



USES MFG INC.
P.O. BOX 156
152 Old Colchester Road
Quaker Hill, CT USA 06375
Att. Mr. Bill Morton

Ref. LR 99910-7
January 16 1997

Subject: Witnessing of field measurements with CSA certified Power Factor Correction Capacitors Cat. No. CMES-3D.

Dear Bill,

This letter will serve as our report on the subject matter that took place on April 2 1996 at Abitibi Price Inc. Sheridan Park.

SCOPE

This exercise is to measure voltage, ampere, power factor and kilowatt in an electrical distribution system with and without using USES CMES-3D power factor correction capacitors. The unit is designed for three phase 347/600V applications and is generally installed using a 400A breaker on an distribution panel or with an 40A disconnect. The USES CMES-3D 600V is designed to be installed on inductive loads.

ELECTRICAL LOADS

On the second floor of the Sheridan Park Technology Centre was the ventilation system. In this system, there were several inductive motor loads rating between 50 horsepower to 5 horsepower, refer to Ill. 1. All loads were controlled from the MCC Control Cabinet in the second floor. This is where the USES CMES-3D 600V model was installed.

METERING USED

Two Tif instrument (Tif KW220-3AV)s were used to do the evaluation on USES CMES-3D 600V model. The first Tif was installed at the first floor electrical room next to the utility meter to evaluate savings. The second Tif was used at the load to evaluate if any changes were seen.

Two Amprobe (ACD-2000)s were used at the same locations to evaluate true RMS-Amperage readings.

Two Amprobe (7A)s were used at the same locations to evaluate the average amperage.



METERING USED cont'd

Two Protec (504)s were used at the same locations to evaluate the voltage.

Two Tif instrument (2300)s were used at the same locations to evaluate the power factor.

Also readings were taken from the utility supplied Digital Meter (Schlumberger VIP 2.5 ELX).

Readings were taken instantaneously when USES was energized and de-energized, meter was reset on each procedure.

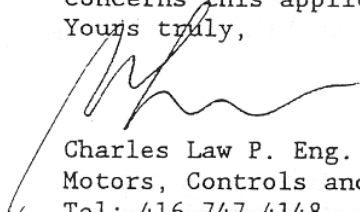
Manufacturer provided the following illustrative material

- | | |
|-------------------------|--------------|
| 1. Equipment floor plan | Ill. 1 |
| 2. Readings measured | Ill. 2 to 7 |
| 3. Data graphs | Ill. 8 to 12 |
| 4. Conclusion | Ill. 13 |

All the above information are on file in the Engineering department at CSA in Etobicoke, Ontario and are to be used for future reference.

With the completion of the above tests, this completes the scope of work originally contemplated for this project. The file No.LR 99910-7 has been closed and you will receive, in due course, a statement of your account as it concerns this application.

