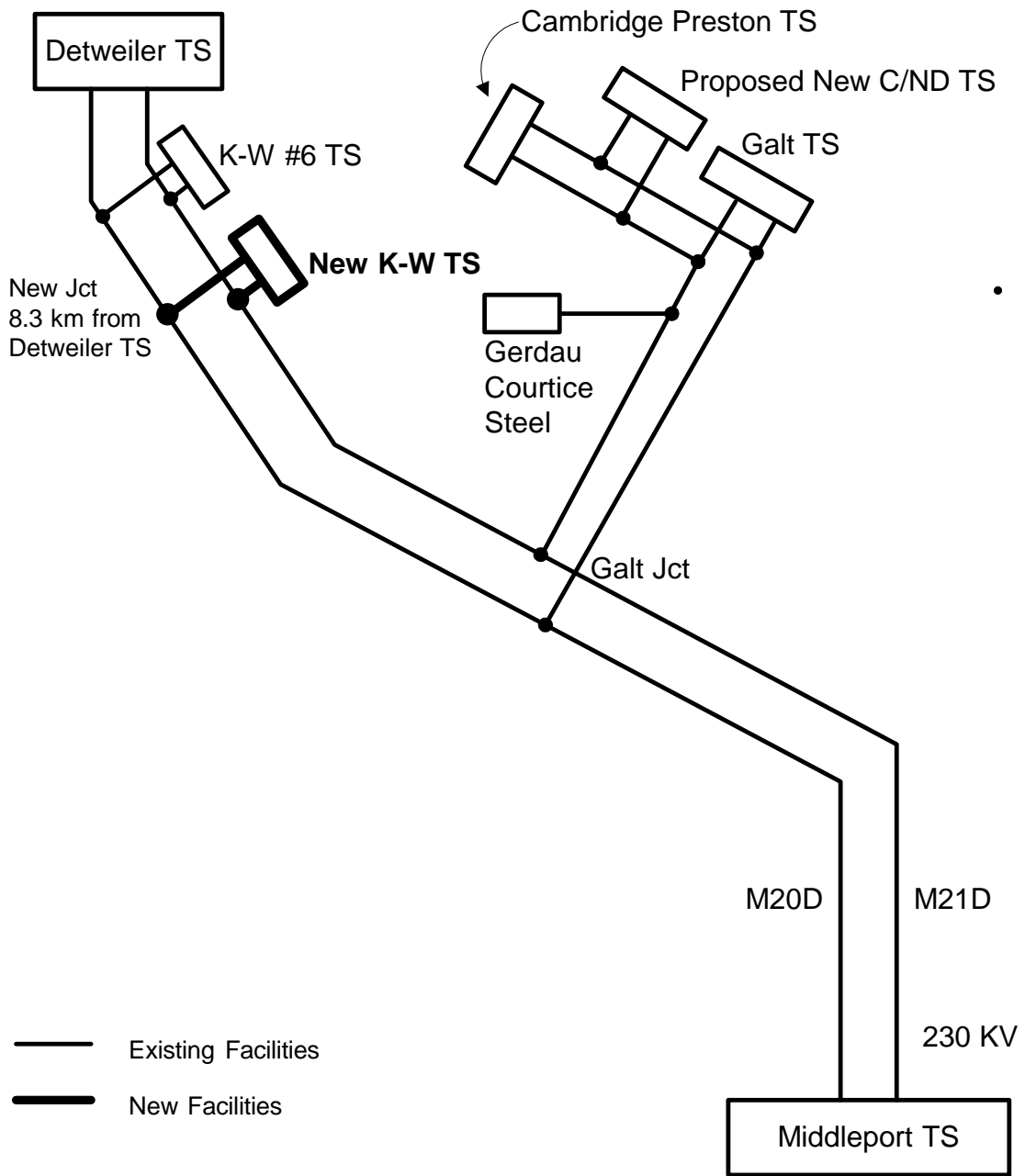
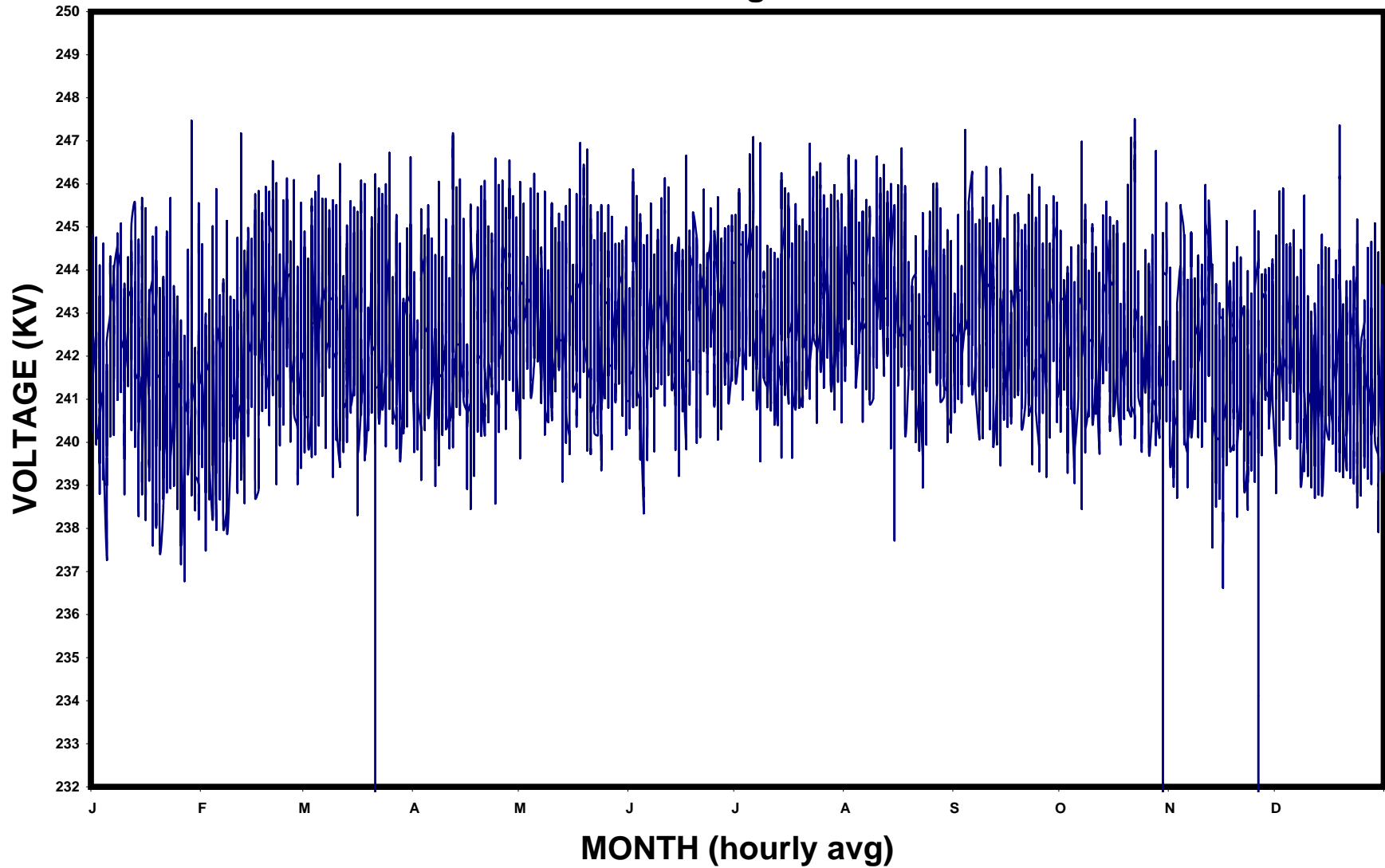


