

Customer 7237768 CHAPLEAU PUBLIC UTILITIES CORP

City CHAPLEAU, ON

Location OUTDOOR/GROUND

Sub-Name CHAPLEAU D.S.

Unit No. T3

Other

NAMEPLATE DATA

ADDITIONAL EQUIPMENT

Manufacturer	PENNSYLVANIA	Equipment Type	TRANSFORMER	Radiators	Yes	Conservator Tank	No
Manufacture Date		Transformer Class	OA	Fans	No	LTC Compartment	No
Serial No.	C-01297-5-1	Impedance %	6.40	Water Cooled	No	Bushing Location	Top
KVA Rating	2,500	Phase/Cycle	3/60	Oil Pumps	No	Breather	Free
High Voltage	115,000 D	Liquid Type	OIL	Top FPV (inch)	0.00	Hose Length (feet)	
Low Voltage	4,160 Y	Gallons	2,600	Bottom FPV (inch)	2.50 Valve	Service Online	
Weight	45,300	Other Access	TOP INSPECTION PLATE	InsulationType	55/65C	Power Available	

VISUAL INSPECTION

FIELD SERVICE

DATE	LEVEL	SAMPLE TEMP	TOP TEMP	P/V	PAINT	LEAKS	DATE	SERVICE
05/19/10	NORMAL	28	49	1.60				
07/20/11	NORMAL	30	53	1.00	FAIR	NONE		
08/20/12	NORMAL	20	20	0.50	POOR			
09/30/14	NORMAL	14	38	0.50	FAIR			

Additional Information

Reason Not Tested

LIQUID SCREEN TEST DATA

DATE	SERVICE	ACID	IFT	DIEL 877	DIEL 1816	GAP	COLOR	SP. GRAV.	VISUAL	SEDIMENT
10/07/03		0.020	33.0	42				0.875	CLEAR	NONE *
06/26/06		0.027	33.0	55			2.00	0.882	CLEAR	SLT SEDI *
10/01/07		0.019	32.0	51			2.00	0.892	CLEAR	SLT SEDI *
10/22/08		0.020 AC	32.7 AC	50 AC			2.00 AC	0.886 AC	CLEAR AC	NONE AC *
10/28/09		0.030 AC	31.2 QU	50 AC			2.00 AC	0.884 AC	CLEAR AC	NONE AC
07/20/11		0.060 QU	32.7 AC	50 AC			2.00 AC	0.881 AC	CLEAR AC	NONE AC
08/20/12		0.080 QU	28.5 QU	43 AC			2.00 AC	0.877 AC	CLEAR AC	NONE AC
09/30/14		0.010 AC	43.8 AC	49 AC			1.00 AC	0.878 AC	CLEAR AC	NONE AC

INHIBITOR CONTENT

DATE	PCT. BY WEIGHT	
10/22/08	ND UN	*
10/28/09	0.013% UN	
07/20/11	0.024% UN	
08/20/12	ND UN	
09/30/14	0.254% AC	

LIQUID POWER FACTOR

DATE	25 C	100 C	
10/22/08	0.120 QU	5.410 UN	*
10/28/09	0.105 QU	4.820 UN	
07/20/11	0.105 QU	3.970 QU	
08/20/12	0.180 QU	5.330 UN	
09/30/14	0.002 AC	0.499 AC	

NOTE - STUDIES SHOW THAT A LEVEL OF 0.3% INHIBITOR IS OPTIMUM FOR PRESERVATION OF IN-SERVICE TRANSFORMER OILS. OILS WITH A LEVEL BELOW 0.08% ARE CONSIDERED TO BE UNINHIBITED.

KEY TO ABBREVIATIONS: AC - ACCEPTABLE QU - QUESTIONABLE UN - UNACCEPTABLE RS - RESAMPLE

NOTE: * After a result indicates that the test or service was performed by an outside source.