Yours truly,

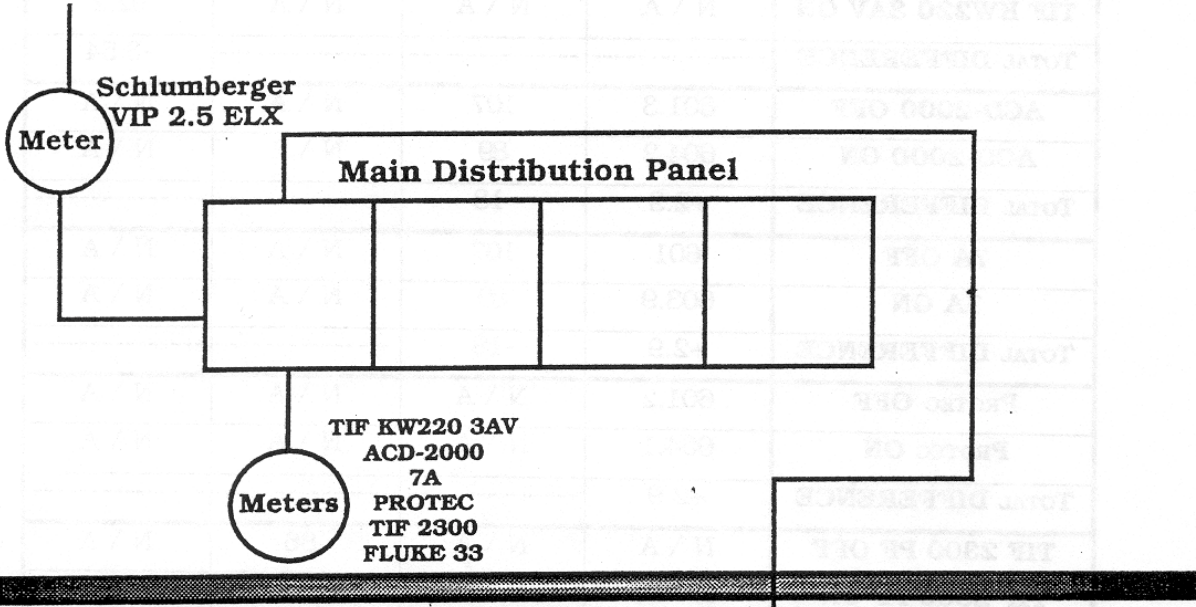

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Sheridan Park Technology Center.

