

**STATUS REPORT**  
**RELATED TO**  
**TRENCH DRY TYPE AIR CORE**  
**SHUNT REACTOR**

**PREPARED FOR:**

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**TRENCH DRY TYPE AIR CORE SHUNT REACTOR STATUS REPORT**

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**APPENDIX "A": COLOUR COPIES OF THE PHOTOGRAPHS OF TRENCH DRY TYPE, AIR CORE, SHUNT REACTOR, AFTER THE INCIDENT, TAKEN BY MR. ROGER ROBINSON, CMS. NINETEEN PAGES INCLUDING THE FRONT PAGE.**

**APPENDIX "B": PAGES NO. 21, AND NO. 22 OF THE ORIGINAL SPECIFICATIONS AND THE FRONT PAGE.**

**APPENDIX "C": A COPY OF TRENCH'S REPORT. NINE PAGES INCLUDING THE FRONT PAGE.**

**APPENDIX "D": A COPY OF POWERTECH'S REPORT. EIGHT PAGES INCLUDING THE FRONT PAGE.**

## TRENCH DRY TYPE AIR CORE SHUNT REACTOR STATUS REPORT

### EXECUTIVE SUMMARY:

Trench Shunt Reactor was the dry type, air-core; 66 kV/50 Hz.

Original Serial Number (Prior to repairing, and testing): 40173.  
New Serial Number (after repairing, testing): 42602-01.

The reactor was located in Coquitlam, BC (near Vancouver).

Size: Fitted in a crate 363 X 363 X 396 cm high (i.e., approximately 11.9 X 11.9 X 12.99 Feet).  
Wight: Approximately 27,000 Lb.

The Reactor in question was originally installed in Northern China, in a hydro electrical power generation facility for the Huaneng Int'l Power Development Corp., Dalian Branch, about three years ago.

In July 2000, the Reactor was shipped to Trench Factory in Toronto, Canada for servicing, and testing.

In August 2000, the Reactor was refurbished, and tested in Trench Factory in Toronto, Canada. Trench's test results were within the original specification. Therefore, the Reactor was shipped to Vancouver for transshipment to China to resume service.

Due to a slight truck accident, en route to China via Vancouver, BC, Canada, Trench asked Powertech in Surrey, BC (near Vancouver) to retest the Reactor. Subsequently, Powertech tested the Unit in October 2000.

I personally inspected the reactor on January 5, 2001. My findings were as follows:

1. The winding exhibited no physical damages, i.e., bends
2. Only one of the Bus Bars showed one minor bend
3. Other damages were limited to scratches of the exterior paint, which had been repaired.

I have compared, and evaluated the test data from Trench in Toronto, and Power Tech in Surrey. The comparison indicated value differences in ambient temperature, applied current, and frequency these likely affected the outcome of the tests, and subsequently the variation in the calculated values. Regardless, the conceived results of the tests, and subsequently the calculated values, were still

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within the original specifications.

Based on the foregoing, I have formed the following opinion:

**In light of the original specifications, in conjunction with Powertech's test results, Trench Dry Type, Air Core, Shunt Reactor, with the New Serial Number 42602-01, described in Appendices "B" to "D" of this report, should function suitably, when installed at a facility that is complimentary with these test results.**

### **OBJECT OF REPORT:**

## TRENCH DRY TYPE AIR CORE SHUNT REACTOR STATUS REPORT

### OBJECT OF REPORT:

On August 13, 2001, I received a letter from Mr. Fred Pfaffle, President of Products Corporation of North America, Inc. In this letter Mr. Pfaffle asked me to do the following:

- a. Provide a report to facilitate the marketing efforts of Corporation of North America, Inc. to locate a buyer.
- b. Incorporate all information related to the Reactor in question. These were in our File No. 00239, in this report.
- c. Include the observation which I made, when I inspected the subject Reactor in this report.
- d. Incorporate the original customer/manufacturer specifications in this report.
- e. Review how current condition of the Reactor in question compares to original specifications, and if these variances would effect the performance of the unit.
- f. Review the history of the subject Reactor, and the original intended application.

I inspected Trench Reactor in question at the premises of Cratex Industrial Packing Ltd. in Coquitlam (near Vancouver), BC, Canada, on January 5, 2001. During this inspection, I photographed the foregoing Reactor.

The documents which I have received, and reviewed were as follows:

- \* The colour copies of the Photographs which I received from Mr. Roger Robinson, CMS of McLarens Toplis Canada in Vancouver, BC (APPENDIX "A").
- \* Page 21 and Page 22 which were provided to me as extracts from the specification to whom the above Shunt Reactor was made (APPENDIX "B").
- \* The Test Report prepared by Trench Laboratory, Reference No. Q94-889801/42602 (APPENDIX "C").

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- \* The Test Report prepared by Powertech Labs Inc. in Surrey, BC. Project No. 12620-27. (APPENDIX "D").
- \* A copy of the "BID REQUEST" prepared by Mr. Roger Robinson, CMS.
- \* A copy of the Email response from Mr. Roger Robinson, CMS, to Mr. Fred Pfaffle, President.

The object of this report is

- To identify the documents which I have reviewed;
- To enumerate, and identify the pieces of information which I have received from others;
- To describe the observations which I made during inspection of the subject Reactor;
- To present the Photographs which I took during my inspection;
- To discuss the documents which I have received in conjunction with my observations, and the Photographs which I took, and to present opinions which I have formed concerning the status of subject Reactor.