Customer 7237768 CHAPLEAU PUBLIC UTILITIES CORP
Sub-Name CHAPLEAU D.S.
Location OUTDOOR/GROUND

S/N C-01297-5-1
Mfg. PENNSYLVANIA
Unit No. T3

Gallons 2,600
KVA 2,500

High Volt. 115,000
Low Volt. 4,160

FURAN ANALYSIS EXPRESSED IN PPB

DATE	5H2F	2FOL	2FAL	2ACF	5M2F	TOTAL
10/22/08	ND	ND	92	ND	ND	92 *
10/28/09	ND	ND	116	ND	ND	116
05/19/10	ND	ND	81	ND	ND	81
07/20/11	ND	ND	88	ND	ND	88
08/20/12	ND	ND	ND	ND	ND	ND
09/30/14	ND	ND	1	ND	ND	1

RECOMMENDATION RETEST 1 YEAR

NO DIAGNOSTIC CHANGES ARE NOTED IN FURAN LEVELS SINCE THE PREVIOUS ANALYSIS. THE CELLULOSIC INSULATION APPEARS TO BE IN GOOD CONDITION.

CALCULATED DP 800

EST. LIFE REMAINING 100%

GAS-IN-OIL ANALYSIS GAS CHROMATOGRAPHY EXPRESSED IN PPM

DATE	HYDROGEN	OXYGEN	NITROGEN	METHANE	CARBON MONOXIDE	CARBON DIOXIDE	ETHANE	ETHYLENE	ACETYLENE	TOTAL COMBUST.	TOTAL GAS
06/26/06	26	364	72,642	124	321	6,859	225	44	ND	740	80,605 *
10/01/07	27	1,112	82,958	126	349	8,698	261	44	ND	807	93,575 *
10/22/08	30	1,944	72,459	111	304	7,174	183	32	ND	660	82,237 *
10/28/09	28	2,418	76,696	110	293	6,869	181	30	ND	642	86,625
05/19/10	28	843	77,296	106	290	5,789	180	31	ND	635	84,563
07/20/11	30	344	77,287	110	259	6,112	163	28	ND	590	84,333
08/20/12	44	1,161	87,475	127	363	4,830	162	27	ND	723	94,189
09/30/14	6	9,642	81,235	16	216	2,391	15	5	ND	258	93,526

RECOMMENDATION RETEST 1 YEAR

B-THE ANALYSIS OF THIS SAMPLE SHOWS NO SIGNIFICANT INCREASE IN THE COMBUSTIBLE GAS VOLUME. THIS INDICATES NORMAL OPERATION.

ICP METALS IN OIL EXPRESSED IN PPM

DATE	ALUMINUM	IRON	COPPER
10/22/08	ND	ND	0.171 *
10/28/09	ND	ND	0.132
07/20/11	ND	ND	0.122
08/20/12	ND	ND	0.600
09/30/14	ND	ND	0.021

RECOMMENDATION RETEST 1 YEAR

THERE HAS BEEN NO DIAGNOSTIC CHANGE SINCE THE PREVIOUS ANALYSIS. THESE DATA INDICATE NORMAL OPERATION.

PCB CONTENT EXPRESSED IN PPM

DATE	1242	1254	1260	OTHER	TOTAL
10/22/08			8		8 *
07/20/11			11		11
08/20/12			11		11
09/30/14			9		9

COLOR LABEL: Green

CLASS: NON-PCB

Results in mg/kg
 ND means None Detected
 (<2 mg/kg per ASTM D4059)

NOTE: * After a result indicates that the test or service was performed by an outside source.



INTELLIGENT TRANSFORMER MANAGEMENT

Date Printed 10/27/2014

TC# 9001

Customer 7237768 CHAPLEAU PUBLIC UTILITIES CORP

City CHAPLEAU, ON

Location OUTDOOR/GROUND

Sub-Name CHAPLEAU D.S.

Unit No. T4

Other

NAMEPLATE DATA

ADDITIONAL EQUIPMENT

Manufacturer	GENERAL ELECTRIC	Equipment Type	TRANSFORMER	Radiators	Yes	Conservator Tank	No
Manufacture Date		Transformer Class	OA	Fans	No	LTC Compartment	No
Serial No.	E-690953	Impedance %	9.70	Water Cooled	No	Bushing Location	Top
KVA Rating	3,750	Phase/Cycle	3/60	Oil Pumps	No	Breather	Free
High Voltage	115,000 D	Liquid Type	OIL	Top FPV (inch)	0.00	Hose Length (feet)	
Low Voltage	4,160 Y	Gallons	2,150	Bottom FPV (inch)	2.50 Valve	Service Online	
Weight	41,800	Other Access	TOP INSPECTION PLATE	InsulationType	55C	Power Available	