FIRST FLOOR

**Electrical Distribution Room
Located on the first floor.**

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SECOND FLOOR

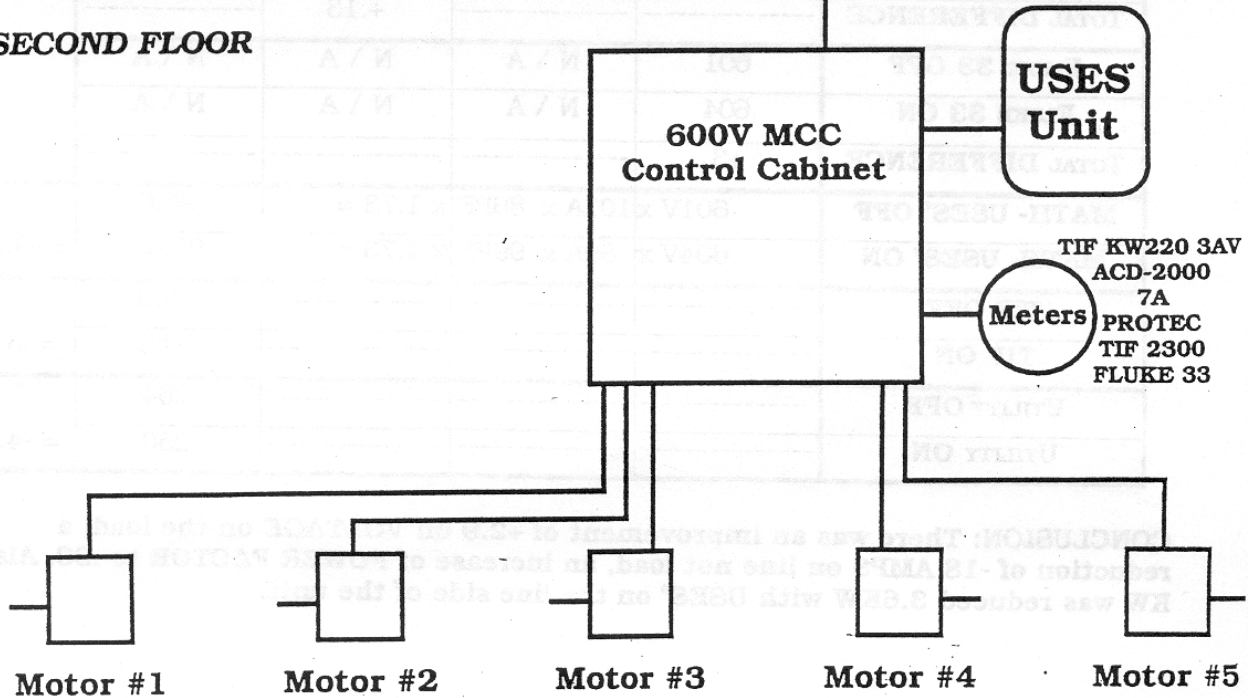


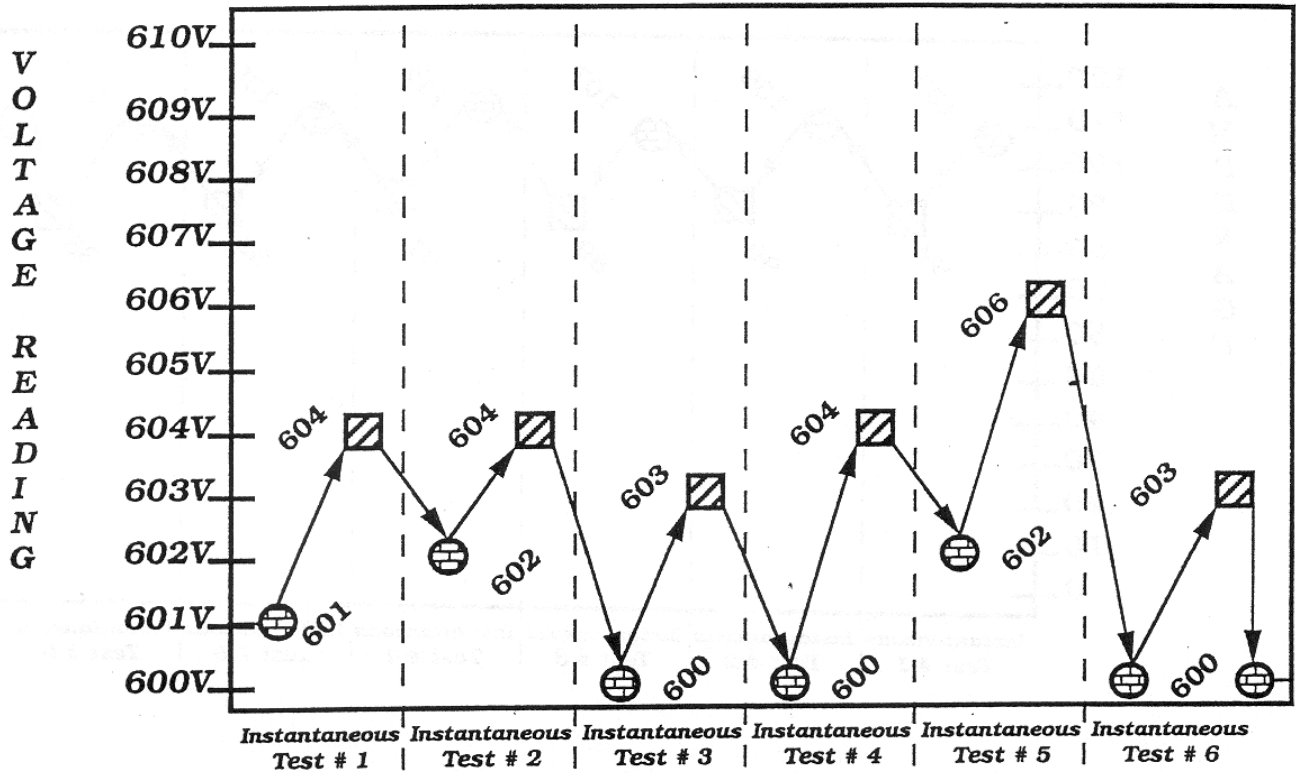
TABLE #1 INSTANTANEOUS TEST 1	VOLTAGE	AMPERAGE	POWER FACTOR	KW	
UTILITY METER OFF	N \ A	N \ A	N \ A	254	
UTILITY METER ON	N \ A	N \ A	N \ A	250	
TOTAL DIFFERENCE	-----	-----	-----	-4	
TIF KW220 3AV OFF	N \ A	N \ A	N \ A	95.8	
TIF KW220 3AV ON	N \ A	N \ A	N \ A	92.2	
TOTAL DIFFERENCE	-----	-----	-----	-3.54	
ACD-2000 OFF	601.3	107	N \ A	N \ A	
ACD-2000 ON	604.2	89	N \ A	N \ A	
TOTAL DIFFERENCE	+2.9	-18	-----	-----	
7A OFF	601	107	N \ A	N \ A	
7A ON	603.9	89	N \ A	N \ A	
TOTAL DIFFERENCE	+2.9	-18	-----	-----	
PROTEC OFF	601.2	N \ A	N \ A	N \ A	
PROTEC ON	604.1	N \ A	N \ A	N \ A	
TOTAL DIFFERENCE	+2.9	-----	-----	-----	
TIF 2300 PF OFF	N \ A	N \ A	.86	N \ A	
TIF 2300 PF ON	N \ A	N \ A	.99	N \ A	
TOTAL DIFFERENCE	-----	-----	+13	-----	
FLUKE 33 OFF	601	N \ A	N \ A	N \ A	
FLUKE 33 ON	604	N \ A	N \ A	N \ A	
TOTAL DIFFERENCE	+3	-----	-----	-----	
MATH- USES° OFF	601V x	107A x	.86PF x 1.73 =	95.6	
MATH- USES° ON	604V x	89A x	.99PF x 1.73 =	92.06	= -3.54
TIF OFF	-----	-----	-----	95.8	
TIF ON	-----	-----	-----	92.2	= -3.6
UTILITY OFF	-----	-----	-----	254	
UTILITY ON	-----	-----	-----	250	= -4.0