FIGURE 1

KITCHENER WILMOT HYDRO INC: NEW TS PROJECT CAA # 2001 - 033

FIGURE 2
Detweiler TS 230kV Voltage Measured in Year 2000



**TABLE 1
LOAD MEETING CAPABILITY ANALYSIS
BASED ON 2010 SUMMER PEAK LOADS¹**

SYSTEM FACILITIES / CONTINGENCIES	SUMMER CONTINUOUS RATING ² (Amps)	POST - CONTINGENCY FLOW (Amps)
THERMAL CAPABILITY ANALYSES		
M20D or M21D Contingency		
M20D, Middleport TS x Galt Jct	2,060	1700
M20D, KW #6 TS x Detweiler TS	2,060	480
M21D, Middleport TS x Galt Jct	2,060	1830
M21D, KW #6 TS x Detweiler TS	2,060	520
Stuck Breaker Condition Resulting in Outage of D7V & M21D		
M20D, Middleport TS x Galt Jct	2,060	1860
M20D, KW #6 TS x Detweiler TS	2,060	530
VOLTAGE ANALYSES		
Steady State Voltage Levels	Within range specified in Chapter 4, Appendix 4.1 of Market Rules	
Abrupt Voltage Changes		
Capacitor Switching	Less than 4% with 10 MVar cap bank switched at new K-W TS. (meets Market Rule requirements specified in Chapter 4, Appendix 4.4)	
Line Contingency	Less than 10% (meets Market Rule requirements specified in Chapter 4, Appendix 4.4)	

NOTES

(1) See Section 4.3.3 for loading assumptions

(2) Based on 35⁰C ambient temperature and 4 km/hr wind speed