VISUAL INSPECTION

FIELD SERVICE

DATE	LEVEL	SAMPLE TEMP	TOP TEMP	P/V	PAINT	LEAKS	DATE	SERVICE
05/19/10	NORMAL	28	47	0.80				
07/20/11	NORMAL	26	44	0.80	GOOD	NONE		
08/20/12	NORMAL	20	47	1.00	FAIR			
09/30/14	NORMAL	20	53	0.80	FAIR			

Additional Information

Reason Not Tested

LIQUID SCREEN TEST DATA

DATE	SERVICE	ACID	IFT	DIEL 877	DIEL 1816	GAP	COLOR	SP. GRAV.	VISUAL	SEDIMENT
10/07/03		0.010	39.0	37				0.860	CLEAR	NONE *
06/26/06		0.005	42.6	44			1.50	0.861	CLEAR	SLT SEDI *
10/01/07		0.003	43.7	36			1.50	0.870	CLEAR	NONE *
10/22/08		0.010 AC	40.0 AC	50 AC			1.50 AC	0.864 AC	CLEAR AC	NONE AC *
10/28/09		0.010 AC	39.0 AC	50 AC			1.00 AC	0.861 AC	CLEAR AC	NONE AC
07/20/11		0.020 AC	45.2 AC	44 AC			1.00 AC	0.859 AC	CLEAR AC	NONE AC
08/20/12		0.060 QU	33.6 AC	40 AC			1.00 AC	0.855 AC	CLEAR AC	NONE AC
09/30/14		0.020 AC	44.7 AC	41 AC			0.50 AC	0.859 AC	CLEAR AC	NONE AC

INHIBITOR CONTENT

DATE	PCT. BY WEIGHT	
10/22/08	0.050% UN	*
10/28/09	0.052% UN	
07/20/11	0.058% UN	
08/20/12	0.060% UN	
09/30/14	0.302% AC	

LIQUID POWER FACTOR

DATE	25 C	100 C	
10/22/08	0.019 AC	0.828 AC	*
10/28/09	0.016 AC	0.563 AC	
07/20/11	0.001 AC	0.266 AC	
08/20/12	0.028 AC	1.540 AC	
09/30/14	0.001 AC	0.159 AC	

NOTE - STUDIES SHOW THAT A LEVEL OF 0.3% INHIBITOR IS OPTIMUM FOR PRESERVATION OF IN-SERVICE TRANSFORMER OILS. OILS WITH A LEVEL BELOW 0.08% ARE CONSIDERED TO BE UNINHIBITED.

KEY TO ABBREVIATIONS: AC - ACCEPTABLE QU - QUESTIONABLE UN - UNACCEPTABLE RS - RESAMPLE

NOTE: * After a result indicates that the test or service was performed by an outside source.



INTELLIGENT TRANSFORMER MANAGEMENT

Page 2

Date Printed 10/27/2014

TC# 9001

Customer 7237768 CHAPLEAU PUBLIC UTILITIES CORP
Sub-Name CHAPLEAU D.S.
Location OUTDOOR/GROUND

S/N E-690953
Mfg. GENERAL ELECTRIC
Unit No. T4

Gallons 2,150
KVA 3,750

High Volt. 115,000
Low Volt. 4,160

FURAN ANALYSIS EXPRESSED IN PPM

DATE	5H2F	2FOL	2FAL	2ACF	5M2F	TOTAL
10/22/08	ND	ND	90	ND	ND	90 *
10/28/09	ND	ND	106	ND	ND	106
07/20/11	ND	ND	83	ND	ND	83
08/20/12	ND	ND	ND	ND	ND	ND
09/30/14	ND	ND	120	ND	ND	120

RECOMMENDATION MOISTURE REDUCTION

The moisture content is confirmed as being unacceptable, based on the equipment class and liquid type. Moisture reduction should be considered.