CONCLUSION: There was an improvement of +2.9 on VOLTAGE on the load, a reduction of -18 AMPS on line not load, an increase of POWER FACTOR to .99. Also, KW was reduced 3.6KW with USES° on the line side of the unit.

Graph #1

⊖ USES® OFF ⊚ USES® ON

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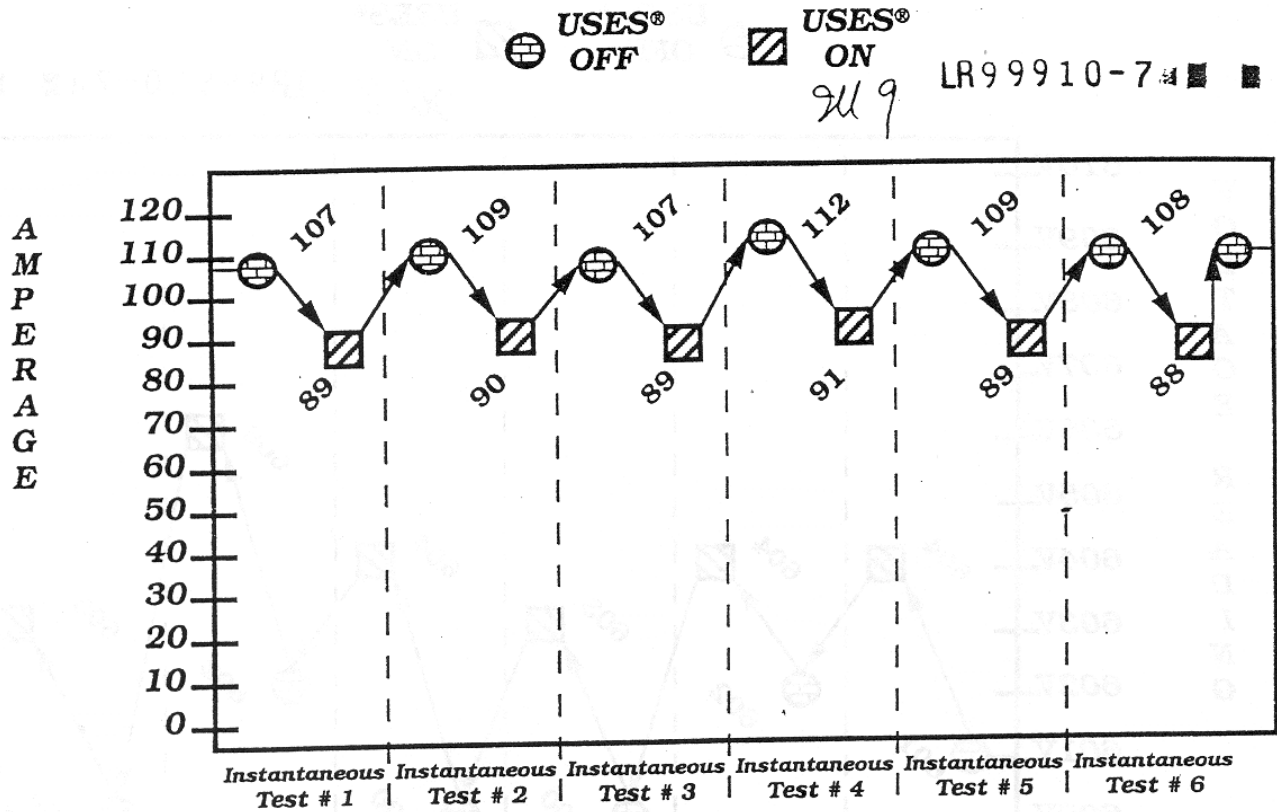


On this evaluation of the USES® CMES-3D 600 unit, off line the voltage reading was an average of 600.8 Volts.