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**INFORMATION EXTRACTED FROM THE DOCUMENTS AND COMMENTS:**

The colour copies of the Photographs, which I received from Mr. Roger Robinson, CMS of McLarens Toplis Canada in Vancouver, BC (APPENDIX "A"), provided me with the following information:

- A. One side of the crate of the Reactor was slightly broken near the top.
- B. One corner of the crate of the Reactor had split.
- C. One side of the crate of the Reactor was slightly bulging at the bottom edge.
- D. The 2X4 wooden support, behind the bulging point, was broken, but did not completely split.
- E. A minor exterior paint scratch was on the exterior wall of the Reactor.
- F. A minor exterior paint scratch was on the top of the Reactor.
- G. Other than the above, none of these Photographs showed additional damages.
- H. A sticker on the crate of the Reactor exhibited the following information:

CONSIGNEE:	HUANENG INT'L POWER DEVELOPMENT CORP. (HIPDC) DALIAN BRANCH
PORT OF DESTINATION:	DALIAN PORT
PACKAGE NO.:	42602-1
DIMENSIONS:	363 X 363 X 396 cm (i.e., approximately 11.9 X 11.9 X 12.99 Feet).
NAME OF EQUIPMENT:	66 kW SHUNT REACTOR
COUNTRY OF ORIGIN:	CANADA

The following is the summary of my review of Trench's report, Powertech's report, and pages no. 21 and no. 22 of the original specifications (Appendixes "B" to "C" inclusive):

- I. The Reactor was installed in Northern China.

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- J. The Reactor was returned to Trench in Toronto, Ontario, Canada for repair in July 2000.
- K. Upon satisfactory repair, and testing, in August 2000, the Reactor was shipped to Vancouver, BC, Canada, for transshipment to China.
- L. An accident occurred en route suggested to Trench that the Reactor should be retested by Powertech in Surrey (near Vancouver), BC, Canada.
- M. The Reactor Original Serial Number (prior to repairing, and testing) was 40173.
- N. The Reactor Serial Number (after having been repaired, and tested) was 42602-01.

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<u>DESCRIPTION</u>	<u>SPECIFIED VALUES</u>	<u>VALUES INDICATED ON NAME PLATE</u>	<u>TRENCH'S VALUES</u>	<u>POWERTECH'S VALUES</u>
O. AVERAGE TEMPERATURE SHALL BE BELOW	70°C	NOT INDICATED	30.4°C <sup>(i)</sup>	36.5°C <sup>(ii)</sup>
P. TEMPERATURE AT HOTTEST SPOT SHALL BE BELOW	130°C	NOT INDICATED	88°C <sup>(iii)</sup>	64°C <sup>(iv)</sup>
Q. LOSSES BELOW 0.4% OF 20,000 kVA (UNIT RATING)	BELOW 80 kVA	NOT INDICATED	73.98285 kW <sup>(v)</sup>	76.9kW <sup>(vi)</sup>
R. PERMISSIBLE REACTANCE TOLERANCE ± 5% OF 72.6 Ω	68.97 Ω OR 76.23 Ω	72.6 Ω	72.185852Ω <sup>(v)</sup>	71.9594 Ω <sup>(vi)</sup>
S. CURRENT RATING	524.848 <sup>(vii)</sup> Amps	524.86 Amps	524.86 <sup>(viii)</sup> Amps	524.86 <sup>(viii)</sup> Amps
T. FREQUENCY RATING	50 Hz	50 Hz	50 Hz <sup>(ix)</sup>	50 Hz <sup>(x)</sup>
U. REFERENCE TEMPERATURE	NOT IND.	NOT INDICATED	75°C	75°C
V. DC RESISTANCE	NOT IND.	NOT INDICATED	0.215008 <sup>(xi)</sup> Ω	0.1266652 <sup>(xii)</sup> Ω
W. DC LOSSES	NOT IND.	NOT INDICATED	59,230 W <sup>(v)</sup>	59,700 W <sup>(vi)</sup>

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<u>DESCRIPTION</u>	<u>SPECIFIED VALUE</u>	<u>VALUE INDICATED ON NAME PLATE</u>	<u>TRENCH'S VALUES</u>	<u>POWERTECH'S VALUES</u>
X. AC LOSSES	NOT IND.	NOT INDICATED	14,698.5W <sup>(v)</sup>	17,200W <sup>(vi)</sup>
Y. INDUCTANCE	NOT IND.	231.1 mH	229.7915 mH <sup>(v)</sup>	229.16 mH <sup>(vi)</sup>

- (i) This is a calculated value obtained from the measured values. It should be noted, however, that the Test Current was 500 Amps; the Test Frequency was not provided; the ambient Temperature was not clearly indicated.
- (ii) This is a calculated value obtained from the measured values. It should be noted, however, that the Test Current was 505.52 Amps; the Test Frequency was 60 Hz; the ambient Temperature varied; the average ambient temperature calculated from various value provided was 12.85°C.
- (iii) This is a measured value. It should be noted, however, that the Test Current was 500 Amps; the Test Frequency was not provided; Average ambient Temperature 41.3°C.
- (iv) This is a measured value. It should be noted, however, that the Test Current was 505.52 Amps; the Test Frequency was 60 Hz; the ambient Temperature varied; the average ambient temperature calculated from various given values was 12.85°C.
- (v) This is a calculated value obtained from the measured values. It should be noted, however, that the Frequency during testing was 50 Hz, and the Reference Temperature was 75°C.
- (vi) This is a calculated value obtained from the measured values. It should be noted, however, that the Frequency during testing was 60 Hz, and the Reference Temperature was 75°C.