RECOMMENDATION RETEST 6 MONTHS

THE TOTAL FURAN LEVEL IN THIS UNIT IS QUESTIONABLE. THE TOTAL FURAN LEVEL INDICATES ONLY LIMITED DAMAGE TO THE CELLULOSIC INSULATION, BUT THE RATE OF INCREASE IS OF CONCERN. THIS MAY BE A SIGN OF DETERIORATION AND SHOULD BE MONITORED WITH A SHORTER RETEST INTERVAL.

CALCULATED DP 710

EST. LIFE REMAINING 91%

GAS-IN-OIL ANALYSIS GAS CHROMATOGRAPHY EXPRESSED IN PPM

DATE	HYDROGEN	OXYGEN	NITROGEN	METHANE	CARBON MONOXIDE	CARBON DIOXIDE	ETHANE	ETHYLENE	ACETYLENE	TOTAL COMBUST.	TOTAL GAS
10/07/03	5	27,733	64,124	1	13	434	ND	1	ND	20	92,311 *
06/26/06	7	40,305	107,528	2	16	397	ND	10	ND	35	148,265 *
10/01/07	ND	32,570	69,188	1	10	419	ND	1	ND	12	102,189 *
10/22/08	ND	29,255	58,830	1	16	445	2	ND	ND	19	88,549 *
10/28/09	ND	31,134	63,345	ND	14	380	ND	ND	ND	14	94,873
07/20/11	ND	23,762	64,905	3	28	454	5	1	ND	37	89,158
08/20/12	ND	31,546	68,448	ND	12	369	ND	ND	ND	12	100,375
09/30/14	ND	34,968	71,879	ND	39	600	ND	ND	ND	39	107,486

RECOMMENDATION RETEST 1 YEAR

B-THE ANALYSIS OF THIS SAMPLE SHOWS NO SIGNIFICANT INCREASE IN THE COMBUSTIBLE GAS VOLUME. THIS INDICATES NORMAL OPERATION.

ICP METALS IN OIL EXPRESSED IN PPM

DATE	ALUMINUM	IRON	COPPER
10/22/08	ND	ND	ND *
10/28/09	ND	ND	ND
07/20/11	ND	ND	ND
08/20/12	ND	ND	ND
09/30/14	ND	ND	ND

RECOMMENDATION RETEST 1 YEAR

THERE HAS BEEN NO DIAGNOSTIC CHANGE SINCE THE PREVIOUS ANALYSIS. THESE DATA INDICATE NORMAL OPERATION.

PCB CONTENT EXPRESSED IN PPM

DATE	1242	1254	1260	OTHER	TOTAL
10/22/08					ND *
07/20/11					ND
08/20/12					ND
09/30/14			2		2

COLOR LABEL: Green

CLASS: NON-PCB

Results in mg/kg
ND means None Detected
(<2 mg/kg per ASTM D4059)

NOTE: * After a result indicates that the test or service was performed by an outside source.



Executive Summary - Final Recap

October 27, 2014

Page 1

Customer 7237768 - Chapleau Public Utilities Corp City/State Chapleau, ON Sales Order 705870

Total TC's 2

Equip Name / Unit No	Serial No	TP No	PM Date	Equip Type	Rating	Vol	Un	LS	KT	DOA	LFP	INH	ICP	FUR	PCB Class	PCB Date	Service History / Remarks
----------------------	-----------	-------	---------	------------	--------	-----	----	----	----	-----	-----	-----	-----	-----	-----------	----------	---------------------------

The following pieces of equipment tested require service work:

Chapleau D.S. / T3	C-01297-5-1	9000	09/30/14	Transformer / Oil	2500	2600	AC	UN	AC	AC	AC	AC	AC	AC	Non-PCB	09/30/14	Moisture Reduction Electrical Testing
--------------------	-------------	------	----------	-------------------	------	------	----	----	----	----	----	----	----	----	---------	----------	---------------------------------------

The following pieces of equipment require a monitoring interval shorter than one year:

Chapleau D.S. / T4	E-690953	9001	09/30/14	Transformer / Oil	3750	2150	AC	UN	AC	AC	AC	AC	AC	QU	Non-PCB	09/30/14	See Furan Data / Retest 6 Mo. Moisture Reduction Electrical Testing
--------------------	----------	------	----------	-------------------	------	------	----	----	----	----	----	----	----	----	---------	----------	---