When the USES® CMES-3D 600 unit was energized on line, the Voltage increased to 604 Volts. This is an increase of approximately 3.2 Volts with USES® on line.

NOTE* Voltage readings were equivalent on both the first floor Electrical room and at the second floor MCC Control Cabinet in the Ventilation Room.

Graph #2



On this evaluation of the USES® CMES-3D 600 unit, off line the Amperage reading was an average of 108.6 AMPS.

When the USES® CMES-3D 600 unit was energized on line, the Amperage was reduced to 89.3 AMPS. This is a reduction of 19.3 in Amperage with USES® on line.

NOTE* Amperage readings with USES® on or off line remained at 108 AMPS on the second floor Ventilation Room MCC Control Cabinet. The USES® unit did not change the characteristics of the load.

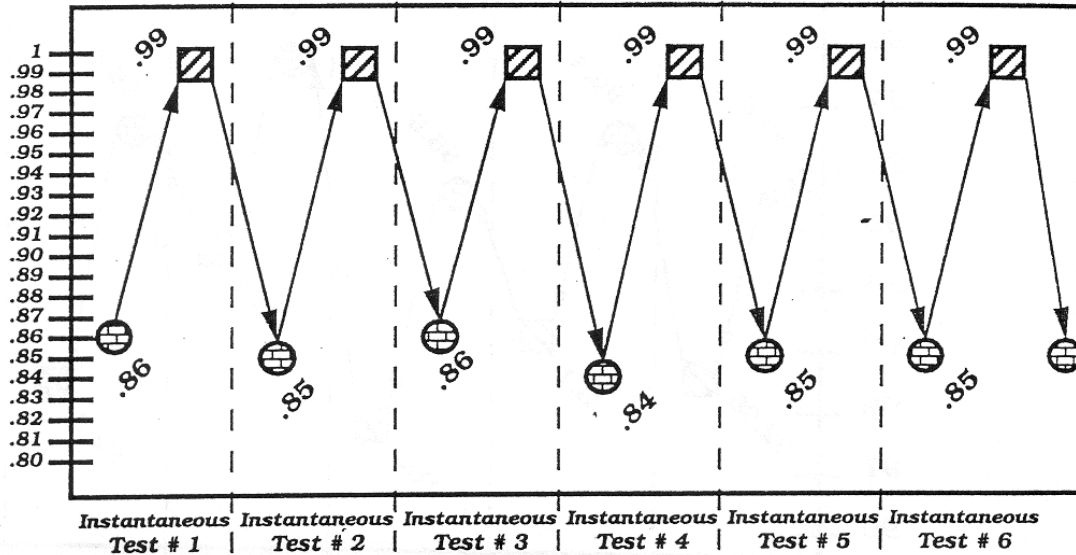
Graph #3

⊕ USES® OFF ▨ USES® ON

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On this evaluation of the USES® CMES-3D 600 unit, off line the Power Factor reading off was .85.

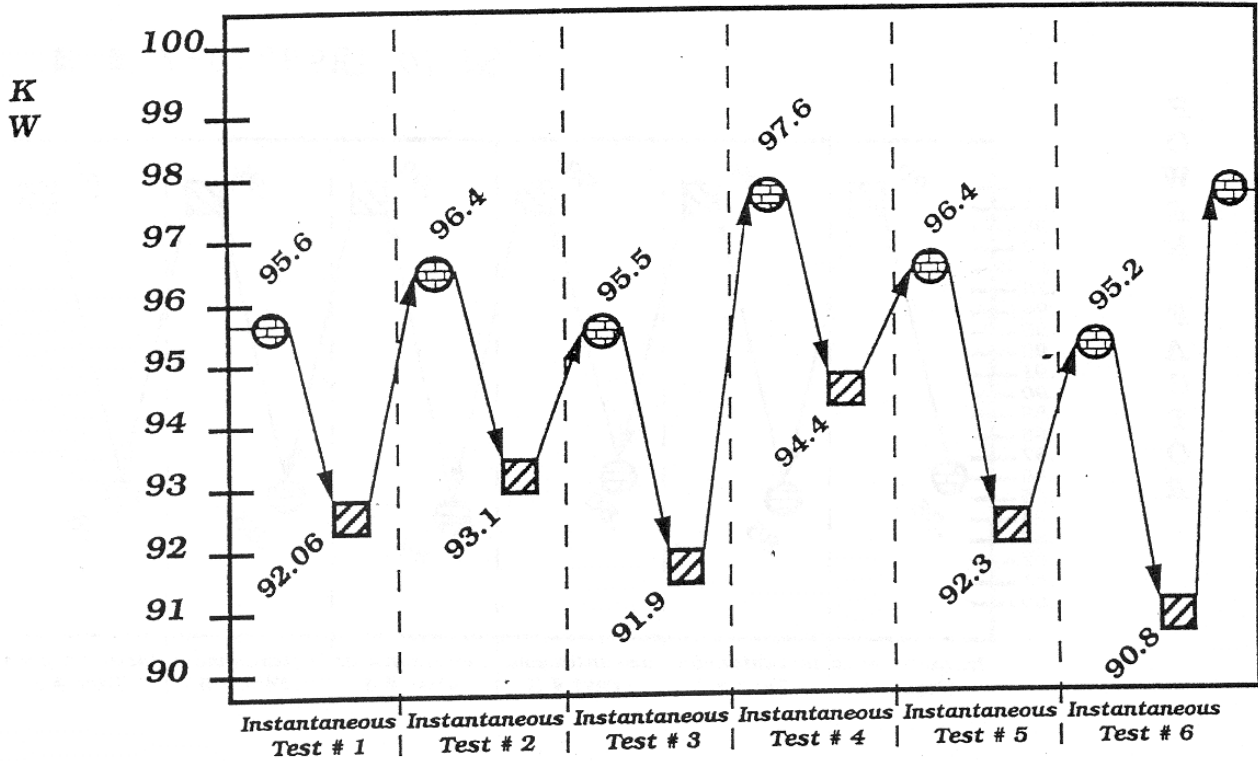
When the USES® CMES-3D 600 unit was energized on line, the Power Factor was increased to .99. The unit increased efficiency of this system.

NOTE Power Factor readings with USES® on or off line remained at .86 Power Factor on the second floor Ventilation Room MCC Control Cabinet. The USES® unit did not change the characteristics of the load.*

Graph #4

USES® OFF USES® ON

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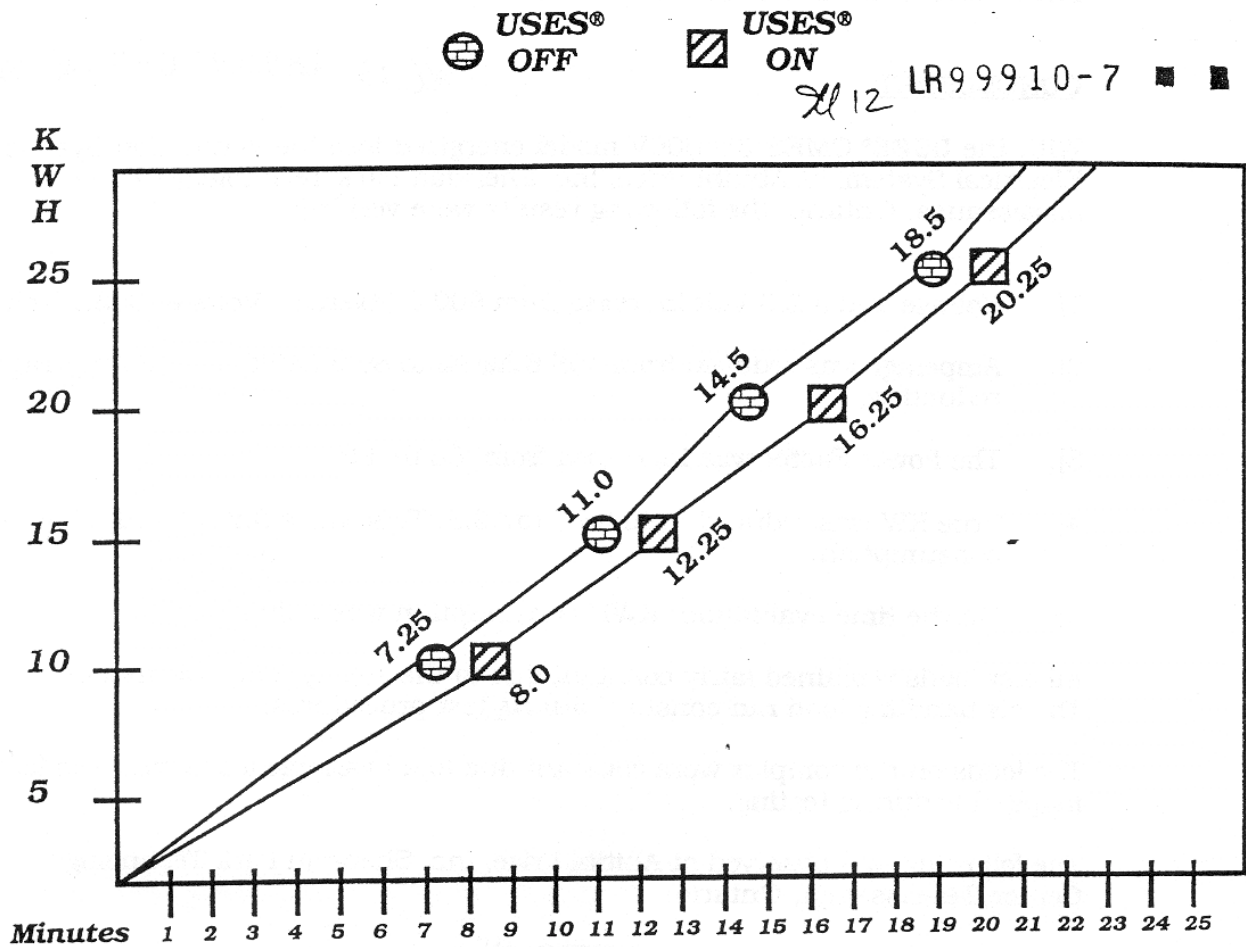


On this evaluation of the USES® CMES-3D 600 unit, off line the KW reading was 96.1.

When the USES® CMES-3D 600 unit was energized on line, the KW was decreased to 92.42. This is a savings of 3.7% with USES® on line. The unit increased efficiency of this system.

NOTE* KWH readings with USES® on or off line remained at 96.5 KWH on the second floor Ventilation Room MCC Control Cabinet. The USES® unit did not change the characteristics of the load.

Graph #5



On this evaluation of the USES® CMES-3D 600 unit KWH versus time study. By using 25KWH as a cap. and the amount of time it took to reach the cap KWH.

As it shows in the graph above, there is a reduction of KWH consumption. With USES® off, it took 18.5 minutes to 25KW. With USES® on, it took 20.25 minutes to use 25 KWH. This graph is to show it took 1.7 minutes longer to reach 25 KWH with USES® on line.

Re: Test Results of the USES® Product

CONCLUSION:

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With the **USES®** CMES-3D 600V model energized into the Ventilation System Electrical System, at Abitibi Price, Inc. Sheridan Park Technology Center, Mississauga, Ontario, the following results were verified:

- 1]. Voltage had a 2.3 Volt increase from 600.8 (Average) Volts to 603.1 Volts.
- 2]. Amperage was reduced from 108.6 AMPS to 89.3 AMPS, a 19.3 Amperage reduction.
- 3]. The Power Factor was increased from .86 to .99.
- 4]. True KW was reduced from 96.1 to 92.3. This was a 3.8 KW reduction in consumption.
- 5]. On the time evaluation, KWH consumption was reduced.

All test loads remained fairly constant due to the steady temperature outside. The air handling load ran constant during test procedures.

The loads on the complex were constant due to all variable loads were rendered inoperable during testing.

The following was observed at Abitibi Price, Inc. Sheridan Park Technology Center, Mississauga, Ontario:

- ⊕ **KW Savings**
- ⊕ **KWH Savings**
- ⊕ **Reduction of Amperage**
- ⊕ **Voltage Regulation**
- ⊕ **Power Factor Improvement**